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Administrative
Record
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VII
726 MINNESOTA AVENUE
KANSAS CITY, KANSAS 66101

MAR 19 1992

David Adler
Former Sites Restoration Division
Department of Energy,
Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, TN 37831-8723

Dear Mr. Adler:

We have completed our review of the draft Baseline Risk Assessment (Assessment) for the St. Louis Site in Missouri. Our comments are divided into two major components: 1) comments on the human health risk assessment, and 2) comments on the ecological risk assessment, primarily from Chapter 6. Following are our comments:

HUMAN HEALTH RISK ASSESSMENT

1. The Assessment does not address ingrowth of radium-226 from decay of the abundant thorium-230 on site. Radium-226 is present throughout much of the St. Louis site at levels far below the concentrations that would reflect secular-equilibrium with the parent thorium-230. Consequently, the concentrations of radium-226 will increase as time passes, as will the release of radon-222 from the decay of radium-226. While the currently existing ratios of Th-230 to Ra-226 are somewhat uncertain, the ingrowth of radium-226 for a given ratio is highly predictable. If the ratio is 100, the radium-226 concentration will increase nearly 10-fold in 200 years, 36-fold in 1000 years. The radon generation levels will increase in proportion to the radium-226 concentration. Thus, in the "future" time frame normally considered for a CERCLA site, the no-action scenario would involve a complex process of increasing radon generation and release. At a minimum, the Assessment should recognize that the radium ingrowth question would have to be dealt with in any case where it is proposed to leave contamination in place.

2. Exposure point calculations were reported to be calculated as 95% upper confidence limit (UL_{95}) values of the arithmetic means for the measured radionuclides at each property (for radiation) and UL_{95} values of arithmetic means for chemical contaminants. However, the draft Assessment does not show the

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actual data used in the calculation or the method used to calculate the UL_{95}. Data presentations (tables in Section 2) may show a range and a mean, but do not permit following the actual calculation that was made. Both the data and the method of determining the UL_{95} should be provided.

3. Data for 17 separate SLDS buildings were combined into one data set, and a UL95 value for that data set was used to arrive at an exposure point concentration for radon exposure in buildings at the SLDS. Combining all the radon data (except for building K1E) to arrive at a single radon exposure point concentration is questionable. Radon concentration measurements for each building are representative of a concentration for each building, which is distinct from all the other buildings. The values for one building are not measurements of the same quantity as are radon measurements in other buildings. Further, there is no reason to believe a worker exists whose exposure time is divided equally among the 17 buildings for which data are included in the UL_{95} calculation. Assuming workers at the SLDS follow a usual pattern of working all day in one building, the associated risks can be calculated only by use of a value (e.g., UL_{95}) determined for that particular building from all of the data for that particular building. Similar treatment of building K1E would permit determination of a UL_{95} value for radon concentration in that building, which could then be used to estimate risks based on time that may actually be spent in that building by workers at the SLDS.

4. Table 2-16 lists those chemical contaminants reportedly deleted from the Assessment. Yet several of those contaminants are listed in Table 7.1 as contaminants of concern. Clarification is needed. If DOE plans to delete any contaminants addressed in the draft Assessment from the draft final Assessment, EPA should be contacted beforehand.

5. As described in Subsection 3.3.1.3, Exposure Point Concentrations for the Inhalation of Particulates, the draft Assessment estimates dose from inhalation of both chemical contaminants and radionuclides in airborne dusts. The approach used was to adopt a value of 0.08 mg soil (30% respirable) per cubic meter of air, from historical data on airborne dust concentrations in St. Louis. This dust was then assumed to contain the contaminants of interest at the same (UL_{95}) concentrations as those found in soil on the site. The resulting dose estimate is not a dominant portion of the total estimated dose for any receptor, but can be significant in terms of overall CERCLA goals. For example, the radionuclide carcinogenic risk from this source for the SLAPS/HISS maintenance worker is greater than 2×10^{-4}. This method of estimating dose from inhaled particulate may yield an

estimating dose from inhaled particulate may yield an overestimate. This is because the particulates measured in urban air do not come primarily from the soil on the plot of ground where the concentration is measured. DOE should investigate whether some of the modeling methods referenced in EPA risk assessment guidance can yield more reasonable estimates of exposure by this route.

6. Subsection 3.3.2.2 deals with Exposure Point Concentrations for the Inhalation of Contaminants from Groundwater. The second paragraph states that, "Exposure to radon gas via inhalation from groundwater was not assessed because exposure to radon is primarily the result of the migration of radon from soil into homes. In addition, concentrations of radium-226 in groundwater were low so that the contribution from this source would be small compared with the contribution from soil (Table 3.20)." Neither of these statements is supported in the Assessment, and neither is a valid reason for not dealing with radon exposure in a shower using ground water. Radon concentrations in ground water do not result primarily from radium-226 dissolved in the ground water, but rather from radium-226 in the soil. In some locations where high levels of radon in soil prevail, ground water use is recognized as an important contributor to the radon levels within a home where ground water wells provide household water. The State of Maine, for example, recommends remedial action for ground water radon concentrations exceeding 10,000 pCi/L. Concentrations well over 100,000 pCi/L are seen in Maine ground water, not accompanied by similar levels of dissolved radium. In the implementation of those recommendations, the groundwater radon concentration is seen to have a major effect on the house air radon concentrations. This issue may be difficult to address, in that there appears to be no information on ground water radon concentrations at the St. Louis Site. However, the Assessment needs to deal with the issue in a credible manner.

7. Contamination that may have been transported via ground water or surface water into the Mississippi River has not been assessed, and is deemed insignificant (Subsection 3.2.2) for two reasons: (1) contaminants in water would be diluted to insignificance, and (2) if detectable contamination exists in Mississippi River sediments adjacent to the site, there would be no exposure to these sediments because the river near the SLDS is deep and relatively fast flowing and is not used for swimming or wading. However, this discussion is silent on the question of fishing, although the draft Assessment elsewhere (page 3-12) recognizes the possibility of accessing the Mississippi River at this point for fishing. The Assessment should deal with the potential for exposure via catching and consumption of bottom feeding fish, which will be of concern to the public.

8. In Subsection 3.3.2.2, Exposure Point Concentrations for the Inhalation of Contaminants from Groundwater, third paragraph (page 3-22), it was assumed that 50L (roughly 13 gallons) of water would be used per shower. According to the U.S. EPA Exposure Factors Handbook 1989 (EPA/600/8-89/043), the median shower duration is approximately 7 minutes and the 90th percentile is 12 minutes. In addition, shower flow rates may range from 5 to 15 gallons per minute. Therefore, the amount of water used per shower would be more in the range of approximately 130 gallons per shower, rather than 13 gallons. Further, the assumption that 50% of the contaminant will volatilize is inconsistent with Henry's Law calculations for many volatile organics of low solubility, which indicate that nearly all will volatilize. Clarification is needed.

9. We disagree with the deletion of ingestion as a pathway for residents of the vicinity properties. It seems possible that children might play and gardens might be grown in contaminated areas, even if those areas are near the roadways. This pathway needs to be more fully addressed in accordance with EPA guidance, and support of any assumptions used provided.

10. Carcinogen slope values for benzo(a)pyrene are listed in the HEAST, Annual FY-1991. However, the Superfund Public Health Evaluation Manual (SPHEM, 1986) is cited as the source for benzo(a)pyrene toxicity values in Section 4.2.2.2, Chemicals for Which No EPA Toxicity Values Are Available (page 4-13). It is inappropriate to utilize toxicity values listed in the SPHEM because a number of the toxicity values in this publication have changed since 1986. Rather, the U.S. EPA Environmental Criteria and Assessment Office, Superfund Health Risk Technical Support Center in Cincinnati, Ohio, should be consulted for current guidance in instances where toxicity values are unavailable for a particular chemical of concern.

    In addition, Table 4.1, which lists toxicity values for the chemicals of concern, cites the HEAST from 1990 as an information source. The most current HEAST available was published in January 1991 [OERR 9200.6-303(91-1), Annual FY-91]. The most recent version of the HEAST should be used to determine toxicity values for use in the Assessment.

11. The most recent version of the Lead Uptake/Biokinetic Model was prepared by the U.S. EPA in January 1991 ("Technical Support Document on Lead," and the associated Program disk and "Users Guide for Lead: A PC Software Application of the Uptake/Biokinetic Model, Version 0.5, " January 1991). The specific site-specific parameter values employed in the uptake/biokinetic modelling for the current and future use scenarios described in Sections 5.2.1 and 5.2.2, respectively, should be provided.

12. The risk characterization results for the future use scenario are not presented in a manner which is consistent with that of the current use scenario results. The numerical risks calculated for the various receptors are not stated or summarized in the text. The text merely states that the risks are " . . . greater than the target range . . ." in Subsection 5.2.2, Hypothetical Future Site Use (page 5-10). The results should be clearly summarized such that the reader will be able to easily determine the relative magnitude of the risks compared to the target risk range.

13. In Table 2.10, several instances are noted where mean values are listed for substances whose detection frequency was zero. Footnote "a" to that table provides the only clue to the possible meaning of such a mean value; it appears that the "mean" listed is a mean calculated from each non-detect sample, using a limit-of-detection value. However, the substances with "0" detection frequency include sodium and potassium, for which mean values are listed that are far below the background levels listed in the same table. The result is a confusing picture, which should be clarified.

14. Subsection 3.3.2.2, page 3-22, discusses exposure point concentrations for the Inhalation of Contaminants from Groundwater. The subsection states that exposure was only assessed for volatile organic compounds with molecular weights greater than 200. It appears that the authors must really have intended this sentence to read " . . . molecular weights less than 200 . . .". Correct?

15. Subsection 3.4.1.1, pages 3-26, 3-27, discusses exposure time, frequency, and duration. The current and future residential scenarios assume an exposure duration of 30 years. However, the child commuter (waiting for school bus) is only assumed to be exposed for 9 years. It seems possible that a child would commute to both elementary and high school for a total duration of 12 years.

16. Subsection 3.4.1.3, page 3-28, discussing ingestion rates, proposes a factor of 0.4 to account for the percentage of outdoor dust transported indoors. This factor is unsupported in the text. The Assessment should state the derivation of the value.

17. Table 3.24, page 3-77, 3-78, gives the exposure frequency for the SLAPS/HISS maintenance worker as 200 days per year. Elsewhere it is explained that this 200 days represents a summation of days required for maintenance at HISS and days required for maintenance at SLAPS. However, the normal work year is 250 days. It should be explained whether this person is away from the site on the remaining 50 work days.

18. Subsection 3.4.2.5 and 3.3.1.4 discuss exposure from ingestion of home-grown produce. Tables 5.22 and 5.23 (pages 5-43, 5-44) present the estimated risks from this source. The doses were calculated on the basis of soil-to-plant transfer factors, which were developed primarily for assessing the maximum exposures that might occur from weapons testing fallout. Does DOE have any additional information which would further support the validity of the approach used, e.g., have the soil-to-plant transfer factors given in Table 3.17 ever been used together with known soil concentrations to calculate levels of toxic metals in food crops?

19. Table 4.2, on pages 4-10 and 4-11, lists a footnote "d" for the benzo(a)pyrene slope factor listing. No footnote "d" is found along with footnotes "a" through "c". In addition, the exponent for the slope factor units is missing, i.e., "$(mg/kg-d)^{-1}$", not "(mg/kg-d)"

20. Table 2.14, Grouping of Radionuclides. Under "Associated Decay Products of Radium-226," "Plutonium-218" should be "Polonium-218."

21. A concentration-toxicity screening for selection of chemicals of concern is described on page 2-25, and referenced repeatedly in Table 2.16, Chemical Contaminants in Soil and Sediment Deleted from the Risk Assessment, as rationale for elimination of many contaminants. However, tables detailing the toxicity values utilized in the screening, sources for the toxicity values [i.e., the Integrated Risk Information System (IRIS) or the Health Effects Assessment Summary Tables (HEAST)], and the results of the concentration times toxicity calculations are not provided in the draft Assessment. Such information should be included.

    Further, the last paragraph in Section 2.5.2 (bottom of page 2-25) states that toxicity values were unavailable for some of the compounds. However, according to the HEAST [U.S. EPA OERR 9200.6-303 (91-1), January 1991], toxicity values [reference doses (RfDs) and cancer slope factors (CSFs)] are available for some of these compounds, as follows:

Chemical	Toxicity Value
Acrylonitrile	Oral CSF = 5.4E-1 $(mg/kg/day)^{-1}$ Inhalation CSF = 2.4E-1 $(mg/kg/day)^{-1}$
2-Butanone	Oral RfD = 8.0E-2 mg/kg/day oral for chronic and subchronic endpoints for methyl ethyl ketone.
Chloroethane	Inhalation RfD = 1E+1 mg/m^3 for chronic and subchronic endpoints for ethyl chloride
4-methylphenol	Oral RfD = 5.0E-2 mg/kg/day for chronic endpoints and 5.0E-1 for subchronic endpoints for p-cresol.

In Table 2-16 (page 2-57) which details the rationale for eliminating chemicals from further consideration in the Assessment, the reason for deleting chemicals which do not have appropriate toxicity values (for example, acenaphthylene, benzo(g,h,i)perylene) is attributed to insignificant contribution to the overall risks based on the toxicity-concentration screen. However, these chemicals could not be evaluated quantitatively in the toxicity-concentration screen. The rationale for deletion should be reworded to state that such chemicals could not be evaluated in the toxicity-concentration screen.

22. In Section 2.4.4, Comparison of Site Contaminant Levels with Regulatory Standards, available criteria, standards and/or regulations pertinent to the sampled environmental media are described. Federal Ambient Water Quality Criteria (FAWQC) for the protection of aquatic organisms are requirements which could be utilized for comparison with the surface water data from Coldwater Creek.

23. U.S. EPA "Guidance for Data Usability in Risk Assessment" (EPA/540/G-90/008, OSWER Directive 9285.7-05, October 1990) should be cited in Section 2.5, DATA EVALUATION, as a resource for the evaluation of data for use in the draft Assessment.

24. Dermal exposure to chemicals in soil and water is not addressed in a quantitative manner in the draft Assessment. However, this is in contrast to the U.S. EPA guidance (U.S. EPA Human Health Evaluation Manual, 1989, and U.S. EPA Interim Guidance for Dermal Exposure Assessment, OHEA-E-367, March 1991), which state that dermal exposure can and should be evaluated quantitatively. Calculated dermal absorbed

doses are compared to adjusted oral toxicity values (administered oral doses which have been converted to absorbed doses).

Carcinogenic PAHs are not typically evaluated with respect to risks associated with dermal contact because these compounds cause skin cancer through a direct action at the point of application. Therefore, it would be inappropriate to employ an adjusted oral slope factor in the case of carcinogenic PAHs. In other cases, however, the Assessment should deal with chemical exposure through dermal absorption.

ECOLOGICAL RISK ASSESSMENT (Chapter 6)

25. It appears that DOE either has not researched regional literature or has not applied that information to the ecological risk assessment. Our comments assume that on-site ecological sampling and analysis are not necessary at this time, but may be, depending upon literature-derived data to be obtained.

26. As described in RAGS II there are generally five sections that are included in an ecological risk assessment: Hazard Identification, Receptor Characterization and Endpoints, Stress-Response Assessment, Exposure Assessment, and Risk Characterization. A more complete treatment of these sections, in accordance with EPA guidance, is needed. At a minimum, DOE needs to research available literature to determine how much information already exists and apply that information to the ecological risk assessment.

27. Because DOE apparently has not conducted any on-site ecological surveys or investigation, the 1987 Corps of Engineers (COE) report cited in the references was reviewed as a source for site and vicinity biota information. Using the COE report as a starting point, we believe the following improvements to Chapter 6 of the Assessment need to be made:

    a) The COE study is nearly six years old. The state of ecological conditions may have changed significantly over that period of time. Whether or not a significant change in ecological conditions has occurred needs to be verified.

    b) The study states that there are small lakes and ponds in the vicinity of Coldwater Creek. These are not discussed or described in the draft Assessment. The Assessment should state whether there are any small

lakes or ponds on the DOE properties. In addition, any small lakes or ponds situated in an area that would be impacted by contaminants from the DOE properties should be noted.

c) Many areas of potentially important biota habitats are listed in the COE report:

- Urban area with some (or significant) vegetation - 2,000 acres.
- Forest (deciduous) - 1,118 acres.
- Forest (coniferous) - 17 acres.
- Open space with scrub-scattered trees - 800 acres.
- Open space with only grasses - old fields - 919 acres.

The size, location, importance and potential impact to these areas are not discussed in the draft Assessment. The Assessment should identify whether any of these biota habitats exist on the DOE properties or whether any such habitats are situated in an area which would be influenced by contaminants from the DOE properties.

d) The COE report lists 65 acres of wetlands in the vicinity of Coldwater Creek. The type, location and quality are not discussed. The assessment of wetlands in the report was conducted before current wetland regulatory guidance and assessment manuals were developed. Therefore, wetland determinations on the DOE properties should be performed using current guidelines. Also, the presence and type of wetlands in the vicinity of the DOE properties should be obtained from National Wetland Inventory maps. Any wetlands situated in areas which could be influenced by contaminants from the DOE properties should be included also.

e) The COE report recommends that site-specific investigations be performed for threatened and endangered (T&E) and other state-listed sensitive species. The draft Assessment does not discuss state-listed species. At a minimum, information on T&E species should be obtained from the Missouri Department of Conservation, Natural Heritage Inventory program.

f) The COE report states that 19 benthos taxa and 6 fish taxa were located in the survey of Coldwater Creek. This does not agree with the number reported in the draft Assessment. The Assessment should state how the benthos and fish toxic data were determined. Additionally, taxa found are presented in tables in the COE report. These tables and taxa are not presented in

the draft Assessment. The number of individuals of some species was presented, but the numbers were not discussed in the draft Assessment.

g) The report states that Coldwater Creek has low species diversity, but that high numbers of those taxa are present. The draft Assessment does not state this. Instead, it leads the reader to believe there is low diversity and low numbers of those taxa present. The Assessment should state how the determination of low diversity and low numbers was made for the ecological risk assessment.

h) The COE report lists trees, shrubs, mammals, birds, reptiles and amphibians as being present at Coldwater Creek. The list is much longer and is not in agreement with those listed in the draft Assessment. The Assessment needs to incorporate the names of the additional species present as identified by the Corps and to provide a discussion of how species that do not appear in the 1987 Corps report were identified for the draft Assessment.

i) The COE report states that the area downstream of the site is more natural and rural, with more wildlife habitat present. A discussion of potential impacts to these areas by site releases is warranted.

28. Because a metal is essential to humans is not a reason to assume it would not pose a threat to ecological systems. Though the metals mentioned may not be a human risk until higher concentrations are attained, they may be toxic or stressful to biota at current levels. The Assessment should address this issue.

29. The toxicity screening of contaminants appears to be based on human toxicity only. Screening for ecological toxicity should be addressed.

30. Factors used to determine potential human exposure pathways are provided, but factors for ecological pathways are not.

31. The contaminants of concern are not defined within Section 6 but should be.

32. The conclusions presented in paragraph 2 on page 6-5 are not supported by data. For example, justification for conclusions regarding the terms "extremely low biota diversity", dominant invertebrates, invertebrates present, "limited populations", fish present and level of concentration are not substantiated in the text. The supporting information should be provided. Also, paragraph

3 on the same page would benefit from expansion. It appears that the information contained in the report by Peterson and Girling may be of more importance to the site than is indicated by the short discussion here. Finally, in paragraph 4 of page 6-5 please explain exactly what is meant by the term "ecologically vital groundwaters".

33. Appendix B should be reviewed to ensure that information presented on the contaminants of concern includes information of ecological importance. For example, BCFs should be presented, and there is no discussion of impacts to biota from cadmium, copper, and chromium. Where site concentrations of contaminants are in the range of possible ecological impacts (e.g., thallium), analysis and clarification is warranted.

Should you have any questions regarding our review, please do not hesitate to contact me at FTS 276-7709.

Sincerely yours,

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Site Assessment and Federal
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cc: David Bedan, MDNR