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September 8, 2010

Eric Gilstrap, PE
Federal Facilities/Hazardous Waste Program
Missouri Department of Natural Resources
917 N HWY 67, Suite 104
Florissant, MO 63031

Re: Department of Health and Senior Services comments on the document Westinghouse Electric Company, Hematite Decommissioning Plan, Revision 0.0, August, 2009.

Dear Mr. Gilstrap:

The Department of Health and Senior Services (DHSS) received your request to comment on the decommissioning plan (DP). Specifically, you requested that DHSS limit our evaluation to development of derived concentration guideline levels (DCGLs). Therefore, our review of the DP is mainly limited to Sections 4 and 5. General comments followed by section-specific comments are provided below.

A) General Comments

1. DHSS requests that the licensee provide supplemental information to the Decommissioning Plan and Record of Decision demonstrating that the post cleanup combined risk resulting from residual contamination meets the National Contingency Plan (NCP) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements to be protective. Guidance regarding the matter is given within the Environmental Protection Agency (EPA) document titled *Establishment of Cleanup Levels for CERCLA sites with Radioactive Contamination*, OSWER No. 9200.4-18, August 1997. The following are examples of content within this directive that are related to this request:

    i. Cleanups should generally achieve risk levels in 10^{-4} to 10^{-6} range.

    ii. Guidance that provides for cleanups outside the risk range (in general, cleanup levels exceeding 15 millirem per year) is not protective under CERCLA and generally should not be used to establish cleanup levels.

    iii. Cancer risk from both radiological and non-radiological contaminants should be summed to provide risk estimates for persons exposed to both types of carcinogenic contaminants. Although the risks initially may be tabulated separately, risk estimates contained in the proposed and final site decision documents (e.g., proposed plans, Record of Decisions (RODs), Action Memos, ROD Amendments, Explanation of Significant Differences (ESDs)) should be summed to provide an estimate of the combined risk to individuals presented by **all** carcinogenic contaminants.

B) Section-specific Comments.

1. Section 1.4, *Decommissioning Objectives*, and Section 1.5 *Site-specific DCGLs* specify compliance with 10 CFR 20.1402, *Radiological Criteria for Unrestricted Use.* We recommend these sections to also reference supplemental information that documents protectiveness under the NCP and CERCLA as described within, *Establishment of Cleanup Levels for CERCLA sites with Radioactive Contamination*, OSWER No. 9200.4-18, August 1997.

2. In Section 1.4, the licensee should identify the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) as guidance to be utilized for planning, conducting, evaluating, and documenting environmental radiological surveys. The decommissioning process should include the final status surveys to demonstrate compliance with cleanup regulations.

3. In Section 1.5, please discuss any plans to allow soils that are inaccessible to remain without being evaluated.

4. In Section 3.6, *Surface Water Hydrology*, bullet point one, note the inconsistency between spring flow in gallons per year and notation of gallons per minute in parentheses. Please revise for consistency.

5. In Section 4.0, *Radiological Status of Facility*, Uranium-236 (U-236) was ruled out as a radionuclide of concern (ROC) in *Derivation of Surrogates and Scaling Factors for Hard-To-Detect Radionuclides*. A surrogate DCGL developed to account for Uranium-235 (U-235) and U-236 may be appropriate. If so, U-236 must also be accounted for in the gamma survey. Please address this in the revised DP.

6. Section 4.1.2, *Background Levels*, regarding use of the term roentgen, in accordance with 10 CFR 20.2101 (a), each licensee shall use the units including curie, rad (radiation absorbed dose), and rem (roentgen equivalent man), including multiples and subdivisions, and shall clearly indicate the units of all quantities on records required by this part. The terms curie, rad, rem, and multiples and subdivisions must appear in all records required by Part 20 or only in those records that specifically deal with activity, absorbed dose, or dose equivalent.

7. Section 4.2.1, *Radionuclide Present*, notes that selection of radionulcides for dose assessment was determined as part of the Hematite Radionuclide Characterization Report (HRCR). Because DHSS has not had the opportunity to review and comment on that document, comment provided in this letter is limited to the assumption that the HRCR is correct. This includes reference to exclusion of U-236 as a ROC in *Derivation of Surrogates and Scaling Factors for Hard-To-Detect Radionuclides* based on hypothesis testing that showed U-235 and U-236 were indistinguishable from each other using alpha and gamma spectroscopy analyses.

8. Section 4.2.2, *Background Levels*, states that assessment of background was performed as part of the HRCR. Please note that DHSS has not had the opportunity to review the HCRC.

9. According to Section 4.3.1, *Radionulcides Present*, "Bismuth-214 was identified in low concentrations in two scale samples from drains in Building 230, indicating the potential presence of radium-226 (Ra-226). However, the concentrations were less than one percent of the uranium concentrations and the operations conducted in the Building 230 did not involve Ra-226. Therefore, Ra-226 was not included as a radionuclide of concern (ROC) in buildings." The degree of binding of bismuth-214 to plumbing can only be loosely correlated to the concentration

of uranium or Ra-226 to indoor surfaces. Therefore, it may be appropriate that Ra-226 be retained as a ROC for the site buildings. Please address this in the revised DP.

10. In Section 4.3.4, *Radiation Levels*, MARSSIM should be referenced for designation of land classification. For the gamma survey, this will designate the percentage of area required to be covered.

11. In Section 4.3.5, *Contamination Levels*, the lognormal 99-percentile of background data is being used for the concentration for total uranium and Ra-226. These upper limits based upon background are used as estimates of background threshold values, compliance limits (*CL*), or not-to-exceed values. These upper limits are often used in site (point-by-point) versus background comparison evaluations. See EPA's ProUCL Version 4.00.04, User's Guide, EPA/600/R-07/038, February 2009, for more information on development of background data.

    According to the EPA document *Engineering Forum Issue: Determination of Background Concentrations of Inorganics in Soils and Sediments at Hazardous Waste Sites*, EPA/540/S-96/500, December 1995, the mean of the background concentration should be used as the central value when being subtracted from the site concentrations.

    Outlier analysis is also required before a central value (i.e. mean) can be estimated. See EPA document *Guidance for Data Quality Assessment, Practical Methods for Data Analysis*, EPA QA-G9, July 2000, for an approach to evaluating datasets.

    For technetium-99 (Tc-99), the reported values less than the minimal detectable concentration (MDC) for all Tc-99 analyses in soil provided in the HRCR were assessed as a statistical population. The threshold value for Tc-99 was calculated to be 1.2 pCi/g (nonparametric 99-percentile of the population). This value must be assessed in RESRAD for dose and risk prior to selection of the background value. Uncertainty associated with use of the MDC in place of a potentially lower concentration found in nature must be discussed.

12. Section 4.3.5.1, *Surface Soils*, references threshold values within Section 4.3.4. The only "threshold values" in Section 4.3.4 are gamma background scan results. If this is the intended reference, no further questions. If other values are being referenced and were left out of 4.3.4 or if this is the incorrect reference, please revise accordingly.

13. As a note for Section 5.0, *Dose Modeling*, RESRAD Recycle software is available to model dose and risk for pipes and other building materials.

14. In Section 5.0, there is no conceptual exposure model provided. DHSS recommends that a model that demonstrates sources, affected media, transport mechanisms, secondary affected medial, and exposure pathways for each receptor be provided. A sample is available in the EPA document *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA*, EPA 540/P-91/001, OSWER 9355.3-11, February 1991. This will aid with identification of exposure pathways for both radiological and non-radiological contaminants.

15. In Section 5.0, to assess the additivity of risk for radiological and non-radiological contaminants, exposure scenarios from the RI should be discussed.

16. In Section 5.2, *Radionuclides of Concern*, the footnote on page 5-3, which notes associated radionulides, does not define or reference a listing of the daughters included for those noted as "D", for short-lived progeny. A listing should be provided.

17. In Section 5.3.1, *Critical Group*, land use is being evaluated for a one-hundred year duration period. Consistent with the requirements of NUREG 1757, the 100-year timeframe is only for estimating future land uses; the licensee must evaluate doses that could occur over the 1000-year time period specified in the license termination rule. Please revise accordingly.

18. Section 5.3.1 states that radon will not be assessed in the dose/risk assessment. According to 40 CFR Part 61, *National Emission Standards for Hazardous Air Pollutants*, radon must be addressed.

    DOE Order 5400.5, *Radiation Protection of the Public and the Environment*, February 1990, Chapter 4, *Residual Radioactive Material*, Section 4, *Guidelines for Residual Radioactive Material*, Subsection b, *Airborne Radon Decay Products*, states that generic guidelines for concentrations of airborne radon products shall apply to existing or habitable structures that are intended for release without restriction. This includes site-related and background concentrations not to exceed 0.02 Working Level, or approximately 4 pCi/L. Risks associated with a concentration of 4 pCi/L (assuming residential exposure) is well above the CERCLA target risk range, and even small fractions of the guideline can produce risks on the order of 10^{-4}. Therefore, DHSS requests that this requirement apply to current and future exposure scenarios, with the radon pathway turned on when using RESRAD. Direct measurements of indoor air prior to release of the property are highly recommended.

19. In Section 5.3.3.1, *Contaminated Zone*, please describe the purpose for estimating the Deep CSM, assuming a 1.5 meter soil cover, as it relates to a remedy or remedial action.

20. According to Section 5.3.3.1, *Contaminated Zone*, demonstration of compliance with the Uniform DCGL is simply a comparison of the DCGL to the average concentration of residual contamination regardless of the depth of the contamination. DHSS recommends that the 95% upper confidence limit (UCL) be utilized as the average for exposure point concentrations (EPCs) for radionuclides. The 95% UCL should be equally applied for all EPCs for each of the CSMs.

21. In Section 5.3.3.1, soil geometries should be assigned to survey units. This is the only foreseeable way to allow for properly selecting the appropriate geometry for a given area and contaminant source (i.e. Ra-226 Impacted Area). A graphical presentation of the units and applicable geometries should be provided as an appendix to this section.

    Also, the term "cover" can conceivably have more than one connotation. Are we to assume that this is clean backfill, site soils that are contaminated and uncontaminated, or both? Please discuss in the DP.

22. According to Section 5.3.3.2, *Site Hydrogeology*, a survey of 721 private drinking water wells, 38 public wells, and 4 industrial wells within a 5-mile radius of the Hematite Site provided no documentation to indicate that any of the wells are completed in overburden. If utilizing DNR's database, wells drilled prior to 1987 and driven or dug wells were not regulated, and therefore may not be included in the list. Note this limitation in the text. If these can be located, please add to the list of wells.

23. In Section 5.3.4.3, the results for the Partial Rank Correlation Coefficient (PRCC) reported in the Regression and Correlation Output (for the peak of the mean dose time) in the RESRAD Uncertainty Analysis Report were used to determine the parameter sensitivities. According to NUREG 6676, *Probabilistic Dose Analysis Using Parameter Distributions Developed for RESRAD and RESRAD-Build Codes*, all of the correlation statistics should be utilized. Provide the logic as to why PRCC was given primary consideration.

24. In Section 5.3.4.4, *Selection of Sensitive Parameter Values*, the distribution coefficient (Kd) has been estimated based upon lines of evidence including the PRCC. The Kd value should be validated using RESRAD and site-specific groundwater results and site-specific estimates of the time since placement of material, solubility and leach rate parameters.

25. In Section 5.3.5, *Soil DCGL Calculations*, please clarify the statement "Note that the concentration of U-235 in soil at the time of license termination will be lower than the listed DCGLs because of the presence of U-234, and to a lesser extent U-238, and the required application of the unity rule when demonstrating compliance." Specifically, explain how the concentration of U-235 correlates to U-234 and U-238, as U-235 is not a progeny of U-238, or in the decay series of U-234, and thus is a relic of the enrichment process.

26. According to Section 5.3.6, *Alternate Scenario-Excavation*, the alternate DCGLs were calculated by simply multiplying the concentration in Table 5-11, Column 3 by a factor of two to account for the mixing with the assumed 1.5 m clean cover soil during excavation. This assumption may be construed as allowing for mixing of hazardous waste for the purpose of reducing the concentration, which may be regulated under the Missouri Hazardous Waste Management Law and Resource Conservation and Recovery Act (RCRA) regulation. At a minimum, the state and federal hazardous waste regulatory requirements are ARARs at this site. Also, model assumptions from for soil types may be altered. For these reasons, DHSS recommends that the Column 3 values not be adjusted.

27. Section 5.3.6 is unclear as to how excavated contamination will be represented for the Surface, Root, and Uniform soil geometries. The term "cross-check" is used, which in itself is not defined. Essentially, this section does not clearly identify how subsurface contamination will be assessed for the aforementioned geometries and what the new DCGLs will be given EPCs will change when subsurface contamination is brought to the surface. As it appears, contaminated subsurface soils will be combined with uncontaminated surface soils (using the Deep soil geometry). If this is the only scenario, DHSS is concerned that contaminated surface soils may be comingled with deep soils brought to the surface for a hypothetical excavation, requiring DCGLs that are representative of higher EPCs in the surface soils. Again, as noted in comment 23 above, DHSS recommends that survey units be defined to address this type of issue.

    Therefore, DHSS recommends utilizing a survey unit approach, the survey unit 95% UCL, and an area equal to 0.5 acres, as recommended as a residential lot size in EPA's *Soil Screening Guidance for Radionuclides: Users Guide*, EPA/540-R-00-007, October 2000 (SSG). Also, please discuss and allow for unforeseen modification to soils that may expose the Deep CSM material to include land contouring for walk-out basements.

28. Regarding Section 5.3.7, *Area Factors*, please explain why the method used for calculating area factors (AFs) for the other CSMs is not directly applicable to the Excavation DCGLs for soil greater than 1.5 m deep. Also, please provide the $DCGL_{EMC}$ that are to apply for the Excavation scenario. Finally, regarding Table 5-13, *Area Factors for Soil Contamination*, explain why area

factors are not calculated for the Deep soil geometry? Lacking AFs, how will $DCGL_{EMC}$ be determined?

29. In Table 5-7 to 5-12, referenced in Section 5.3.7, DCGLs for uranium must be evaluated to consider non-carcinogenic effects. The more conservative of the carcinogenic and non-carcinogenic cleanup goals should apply.

30. In Section 5.3.7, *Area Factors*, the area factor (A_m) proposed is for a hypothetical basement floor area in RESRAD. First, it is unclear what is meant by the statement "Therefore, the AFs for soil at depths greater than 1.5 m are defined as the range of values that satisfy the requirement that the area weighted average concentration over a 200 m^2 does not exceed the Excavation DCGL."

    Second, the calculations are to be performed assuming a clean cover adjacent to the disturbed area. However, it is unknown whether surface soils are contaminated in areas adjacent to soils being evaluated for the Deep Soil conceptual model. Please discuss the potential for excavations occurring in areas with contaminated surface soils. If contamination exists, DHSS recommends utilizing a survey unit approach, the survey unit 95% UCL for ROC EPCs, and an area equal to 0.5 acres, as recommended as a residential lot size in EPA's SSG.

31. In Section 5.3.8, *Ground Water Dose to Source Ratio*, the calculation time factor has been set to 1 year only. Elaborate as to why 1 year was chosen, given the peak dose to source ratio (DSR) may occur beyond one year. Specifically address the effects on associated nuclide concentration for groundwater while considering variation in activity of associated radionuclides, and the effects on dose and risk. Note that this DSR should only apply to a current exposure scenario; a future scenario should be provided using RESRAD predictions over a 1,000 year period.

32. In Section 5.3.8, *Ground Water Dose to Source Ratio*, the estimated DSRs appear not to address associated radionuclides. Given RESRAD summary reports provide dose only from the principle radionuclide for the water-dependent pathway, and the concentration report presents concentration of both principle and associated radionuclide, a DSR for associated radionuclide cannot be determined in the manner presented in this section. Also noting that the concentration report indicates that the concentration of principle to associated radionuclide is not in equilibrium in the groundwater media, explain how the DSR calculations will be usable to address associated radionuclide. Please discuss how the concentration was derived for each DSR, considering the concentrations of principle radionuclide differ from associated radionuclide, while the dose equivalents assumes the presence of both.

33. In Section 5.3.8, when discussing the purpose of generating DSRs for groundwater, what is meant by the statement "To determine the significance of the potential existing groundwater"? Please clarify.

34. In Section 5.4.1, *Critical Group and Exposure Pathway*, the industrial worker is the only receptor proposed for this site. First, a current and future exposure scenario should be provided. Second, a female that is pregnant should be qualitatively discussed. Third, consider the potential for exposure to a maintenance worker; one who has the highest-end contact with building and equipment surfaces, including cleaning. This person will also have exposure to indoor and outdoor contamination. A conceptual exposure model is recommended to illustrate receptors and pathways of exposure.

35. In Section 5.4.1, for clarification, the exposure pathways for external dose should include both removable and non-removable fractions. Non-removable fractions include that fraction sequestered into building materials and surfaces due to painting and absorption into structural materials (i.e. concrete).

36. In Section 5.4.1, a building renovation scenario is not discussed. Is this a probable future scenario for this site? If so, NUREG/CR-5512 provides guidance on this scenario.

37. In Section 5.4.2, *Conceptual Site Model*, the assumption is that daily activities would include light commercial work and occupancy without deliberately disturbing the residual surface contamination. This is unrealistic to assume, and thus will eliminate dust generated during cleaning. As this is a sensitive parameter as defined by NUREG 6697, and other modifications to the RESRAD-Build parameter list have been requested (i.e. adding additional rooms), EPA's EFH provides an alternative value of 3.0E-05, based upon particle distributions of 1 to 5 micrometer (μm) size particles. This particle range coincides with dosimetry models used to develop dose equivalents, noting that 1 and 5 μm are the default sizes used in International Commission on Radiation Protection (ICRP) Publication 30 and Publication 68, respectively. Please revise accordingly.

38. In Table 5-16, *RESRAD-Build Input Parameters*, *Small Office and Warehouse*, the ingestion rate should be 1.12E-04 m^2 per hour, not 1.0E-04, in the quoted literature source.

39. Regarding Table 5-16, DHSS assumes that the calculations are being performed as an area source, not a volume, line, or point source. If an area source, please discuss effects from painting or other wall coverings, as discussed above. Also, can it be verified that 10% or less is removable fraction? Please discuss.

40. In Table 5-16, the number of rooms is set to 1. If there is more than one room that is contaminated, include it in the RESRAD run. The identification of more than one room in which a source is located affects the air pathways and the indirect ingestion pathway. Define whether source is volumetric, area, line, or point source.

41. In Table 5-16, the dose/risk library chosen is the FGR 11. This includes use of FGR-13 cancer slope factors. DHSS recommends utilizing the HEAST 2001 library, which includes FGR 11 and FGR 12 dose conversion factors, the same as the FGR 11, yet utilizes HEAST slope factors.

42. In Section 5.4.3.2, the source lifetime factor is not consistent with the recommendations of NUREG 6697. The most likely value presented in this guide is 10,000 days.

43. In Section 5.3.4.2, the small office building exchange rate has been set to 0.83 per hour. The licensee needs to provide documentation confirming this exchange rate for the buildings will continue on site after the remedy.

44. In Section 5.3.4.2, the proposed deposition velocity (DV) value of 8.07E-05 exceeds most of the tabled values within NUREG-6697, and is at the lower end of the distribution curve. In lieu of no site-specific data, DHSS recommends use of NUREG-6697 Table 7.5-1, *Estimated Indoor Deposition Velocities by Particle Size*, with a DV of 3.88E-4 for a 2.8 μm particle in a forced air exchange environment. This DV is supported by the Figure 7.5-1, *Idealized Representation of Indoor Particle Deposition Velocity*, for the 1 to 5 μm range.

45. In Table 5-16, *Warehouse*, the indoor time fraction is not defined. Please provide the reason for not providing a value.

46. Section 5.4.3.2, *RESRAD Build Parameter Sensitivity Analysis*, Table 2.4.1, *Potential Correlations among RESRAD and RESRAD-Build Paramter Assigned Distributions* provides correlations typical for running the RESRAD-Build software. Please verify that the listed factors are not sensitive in the analysis performed for the Hematite facility.

47. In Table 5-16, *Warehouse*, the exposure duration (ED) is not defined. For the small office, the ED is set to 365 days. ED should be set to a period of 25 year (95^{th} percentile, Bureau of Land Statistics, 1990), equivalent for a worker scenario. In RESRAD-Build, the exposure duration is used to calculate the amount of time at each receptor location as time at receptor location as a function of exposure duration, indoor fraction, and receptor time fraction.

48. In Table 5-16, why set the Evaluation Times to 1 and 30 years? How was a 30-year assumed life for this building derived? As proposed, only three calculations will be provided; at time 0, 1 year, and 30 years. From this data, how would peak of the mean dose for the building life be provided? Also, how will the year in which maximum dose and in-growth be evaluated using only two one-year time frames? Please explain. Note that the dose from time summed in RESRAD-Build should be provided for a 25-year exposure.

49. Regarding Section 5.5.2, *Buried Pipe DCGL Calculations*, during excavation, removal of pipe must be addressed. RESRAD-Recycle should be used for evaluation of dose from exposure to pipe.

50. In Section 5.3.4.4.3, *Kd of Th-232 in the Contaminated Zone*, the distribution coefficients (Kd) is being decreased because of a positive relationship between dose and Kd. For the intent of this study, the 75^{th} percentile should be maintained, especially given this report concludes no significant difference in dose can be attributed between the proposed value of 3,300 and 68,000 L/kg. Also, according to the original study, loam is composed of 65 to 82 percent (%) sand; the clay fraction will be 18 to 35%. Do the site soils conform to this criterion?

    According to the Agency for Toxic Substance and Disease Registry (ATSDR) toxicological profiles for thorium, some of the species of thorium are insoluble, while other forms are highly soluble. Therefore, for the purpose of environmental fate and modeling, DHSS suggests that the radionuclides in soils be speciated. Otherwise, RESRAD groundwater concentrations can be used to verify the Kd values.

51. In Section 5.3.4.3, *RESRAD Parameter Sensitivity Analysis*, the Kd's for several radionuclides have been identified as sensitive parameters. Sections of the document identify that soil type will be the predominant metric used to estimate a site-specific Kd.

    According to support guidance for RESRAD, *Data Collection Handbook To Support Modeling Impacts of Radioactive Material in Soil*, Environmental Assessment and Information Sciences Division Argonne National Laboratory, April 1993, Section 32, *Distribution Coefficients*, because of its dependence on many soil properties, the value of the distribution coefficient for a specific radionuclide in soils can range over several orders of magnitude under different conditions. The guidance notes that a batch and column method for determination of distribution coefficients is available. Either test may be performed to support selection of a Kd, pending whether soils exist under saturated or unsaturated conditions.

52. In Table 5-4, Soil Concentrations Used for RESRAD Parameter Sensitivity Analysis, associated radionuclides are not addressed. First, DHSS assumes that this will not be the concentrations used in the RESRAD dose/risk assessment. If this table is to provide concentrations for the RESRAD assessment, the 95% UCL should be utilized. Second, associated radionuclides for the listed principle radionuclide with half-lives longer than 6 months are not addressed in this table. Discuss the potential impact of not providing all principal and associated radionuclides, down to and including the most stable form including lead. This will exceed the 180-day half-life setting provided in RESRAD. Unless otherwise not detected on site, associated radionuclides are assumed to be in equilibrium, pending branching fractions.

53. In Table 5-6, RESRAD Input Parameters, the following comments apply:

    a. Regarding radon, this pathway is depicted as inactive. Radon should be addressed for the indoor air pathway. See comment 24 above for details regarding radon.

    b. Regarding Basic Radiation Dose Limit parameter, the limit should be set to 15 mrem/yr.

    c. Regarding Groundwater Concentration parameter, actual concentrations of radionuclides should be entered for the Kd that were considered sensitive parameters.

    d. Regarding CS Thickness parameter, the uniform soil should be from ground surface to bottom of the Contaminated Zone. For root, the depth is from 15 cm to 1.5 meters. For other scenarios, please note whether root, deep, or excavation soil is intended to be represented.

    e. Regarding the saturated zone hydraulic gradient parameter, if substantial differences between the two wells tested exist, use the greater of the two wells. We recommend that the licensee consult with its engineer.

    f. Regarding the external gamma shielding factor, Microshield software was used. DHSS requests that the model be evaluated by the Missouri Department of Natural Resources, as we do not have this software, nor have the resources to obtain it. In lieu of the findings from the software, the value of 0.4 may be used.

    g. Regarding the fruit, grain, and vegetable consumption parameter, revise to 469 kg/year. This is based upon 22.4 g/kg-day (12.4 g/kg-day for fruit and 10 g/kg-day for vegetables) minus the leafy vegetable rate for a 60 kg adult (60kg used because intake rate data includes child data (EFH, Table 1-2)), and then time-weighted and averaged over 365 days per year, 30 years.

    h. Regarding the meat and poultry consumption parameter, revise to 5.1 g/kg-day using the residential scenario for a subsistence farming adult and child adjusted (EFH, Table 1-2), or 109.8 g/year for the age-adjusted resident (time-weighted and averaged over 365 days per year for 30 years).

    i. Regarding soil ingestion rate, assuming 100 mg/day for residential adult and 200 mg/day for residential child (EPA's Risk Assessment Guidance for Superfund, Part A,

EPA/54011-89/002, December 1989), revise to 43.8 g/year (based upon 120 mg/day time-weighted averaged over 365 days per year for 30 years).

j. Regarding drinking water intake, revise to 34 ml/kg-day assuming 70 kg for an adult and 15 kg for a child (EFH, Table 1-2), or 730 L/year (based upon 2 L/day time-weighted and averaged over 365 days per year for 30 years).

Thank you for the opportunity to comment on the DP. If you have questions or comments, please contact Andrew McKinney or Jonathan Garoutte at (314) 751-6102.

Sincerely,

Original Signed Here

Cherri Baysinger, Chief
Bureau of Environmental Epidemiology

CB:JG:AM:mp

Cc: Branden Doster, Unit Chief
Remediation and Radiological Assessment Unit