PAST REMEDY REPORT
EPA COMMENTS

Section 4.5, Potential Exposure Pathways: This section draws conclusions about the likelihood of certain exposure pathways contributing significantly to health risks. The conclusions are not always supported or consistent with other sections of the report. For example, on page 13, the fourth bullet states that the most likely pathways of plutonium migration from 199 are wind and water erosion of surface soil. Also, the discussion on surface water and soils on pages 20-22 indicates that surface runoff may occur readily at IHSS 199 given the site conditions. Yet, section 4.5.3.2 on page 85 dismisses all pathways associated with the surface runoff release mechanism based on the assertion that it is not likely to produce any measurable amount of airborne plutonium. The possibility of ingestion of contaminated water and biotic uptake of contaminated sediments is not mentioned though these are credible pathways (the site conceptual model identifies them). Also, the report indicates that there is no intention to consider these pathways further in the RI. At a minimum, the report should be modified to include a justification for not considering the surface runoff pathways (e.g., the low soil levels are expected to be further diluted in the surface runoff, etc.) and a statement should be included that indicates these pathways will be examined further in the RI. As another example of text inconsistencies, in the excerpt from document D-8 on page 14, DOE appears to be relying on the conclusion from this disclosure as the basis for stating in section 3.1.2 on page 46 that plutonium is the only known contaminant of concern at 199. This is a problem because the data useability review in table A.18 rejects D-8 on every criteria evaluated. It is a very weak document on which to base a conclusion about contaminants of concern. To add to this problem, the text on page 46 states that radionuclides other than plutonium were measured in 1977 but these data do not meet the data useability requirements. However, none of the data meet the data useability requirement so why is DOE choosing to include Pu and Am but ignoring other radionuclides? A couple of suggestions to fix this problem:

1. Add text on page 14 which recognizes the weakness of document D-8 and refers the reader to the data useability review in the appendix. Delete the first sentence in section 3.1.2 on page 46. Change the text on page 46 to: For the purposes of this conceptual model and qualitative risk assessment, only plutonium and its decay product americium will be considered because..... (why?). Include a technically defensible reason.

or,

2. Modify the first paragraph of section 3.1.2 on page 46 by deleting the first sentence and modifying the third sentence to read, " Concentrations of a number of radionuclides other than

plutonium were measured in 1977 in IHSS 199 lawsuit acreage soil (see Appendix D). All of the existing data was reviewed for useability in a quantitative risk assessment. Only one report was found to be usable, the 1987 report by Rockwell International, "Remedial Action Program on Jefferson County Open Space Land in Section 7....Reservoir". However, this report only considered plutonium. Because of the identified problems with data useability, for the purposes of this conceptual model and the qualitative risk assessment in this document, only plutonium and its decay product americium are considered. Data for other potential radionuclides and non-radioactive contaminants if required will be developed during the future IHSS RI activities.

Page 64: The discussion on unit risk estimates is incorrect. Unit risk estimates are calculated by multiplying the slope factor by the inhalation rate or the water consumption rate and the duration of exposure in days. A dimensional analysis shows that the way it is written in the text does not make sense.

Page 68: The fifth line down states that the existing data indicate that the highest Pu concentration measured was less than 10 pCi/g but Table 4.2 reports values of 22.1, 25.1, and 12.7. The text needs to be corrected appropriately.

Page 72: Provide a reference for the second paragraph. The values reported in Transuranic Elements Volume 1 page 5.8 are:

d < .05mm will be resuspended
.05mm < d < 1.0mm will move by saltation
d > 1.0mm will creep

If this is the reference used for the paragraph, the values need to be corrected and the reference cited. If this not the reference used, cite the appropriate reference.

Page 85: The justification for excluding the soil ingestion pathway is not given. While the discussion appears to rely on the land use assumption, a clear statement to that effect is never made. Such a statement should be included along with supporting information about the current land use and existing restrictions. We are not convinced that the pathway should be excluded particularly since the risk assessment in the appendix indicates that ingestion of soil contributes 96.5% of the total risk in a recreational exposure scenario. Without conclusive justification for excluding this pathway, it must be evaluated.

Page 92: On the draft version, we commented specifically on the GI absorption factor for Pu. The HEAST lists a factor of 1.0E-04 for Pu-239 oxide. You should reference this value in this section. You should also note that the factor for Am-241 is 1.0E-03.

Sections 3.0 and 4.0: The only mention of americium is on page

46. None of the discussion of potential pathways considers americium fate and transport. Exposure pathways are dismissed as negligible without consideration of americium. There are two options which will correct this. Either include a discussion of americium in every instance that plutonium is discussed and provide separate rationale for inclusion or exclusion of an exposure pathway involving americium, or include an explanation at the beginning of section 3.0 (page 45) of what properties of americium caused you to exclude it from consideration. The discussion on pages 56 and 57 indicate that americium is potentially very important in a quantification of risk.

Appendix C.2: Table C.2 lists the three absolute risks as 1.3. It is assumed that these are mistyped and should actually read 0.13.

Page C-8: There are several references to the use of 30 years as a lifetime. This is incorrect. 30 years is used as an upperbound estimate of residence in one house, not lifetime. The text should be corrected to reflect this.

Page C-9: Item 6 provides a cancer potency slope factor for ingestion. The value provided is that for plutonium 239 oxide. The value for plutonium 239 is 10 times higher. The text should indicate that the value is for plutonium oxide.

Page 70: The last sentence on this page must be modified to read, "A physical examination of IHSS 199 and a review of available historical data for the current use of the site indicate that the primary transport media for plutonium to leave the IHSS 199 areas are air, surface water, groundwater, and biota (Figure 3-1). As it is currently written, the text is inconsistent with the discussion on page 42. On page 42 and elsewhere in the text, the contaminated soils of IHSS 199 are referred to as the source not the transport medium.

Page 71: The first paragraph on this page consistently refers to soil ingestion as a transport medium. Soil ingestion is an exposure route not a medium.

Appendix C: The assessment of vegetable uptake, based on Burley (reference not included in document), appears different than that of Baes et al in the 1984 DOE report, "A Review and Analysis of Parameters for Assessing Transport of Environmentally Released Radionuclides Through Agriculture ". EPA can provide a copy of this report to DOE upon request. The numbers in the latter report suggest that the generic calculations may overestimate Pu uptake into plants, and that excluding Am may ignore the major potential source of risk. However, the distribution coefficients from Burley may not be equivalent to the B_r and B_v parameters generated by Baes. A thorough comparative analysis of the Burley and Baes reports should be conducted, and some discussion of the

potential relative contribution from Americium should be presented.

Page 92: There is a double inconsistency in the f_1 (GI absorption) factors for plutonium. Not only are the reported values inconsistent with HEAST (ECAO thinks that HEAST is accurate), but the use of the slope factors from HEAST creates an internal inconsistency, since these slope factors are based on the HEAST f_1's. This needs clarification.

Appendix C: The dispersion and deposition modeling used in the generic risk assessment is not well described and cannot be fully evaluated. Either provide a well documented description of the models used, or use a simple model such as that of Moghissi et al (In "Dynamics, Exposure and Hazard Assessment of Toxic Chemicals, Haque R, ed. Ann Arbor Science. Chap 31):

$$C_{dep} = \frac{(D)\ (IF)\ (X)\ (DY)}{(k_2)\ (Y)}\ (1-\exp[-k_t\ (T)]$$

Where:
- D = chemical-specific deposition rate (g/m^2-year)
- IF = interception fraction
- X = conversion factor (1000 mg/g)
- DY = conversion factor (yr/365 day)
- k_t = weathering rate constant (day^{-1})
- T = growth period (days)
- Y = yield (kg/m^3)

This approach has been used in the region and seems to have some general acceptance. IF and k_t estimates are provided in the referenced Baes paper. D would be estimated with separate modeling. Some additional characterization of the deposition pathway should be done and a more thorough evaluation and presentation of the appropriate methods to be used should be included.

Also, there are included in some of the tables in this appendix some parameters which are irrelevant to the risk calculations (e.g. body weight, average daily intake, average lifetime, etc). Because of the way the slope factors for radionuclides are, calculation of risk is somewhat simpler than for non-radioactive substances. Although the calculations appear to have been done appropriately, the inclusion of these "extra" parameters is confusing. If they must be included, perhaps they can be summarized separately in a table which indicates inputs to slope factor calculations.