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**COMMENTS/RESPONSES ON REVISED RISK
ASSESSMENT WORK PLAN ADDENDUM**

04/13/92

**DOE-1363-92
DOE-FN/USEPA
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LETTER**



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APR 14 1992

DOE-1363-92

Mr. James A. Saric, Remedial Project Director
U. S. Environmental Protection Agency
Region V - 5HRE-8J
77 W. Jackson Boulevard
Chicago, Illinois 60604

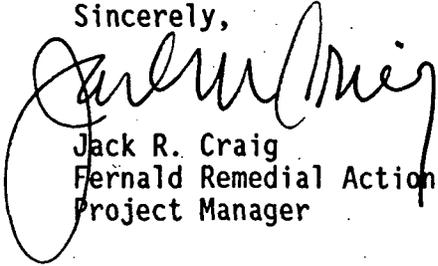
Dear Mr. Saric:

COMMENTS/RESPONSES ON REVISED RISK ASSESSMENT WORK PLAN ADDENDUM

The purpose of this letter is to transmit the proposed comment responses which were prepared in response to the final comments received from the United States Environmental Protection Agency (U.S. EPA) on March 11, 1992. Per the telephone conversation between you and Robert Janke, I am transmitting these comment responses and requesting that you respond within 14 days. Unless these proposed responses are unacceptable to U.S. EPA, the responses will be incorporated and the final revised Risk Assessment Work Plan Addendum will be transmitted to the U.S. EPA and Ohio Environmental Protection Agency (EPA) on April 30, 1992.

If you or your staff have any questions, please contact Robert Janke at FTS 774-6883 or (513) 738-6883.

Sincerely,


Jack R. Craig
Fernald Remedial Action
Project Manager

FN:Janke

Enclosure: As Stated

cc w/enc.:

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M. Butler, USEPA-V, 5CS-TUB-3
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DRAFTCR-FEMP-RAWP
April 6, 1992**SUMMARY OF COMMENTS/RESPONSES****Risk Assessment Work Plan Addendum
John Frazier**Date Document Issued February 4, 1992Date Comments Due March 4, 1992/Received OEPA-March 9; EPA-March 17, 1992Date Report Due April 16, 1992General Comments

1. Commenting Organization: U.S. EPA Commentor:
Pg. # Section # Paragraph # Sent./Line #
Original Comment #1

Comment: On January 16, 1992, the Department of Energy (DOE) presented a proposed background sampling plan at a meeting held in Chicago, Illinois, to discuss the FEMP risk assessment work plan addendum. It is not clear how or if this proposed plan was incorporated into the draft final risk assessment work plan addendum.

Response: The proposed sampling plan, RCRA/CERCLA Background Soil Sampling Plan at the Fernald Environmental Management Project, will not be incorporated into the Risk Assessment Work Plan Addendum. The Background Soil Sampling Plan is a separate work plan addendum for the RI/FS. Data collected under the Background Soil Sampling Plan will be used in all risk assessments performed subsequent to their (data) collection. The role of the Background Soil Sampling Plan is indicated in a footnote of Table 3-1 of the Risk Assessment Work Plan Addendum.

Action: No text change is required.

2. Commenting Organization: U.S. EPA Commentor:
Pg. # Section # Paragraph # Sent./Line #
Original Comment #2

Comment: The above-mentioned proposed background sampling plan discusses soil sampling only, and, therefore, sampling procedures to be used for other media cannot be assessed from its review.

Response: DOE agrees with the comment. As noted in Table 3-1 of the Risk Assessment Work Plan Addendum, site-specific background data for media other than soil or sediment are obtained from the WEMCO environmental monitoring program and the RCRA groundwater monitoring program. Sampling procedures for media other than soil are described by the environmental monitoring and RCRA sampling programs. Regional data will be used for background levels in soil until site-specific data are acquired according to the Background Soil Sampling Plan. It is assumed for the purpose of risk-

assessment activities that the background levels for sediment equal the background levels for soil.

Action: No text change is required.

Specific Comments

The following specific comment refers to the above-mentioned proposed background sampling plan:

3.	Commenting Organization: U.S. EPA	Commentor:	
	Pg. #	Section #	Paragraph #
	Original Comment #1		Sent./Line #

Comment: The sampling plan states that a sufficient number of samples will be taken to adequately establish parameters for statistical evaluation, but it does not clearly discuss the criteria used to determine the "adequacy" of the data. The sampling plan states that this evaluation will be made on the basis of "past data," but the application of past data is not clear. The plan should clearly present the procedures, equations, and references to be used in evaluating the adequacy of sampling data.

Response: As noted in the response to Comment No. 1, the RCRA/CERCLA Background Soil Sampling Plan at Fernald Environmental Management Project is a separate work plan addendum for the RI/FS that will not be incorporated into the Risk Assessment Work Plan Addendum. Data collected under the Background Soil Sampling Plan will be used in all risk assessments performed subsequent to their (data) collection.

Comments pertaining specifically to the Background Soil Sampling Plan should be directed to DOE as part of the review process for the Background Soil Sampling Plan. This comment is not directed at the Risk Assessment Work Plan Addendum and will be referred to the DOE personnel responsible for responding to comments on the Background Soil Sampling Plan.

Action: No text change is required.

The following specific comments refer to methods proposed in a memo presented at the above-mentioned meeting and incorporated into the above-mentioned draft final risk assessment work plan addendum:

4.	Commenting Organization: U.S. EPA	Commentor:	
	Pg. #3	Section #4.2.1	Paragraph #2
	Original Comment #2		Sent./Line #12-19

Comment: Using r^2 alone to determine a linear relationship is not sufficient. A lack-of-fit test should be performed to determine the appropriateness of assuming a linear relationship.

Response: The procedure of applying the correlation coefficient (r^2) to a probability plot for linearity to test the normality or lognormality is actually a sufficient statistical goodness-of-fit test.

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This statistical method was developed by Looney and Gullledge in 1985 (Looney and Gullledge 1985). They generated critical values needed for the test for sample sizes between 3 and 100 as given in Table 4-1 in Section 4.0. The correlation coefficient (r^2) for a probability plot must be used in conjunction with these critical values when testing for normality. Because the correlation coefficient method has performance similar to that of the Shapiro-Wilk's test (1965), one of the most powerful tests available for evaluating normality; but involves simpler statistical procedure than the Shapiro-Wilk's test, the correlation coefficient method has been recommended to be used as a test for normal or lognormal distributions (Gilbert 1987).

Action: Revise Section 4.2.1, paragraph 2 to read:

"Although a visual inspection of the probability plot is often sufficient to determine whether the plotted points follow a straight line, a statistical goodness-of-fit test is performed that applies the correlation coefficient to a probability plot for linearity to test the normality or lognormality."

5. Commenting Organization: U.S. EPA Commentor:
Pg. #10 Section #4.3.1 Paragraph #1 Sent./Line #4-10
Original Comment #3

Comment: Onsite concentrations should be compared to the lower confidence (tolerance) limits of background concentrations, rather than the upper confidence (tolerance) limits as proposed. This approach is more conservative and possibly more appropriate.

Response: DOE disagrees with the comment. Use of the upper tolerance limit (UTL) provides the standard statistical methodology by which site-related measurement results (sample concentrations) can be compared to background levels (concentrations). This comparison is a fundamental step for identifying chemicals of potential concern. Use of the UTL, defined as the upper 95% confidence limit on the 95th quantile, provides a reasonable demarcation between site-related sample concentrations and "true" background concentrations. In this way, the "false positive" identification of sample concentrations as being "above background" is held to a level of approximately one in twenty (1/20). Use of the "lower confidence (tolerance) limit" is a non-standard approach that would unnecessarily lead to inclusion of more constituents of concern that are present only at background concentrations.

Action: No action is required.

6. Commenting Organization: U.S. EPA Commentor:
Pg. #24 Section #5.2.4 Paragraph #4 and 5 Sent./Line #21-31
Original Comment #4

Comment: It is not clear from the site characterization if the surface water bodies located on the site contain water all year, or if they dry out in summer. If a surface water body (such as Paddys Run) dries out in summer, then exposure to the sediments associated with that surface water body should be estimated using parameter values for exposure to surface soil during the dry period(s). This may result in the assumption of a greater exposure frequency, and a larger body surface area exposed.

Response: As stated in previous response to Comment No. 181, Paddys Run and the Storm Sewer Outfall Ditch dry out in the summer. Exposures to sediment are considered potential exposure pathways whether the surface water bodies contain water all year or not. Section 5.2.4, page 24, lines 20 to 26 describe potential sediment exposure pathways to be included in risk assessments. The methodology for calculating exposure to sediments is presented in Section 7.2.1, and is the same as for soils.

Action: In Section 5.2.4, page 24, lines 20 to 26, add the following text between the second and third sentence:

"Surface water bodies such as Paddys Run and the Storm Sewer Outfall Ditch dry out in the summer, whereby potential direct exposures to contaminated sediment are the same as potential direct exposures to surface soil."

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7. Commenting Organization: U.S. EPA Commentor:
Pg. # Section #CR 122 Paragraph # Sent./Line #
Original Comment #

Comment: A figure detailing Operable Unit #3 must be included in the Work Plan

Response: A figure depicting Operable Unit 3 will be included in Section 1.7.

Action: Figure 1-5 will be included in Section 1.7 to depict Operable Unit 3. Figure 1-5 will be referenced on page 1-7, line 30.

8. Commenting Organization: U.S. EPA Commentor:
Pg. # Section #CR 138/148 Paragraph # Sent./Line #
Original Comment #

Comment: This response does not reflect what is proposed in the background sampling plan. Sufficient background locations must be selected to assure a good mean value is developed.

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Response: The responses to Comment Nos. 138 and 148 are consistent with the number of samples proposed in the background sampling plan. The responses to Comment No. 138 and 148 apply to background samples for all constituents in all media, not just soil samples. At least twelve (12) background samples with at least 50% of the data exceeding the sample quantitation limit (SQL), will be used to determine the background concentration distribution (and the UTL) for each constituent in each medium. If analytical results for the 30 (or 90) soil samples are available from implementation of the Background Sampling Plan, then all 30 (or 90) will be used for determining the background concentration distributions and UTLs. A sufficient number of background locations will be selected to develop appropriate statistics for background concentrations of constituents.

Action: No text change is required.

9.	Commenting Organization: U.S. EPA	Commentor:	
	Pg. # Section #CR 151	Paragraph #	Sent./Line #
	Original Comment #		

Comment: If the data is [sic] insufficient, U.S. DOE may be required to acquire more samples.

Response: It is acknowledged that if site characterization is deemed inadequate by EPA, acquisition of additional samples may be required. This type of scenario led to the recent implementation of a supplemental sampling and analysis plan for Operable Unit 4 after EPA review of the October 1990 Remedial Investigation report determined that Operable Unit 4 was inadequately characterized.

Action: No text change is required.

10.	Commenting Organization: U.S. EPA	Commentor:	
	Pg. # Section #164	Paragraph #	Sent./Line #
	Original Comment #		

Comment: Pb-212 is a typographical error, it should read Pb-210.

Response: The comment is confusing. Comment No. 164 deals with the U-235 series. If this comment refers to the original Comment No. 169, the typo in Comment No. 169 is noted. This correction does not change the response and action for Comment No. 169. Radionuclides in the uranium-238 series (including Pb-210) that can contribute to exposures in the home garden scenario will be included in each specific exposure assessment.

Action: No text change is required.

11. **Commenting Organization:** U.S. EPA **Commentor:**
Pg. # **Section #CR 196** **Paragraph #** **Sent./Line #** 
Original Comment #
- Comment:** Are resuspension rates, mass loading, and deposition velocities poorly quantified? If so why?
- While U.S. EPA does not generally approve oversimplified models, such as Box models, it may be appropriate to use if data is [sic] unavailable. However, more information is needed on the use of the Box model as it relates to the conceptual model of the site.
- Response:** **Part 1 of comment:**
Yes. It is difficult to completely characterize all of the microclimates contained within a 1050-acre site that influence resuspension rates, mass loading and deposition velocities. Thus data gaps are expected and use of simplified transport models, such as the Box model, is appropriate. (Also see the response to Comment No. 36.)
- Part 2 of comment:**
When the Nearfield Box Model is used in a specific risk assessment, it will be prefaced by a reasoned justification for its use. Since its use will be application- specific, a description of the parameter values (see Section 6.3.1.3) used in model calculations will be given at that time.
- Action:** No text change is required.
12. **Commenting Organization:** U.S. EPA **Commentor:**
Pg. # **Section #CR 213** **Paragraph #** **Sent./Line #**
Original Comment #
- Comment:** This response cannot be adequately addressed without the Schaum 1991 letter. The Schaum 1991 letter must be included as a reference.
- Response:** A copy of the Schaum letter was originally provided to DOE by EPA Region V. It is included in the List of References.
- Action:** A copy of the Schaum letter is attached to this comment/response document.
13. **Commenting Organization:** U.S. EPA **Commentor:**
Pg. # **Section #CR 253** **Paragraph #** **Sent./Line #**
Original Comment #
- Comment:** Where age and gender are part of the scenarios, the age/gender specific factors should be used.
- Response:** Gender is not a part of any of the exposure scenarios. Specific ages are part of some scenarios such as the child ingesting soil or sediment while playing; however, the risks

associated with the age-specific pathways are estimated using the required EPA HEAST methodology.

The risk estimate from NESHAPS is presented only for use in scenarios involving exposure to penetrating radiation from sources other than contaminated surface soil. Exposure scenarios involving exposure to penetrating radiation from sources other than contaminated surface soil are not age-specific; therefore, the age-averaged value from NESHAPS will be used.

Action: No text change is required.

14. Commenting Organization: U.S. EPA Commentor:
Pg. # Section #CR 254 Paragraph # Sent./Line #
Original Comment #

Comment: U.S. DOE must avoid language that may unnecessarily discredit this document to the general public or the scientific community.

Response: DOE agrees with the comment. DOE will not use language that will unnecessarily discredit this document to the general public or the scientific community.

Action: No action is required.

15. Commenting Organization: U.S. EPA Commentor:
Pg. # Section #CR 258 Paragraph # Sent./Line #
Original Comment #

Comment: Ten centimeters is too shallow, and unacceptable for surficial sampling.

Response: The comment is confusing. Too shallow for what? Determination of a specific sampling depth is beyond the scope of this document. The 10-cm depth is the basis for EPA's guidance on external exposures from soil. (see EPA HEAST, Appendix C). DOE believes that EPA's risk assessment methodology for assessing the impacts of external radiation exposures is overly conservative as a consequence of use of the 10-cm depth. However, DOE has agreed to follow EPA risk assessment methodology (e.g., use of slope factors), to the extent that the methodology is available.

Action: No text change is required.

16. Commenting Organization: U.S. EPA Commentor: Pat Van Leeuwen
Pg. # Section # Paragraph # Sent./Line #
Original Comment #66

Comment: The average time (AT) for all non-carcinogenic exposure pathways remains in error. For non-carcinogens, the AT should be corrected to read "AT equals (ED) (365 days/yr). U.S. EPA avoids making this error by using as the demoninator [denominator] value in all equations: $BW \times AT \times 365 \text{ days/yr}$. In the latter presentation, AT is the averaging time in "years".

Response: The averaging time will be corrected as noted in the comment.

Action: In Section 7.0 the averaging time for noncarcinogens in all cases should be "(ED)(365 days/yr)".

17. Commenting Organization: U.S. EPA Commentor: Pat Van Leeuwen
Pg. # Section # Paragraph # Sent./Line #
Original Comment #69/75

Comment: Your comment package indicated that no text changes would be made in response to these comments. However, an examination of the final draft document shows that the units for the permeability constant (PC) shown in line 18, page 7.0-14, were changed to "L/cm²/hr". The units for this parameter value are now incorrect. The units for the chemical-specific PC should be changed to "cm/hr" and the volumetric conversion factor (CF) should be put back in the equation. Such methodology changes should not be made without the approval of U.S. EPA.

Response: The change in units to "L/cm²/hr" was inadvertent and will be corrected.

Action: In Section 7.2.1.7, page 14, add "(CF)" to equation 7-22 and to the list of variables below the equation. In addition, on line 18, change the units for the variable PC from "L/cm²/hr" to "cm/hr".

18. Commenting Organization: U.S. EPA Commentor: Pat Van Leeuwen
Pg. # Section # Paragraph # Sent./Line #
Original Comment #120

Comment: This comment prompted me to look more closely at risks to the community and to workers during remedial actions. In Section 10.2.3.2, page 23, Transportation Risks, the calculations for potential worker highway deaths and accident-related injuries are presented. U.S. EPA considers such risks to be beyond Agency control and does not consider them in the Remedial Alternatives risk assessment. Please refer to the Risk Assessment Guidance for Superfund: Volume 1 - Human Health Evaluation Manual (Part C, Risk Evaluation of Remedial Alternatives), Section 2.2.2, page 20, second paragraph: "It is important to note, however, that factors not associated directly with hazards particular to a given site (e.g. risk of accidents during offsite motor vehicle transport) are not usually considered during the FS, but instead should be addressed prior to remediation in the site health and safety plan."

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The worker risk of highway death and injury is the same for all workers in the transport industry and is not related to this site. Even remedial workers driving to and from the site and drivers delivering other remediation materials to the site incur these risks. Such risks are beyond the Agency's calculation ability or scope of control.

Response: The selection of an off-site alternative introduces "short-term" risks to the community and workers in the form of transportation accidents. These risks are actually much more "real" and quantifiable than cancer risks. To ignore these risks would be irresponsible. The EPA can control these short-term risks by minimizing off-site disposal.

Action: No action is required.

19. **Commenting Organization:** U.S. EPA **Commentor:** Pat Van Leeuwen
Pg. # **Section #** **Paragraph #** **Sent./Line #**
Original Comment #133/252

Comment: To repeat earlier comments, dose-response data from the open-literature can sometimes be used to derive toxicity values for both carcinogens and non-carcinogens. Often it is more appropriate to consider contaminants without toxicity values in a semi-quantitative or qualitative manner or to use modeling. All efforts to develop reference doses or slope factors should be undertaken in conjunction with the Environmental Criteria and Assessment Office (ECAO), Cincinnati. Please incorporate this viewpoint in the explanation beginning on page 3.0-6, line 5.

Response: Efforts to develop reference doses or slope factors will be undertaken in conjunction with the ECAO in Cincinnati.

Action: In Section 3.4, page 6, revise the sentence on line 5 to read:

"If it is found that a reference dose or slope factor is not available and a value must be developed, the effort will be undertaken in conjunction with the EPA Environmental Criteria and Assessment Office (ECAO) in Cincinnati."

20. **Commenting Organization:** U.S. EPA **Commentor:** Pat Van Leeuwen
Pg. # **Section #** **Paragraph #** **Sent./Line #**
Original Comment #146/156/273

Comment: Statistical methodologies provided by DOE for the selection of chemicals of concern and for the identification of hot-spots have been submitted for review to Paul White, U.S. EPA, Exposure Assessment Group, Washington. He has agreed to provide you with written comments on DOE's proposed methods.

Ibid On page 4.0-10, line 22, what is "EPA 19901"? This reference is not included in the List of References.

Response: Since no additional written comments on the proposed statistical methods have been received, comment responses or revision for statistical methodologies have been based on those relevant comments presently available to DOE.

The reference "EPA 1990I" was a typographical error.

Action: No text change is required.

On page 4-10, line 22, change "EPA 1990I" to "EPA 1990b".

21.	Commenting Organization: U.S. EPA	Commentor: Pat Van Leeuwen
	Pg. #	Section #
	Original Comment #184	Paragraph #
		Sent./Line #

Comment: Table 5-3 is still confusing in that it divides pathways by present and future contamination of media, while the usual category for division is land use. Some pathways still appear to be missing in the tabulation - i.e., for pathways #34, 38 and 39, how does the change in access controls affect the contaminant level in the Great Miami River and the dermal contact, incidental ingestion and immersion irradiation pathways associated with swimming in this water? It would make more sense to group pathways by land use - current land use, future land use and remediation activities, and within the land use, by target populations to which the pathway is applicable.

Response: The reviewer's opinion is appreciated. The text accompanying Table 5-3 states that the pathways are organized by current and future exposure scenarios, not current and future contamination. When access controls change, receptors may be exposed to areas containing higher levels of contamination. Also, natural processes at the site may erode waste area caps and breach containment barriers, increasing the amount of contaminants readily available to the biosphere.

A change in access controls will not change the concentrations in the Great Miami River encountered under pathways 34, 38, and 39. However, the potential exists for future erosion of the sources at the FEMP. This could led to higher concentrations in eroded material and runoff. This, in turn, could increase the concentrations of constituents of potential concern in the Great Miami River. The complementary pathways to 34, 38, and 39 (6, 15, and 20) will consider this potential situation.

Action: DOE will present specific details of each exposure assessment in specific risk assessment reports and will continue to explain its methodology and intent to concerned reviewers throughout the CERCLA process at the FEMP. No text change is required.

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22. Commenting Organization: U.S. EPA Commentor: Pat Van Leeuwen
Pg. # Section # Paragraph # Sent./Line #
Original Comment #215/220/65

Comment: There still seems to be some confusion on the use of background concentrations. On page 7.0-4, lines 14-16 and 23-24 are contradictory. As we discussed at the FEMP RI/FS meeting in Chicago on January 16, 1992, it is permissible to subtract the background concentrations for naturally-occurring and some anthropogenic radionuclides from the measured concentrations in the calculation of site-related risks from these contaminants. It is not appropriate to subtract the background concentrations from the measured concentrations to calculate risks from non-radioactive compounds. Background concentrations of naturally-occurring inorganic contaminants are considered in choosing inorganic chemicals as "chemicals of concern" for the site. In the latter process, the background concentrations of organic chemicals are assumed to be zero. These points have not been accurately reflected [in] the revised Work Plan. Please make these corrections in the text.

Response: In Section 7.1.1, page 7-4, lines 14 through 22, it is stated:

"The 95% confidence limit on the arithmetic mean for the background concentration for each carcinogen (including radionuclides) will be subtracted from the site-related UCL for the carcinogen to determine exposure concentrations of carcinogens at exposure points. In this way the quantified exposure and risks that represent the excess attributable to contamination from the site can be presented. In addition, exposures to background concentrations of carcinogens (including radionuclides) will be assessed to provide the risks associated with exposures that are not attributed to the site. This information facilitates the important comparison of the background risks, the added risks due to the site, and the total risk (background risk plus risk from the site)."

This paragraph explains in detail that risks due to background sources, site-related sources, and background plus site-related sources will be calculated. DOE agrees that background concentrations of naturally-occurring inorganic contaminants will be considered in choosing inorganic chemicals as "chemicals of concern" for the site. Background concentrations for each carcinogen (including radionuclides) will not be subtracted prior to choosing chemicals of potential concern, but background concentrations will be subtracted to determine exposure concentrations of carcinogens at exposure points.

Action: The following will be added in Section 7.1.1, page 7-4, to the end of line 22:

"Risks from concentrations of anthropogenic contaminants (carcinogens) that can be attributed to sources other than the FEMP will be presented as part of the overall risks, but excluded from the site-related risks. In the absence of knowledge of background data for a contaminant in a specific medium, a background level of zero will be assumed for the contaminant in the specific medium. This will likely be the case for organic chemicals and some anthropogenic radionuclides."

23. Commenting Organization: U.S. EPA Commentor: Pat Van Leeuwen

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Pg. # Section # Paragraph # Sent./Line #
Original Comment #233/72

Comment: Comment #233 requested that values for body surface area for all age groups be made consistent with current guidance and referred the contractors to the OHEA document (OHEA-E-367), section 2.4, for default values. I was unaware that values for body surface area proposed in comment #72 would be adopted without a check of the reference document cited. The values incorporated in the table on page 7.0-17 are not very conservative. Using values from OHEA-E-367, the total body surface area for the child <6 yrs would range from 7000-8000 cm², for the child/teen from 15,150-16,550 cm² and for the adult from 20,000-23,000 cm², using the 50th and 95th percentile values for the ages of concern. For the dermal contact with soil pathways, it is appropriate to include the hands, legs, arms, neck and head, for an exposure of 25% of total body surface area. The range of values for the child/teen and the adult for soil contact pathways should be 3800-4200 cm² and 1750-2000 cm², respectively. The values for the creek wading pathway should be recalculated using the teen body weight as a percentage of adult body weight, and the range of values should be presented.

The new EPA document "Dermal Exposure Assessment: Principles and Applications", EPA/600/8-91/011B, which should be available soon, reaffirms these values and suggests the use of the 95th percentile values as a reasonable maximum exposure value.

Changes to page 7.0-18 In the Exposure Duration (ED) section, to what does footnote "b" refer?

Response: When the document referenced in the comment is available, pertinent information from the document will be incorporated into the Work Plan Addendum.

Footnote "b" was inadvertently left in the text.

Action: No text change is required.

On page 7-18, line 10, delete footnote "b".

24. Commenting Organization: U.S. EPA Commentor: Pat Van Leeuwen
Pg. # Section # Paragraph # Sent./Line #
Original Comment #241

Comment: In equation 7-30, used to calculate the PC for other organics, "-2.73" should be "-2.72".

Response: DOE agrees with the comment.

Action: In Section 7.2.2.3, page 24, line 16 change the value "-2.73" to "-2.72".

Attachment

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25. Commenting Organization: U.S. EPA Commentor: Pat Van Leeuwen
Pg. # Section # Paragraph # Sent./Line #
Original Comment #

Comment: Incorporation of responses into work plan - Several of the responses which adequately addressed EPA concerns should be incorporated into the work plan but were not; the "Action" was "No text change is required". The text of the following "Response" numbers must be included in the work plan: 270 (regarding use of total organic carbon data); 280 (regarding use of fate and transport modeling results conservatively); 283 (regarding use of bioconcentration factors); 291 (regarding additional field investigations); and 294 (regarding a summary of existing data).

Response: The responses to Comment Nos. 270, 280, 283, and 291 will be incorporated into the text. It is inappropriate to include the response to Comment 294 into the text because the referenced "text" is an outline only.

Action: The following will be added at Section 4.1, page 4-1, line 13:

"(This does not imply that data useful in evaluating likely exposures, for example TOC in sediments, will not be used qualitatively in risk assessments.)"

The following will be added at Section 6.0, page 6-1, line 18:

"Due to uncertainties associated with use of these models, all model results will be carefully reviewed and used in a conservative fashion."

The following will be added at Section 9.5, page 9-8, line 6:

"Additional field ecological investigations will be proposed if they are found to be necessary for remedial action decision-making."

The following will be added at the end of Section 7.4.2.1, page 7-35, line 7:

"Attempts will be made to obtain bioconcentration factors for those metals and organic compounds that are expected to have muscle-to-muscle or soil-to-muscle bioconcentration factors exceeding one."

26. Commenting Organization: U.S. EPA Commentor: Pat Van Leeuwen
Pg. # Section # Paragraph # Sent./Line #
Original Comment #

Comment: Use of field derived plant uptake ratios - Upon review of the "Biological Sampling Analysis and Resources" report, the BTAG has determined that plant radionuclide concentrations should be modeled using both the Baes et al ratios and the soil to plant ratios previously measured (rather than simply the previously measured plant concentrations). By using these measured ratios, a more conservative estimation of plant uptake can be made for plants growing in highly contaminated soils.

Response: Soil-to-plant concentration ratios derived from site-specific data are likely to be overly conservative because the samples were collected in 1987-1988 when the FEMP was still in operation. Radionuclide concentrations in plant samples from that period may reflect airborne deposition, which has decreased since production ceased. The Baes et al. (1984) ratios are more appropriate for present and probable future conditions, where the primary route of plant accumulation of radionuclides would be direct uptake from soil.

Action: No text change is required.

27. Commenting Organization: U.S. EPA Commentor: Pat Van Leeuwen
Pg. # Section # Paragraph # Sent./Line #
Original Comment #

Comment: Earthworms may be an important exposure pathway - Comment response number 284 states that further information on the earthworm to robin exposure pathway would not influence ecological risk assessment. Justification is necessary for such a statement, which seems premature, and it should be deleted from the responses before they are approved. In addition, it is unclear why this response does not discuss the Osborne (1990, 1991) studies of robins.

Response: The response is taken out of context. Response to Comment No. 284 states that further information "is unlikely to influence the ecological risk assessment sufficiently to affect selection of remediation goals for the FEMP" (emphasis added). This is a reasonable suggestion, given the conservative assumptions made for this pathway, e.g., soil-to-earthworm-to-robin transfer coefficient of one. Risk assessment staff did not have details on the Osborne studies when the response was written. Site-specific data on contaminant uptake by earthworms from these studies will be used in ecological assessments when the data become available.

Action: At the end of the first paragraph, Page 7-35 (following the text added above), add:

"Site-specific data on contaminant uptake by earthworms are currently being collected. These data will be incorporated into ecological assessments when they become available."

28. Commenting Organization: U.S. EPA Commentor: Pat Van Leeuwen

Pg. #	Section #	Paragraph #	Sent./Line #
Original Comment #			

Comment: Use of conservative and "average" exposure scenarios in ecological risk assessment modeling - Depending on the distribution of sampling point data, the area in question and the animal being exposed, exposure calculations should use both a mean soil, sediment and/or water concentration and a more conservative value of the mean plus one or two standard deviations. EPA will reserve the right to make final decisions on which values are ultimately used to assist with remediation decisions.

Response: Ecological exposure calculations for aquatic and terrestrial biota will be made using the mean in addition to the maximum for any cases where the maximum exposure indicates a potential toxic effect (e.g., a maximum surface water concentration exceeds and Ambient Water Quality Criterion). This response will be added to the text.

Action: Add to last paragraph of Section 7.4.3:

"Ecological exposure calculations for aquatic and terrestrial biota will be made using mean values in addition to maximum values for any cases where the maximum exposure indicates a potential toxic effect."

29. Commenting Organization: U.S. EPA Commentor: Pat Van Leeuwen
Pg. # Section # Paragraph # Sent./Line #
Original Comment #

Comment: Comments on the Biological Sampling Analysis and Resource Report - Although this report was not officially reviewed for approval by the BTAG, but rather was used for its information, the following are some comments on this document:

Pg 3-11, bullet 3 - The text should state the species and numbers of fish in composited samples (whether different species composited together).

Pg 4-28, Table 4-13 - The composites of mouse and shrew need to be clarified as to how many of each animal were tested. In addition Page 4-27, Sec. 4.2.3 states that the carcass used in composites contained no detectable radionuclides, therefore the presence of 18 pCi/L in the composite should be addressed.

Pg 4-42, Table 4-22 - The levels of mercury detected in grass samples are extremely high. The area where these samples were collected may require more concentrated soil and/or biological sampling and should be further investigated.

Pg 5-2, para. 2 - A caged fish study to determine the bioaccumulation of uranium was conducted in 1990. These results should be made available.

Despite a wide range of analytical results, the conclusion that biota are exposed to radionuclides is valid. In addition, the water chemistry data from FEMP effluent tested for toxicity should be made available.

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Response: Different species of fish were not composited together. Field records do not indicate the number of fish in composite samples of fish or mammals. Potential effects of 18 pCi/g uranium in a mammal will be discussed in the ecological assessment. Further soil samples have been collected from the FEMP, and results will be reported as they become available in the Site-Wide Characterization Report and appropriate operable unit RI reports. The caged fish study was unsuccessful and produced no data. Fish placed in cages in Paddys Run experienced total mortality at both reference and test locations, probably due to heavy sediment loads in the stream. Water chemistry data from effluent toxicity tests will be presented in an appendix to the Site-Wide Characterization Report.

Action: No text change is required.

30. Commenting Organization: U.S. EPA Commentor: Pat Van Leeuwen
Pg. # Section # Paragraph # Sent./Line #
Original Comment #

Comment: Comments on Statistical methodology - The selection of statistics to fit the data is the wrong approach. Statistical analyses should have been selected and resulting decision trees established before data collection. Use of a statistical approach to select contaminants of concern may not be appropriate for ecological assessment.

Response: The use of post hoc statistics in the Biology Report, while less than ideal, is a common and useful descriptive tool in ecology. DOE believes that the methods used to select constituents of potential concern for human health risk are inappropriate for ecological assessment.

Action: No text change is required.

31. Commenting Organization: U.S. EPA Commentor: Pat Van Leeuwen
Pg. # Section # Paragraph # Sent./Line #
Original Comment #

Comment: Overall comment - Normally EPA would not choose to use only risk assessment modeling for ecological assessment. Previous review of nature and extent of contamination in conjunction with information on site habitats would be used to design field studies where appropriate. The BTAG will evaluate results of the risk assessment; however further field studies may be appropriate.

Response: The Work Plan Addendum does not propose to use only risk assessment modeling for ecological assessment. Ecological assessment at the FEMP relies on at least ten site-specific ecological studies in addition to RI/FS and WEMCO data on contaminant concentrations in surface water, soils, and waste units. The available data include extensive habitat characterizations, toxicity studies, and surveys of aquatic communities. These studies were described in detail to U.S. EPA and Ohio EPA in a briefing on March 12, 1992.

Action: No text change is required.

OEPA Comments

32. Commenting Organization: OEPA Commentor:
Pg. # Section # Comment 2 Paragraph # Sent./Line #
Original Comment # 1

Comment: This task is larger and more involved than implied by DOE's two sentence response. This action must be closely documented and all changes/assumptions must be solidly defended. The Ohio EPA must be involved in this process.

Response: DOE agrees that model validation is a significant, complex task that must be closely documented. Changes that are made in the models and parameters presented in the Risk Assessment Work Plan Addendum will be solidly defended in risk assessment reports. U.S. EPA and Ohio EPA will review any changes through the RI/FS document review process.

Action: No text change is required.

33. Commenting Organization: OEPA Commentor:
Pg. # Section # Comment 3 Paragraph # Sent./Line #
Original Comment # 2

Comment: The DOE has not presented any investigations on contaminant rate migration for any of the varying glacial overburden conditions. This information is presumed to be critical for vadose zone modeling.

Response: Chemical-specific and radionuclide-specific parameters for contaminant migration have been taken from published investigation results for similar geologic media at other sites. FEMP-specific data pertaining to contaminant migration through the glacial overburden are being acquired for operable unit investigations. These data will be included in the groundwater fate and transport section of operable unit risk assessments.

Action: No text change is required.

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34. Commenting Organization: OEPA Commentor:
Pg. # Section # Comment 73 Paragraph # Sent./Line #
Original Comment # 3

Comment: The failure to select the groundhog as an indicator species due to its low abundance is quite irrational. The fact that a species is unexpectedly absent would suggest the possibility that site related factors may be affecting that organism, thus supporting further investigation of it. Additionally, one does not have to go to Oak Ridge to see groundhogs residing near waste pits. Field activities were recently initiated at FEMP to resolve groundhog intrusion into the Waste Pit 5 berm. Groundhog excavations have also been noted in various OU2 areas. Groundhogs are likely to be receiving larger external and internal radiation dose and chemical exposure than the white-footed mouse due to their intrusive nature and the depth to which they must excavate and reside. The high fat content and hibernating nature of groundhogs additionally makes them susceptible to significant exposures. DOE should reconsider the use of groundhogs as an additional indicator species.

Response: The Work Plan Addendum already proposes three small mammal species as indicator species, exposed to potential contaminants via a variety of pathways. DOE feels that these species will provide sufficient detail for this aspect of ecological assessments at the FEMP.

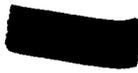
Action: No text change is required.

35. Commenting Organization: OEPA Commentor:
Pg. # Section # Comment 75 Paragraph # Sent./Line #
Original Comment # 4

Comment: It is hard to believe that DOE was unable to find any better transfer factor to use for white-footed mouse than the plant-to-beef factor. It would seem that a significant volume of data exists for other rodents (i.e., rat bioaccumulation and toxicity studies). The use of plant-to-beef ratios with no uncertainty factors or literature support for similarity in uptake rates further indicates the need for site-specific data.

Response: Laboratory studies of rodents generally report toxic or reference doses, rather than bioaccumulation factors. This information is being used in FEMP ecological assessments, as described in Section 8.3. Uncertainty factors are applied in the risk characterization and toxicity assessment, rather than in the exposure assessment. DOE welcomes any assistance that Ohio EPA can provide on existing databases for rodent bioaccumulation factors.

Action: No text change is required.

36. Commenting Organization: OEPA Commentor:
Pg. # Section # Comment 192 Paragraph # Sent./Line # 
Original Comment # 5

Comment: While it is impossible to sample every location in a large environment medium, it is imperative that the number of samples obtained be sufficient to adequately represent the medium.

Response: DOE agrees that it is important that the site be adequately characterized. This sentiment is reflected in the previous response to Comment No. 192.

Action: No text change is required.

OEPA Specific Comments

37. Commenting Organization: OEPA Commentor:
Pg. # 3 Section # 3.1 Paragraph # Sent./Line #
Original Comment # 1

Comment: Table 3-1.

- a. It is unclear from this table what each report will provide. Does the WMCO Environmental Monitoring Annual Report include background data on all naturally occurring HSL and radionuclide contaminants found on site? Additionally, is all the Environmental Monitoring data of RI/FS QAPP quality? If not, the usefulness of this data for RI/FS background is questionable.
- b. Does DOE intend to use background soil concentrations to infer background sediment concentrations? This does not appear to be an appropriate assumption since the distribution of particle size and sediment types varies significantly along the length of a stream. DOE should incorporate specific sediment sampling into the background soil sampling plan to obtain site specific sediment data.

Response: a. The WMCO Environmental Monitoring Annual Report does not include background data for all media for all naturally-occurring HSL and radionuclides contaminants found at the site. As noted in the footnote of Table 3-1, chemicals and radionuclides for which background data are not available or of sufficient quality are assumed to have a background level of zero. The quality of WMCO Environmental Monitoring data will be reviewed with respect to RI/FS QAPP requirements. WMCO data that are not found to be of RI/FS QAPP quality will not be used for determining background levels.

- b. DOE intends to use background soil concentrations as background sediment concentrations if the latter are not available for a specific area. A background sampling program for sediments would be very costly and time-consuming due to the large number of potential areas that would need to be sampled for background "sediment". There is no apparent benefit from such a background sampling program since background surface soil sampling should provide concentration estimates appropriate to use as background sediment concentrations.

Action: No text change is required.

38. Commenting Organization: OEPA Commentor:
Pg. # 15 Section # 4.4 Paragraph # Sent./Line #
Original Comment # 2

Comment: Table 4-4.

- a. The following radionuclides should be added to Table 4-4 as contaminants in OU4: Pb-214, Bi-214, Th-227, Ra-223, Rn-219, and Pb-211. These radionuclides were detected in the K-65 waste during the "Characteristics of Fernald Residue Before, During, and After Vitrification" 1991 study.
- b. The following inorganics should be added for OU1: Sb, Ca, Fe, K, and Na (see recent OU1 Runoff Removal Action Sampling results).

Response: a. The listed radionuclides have short to very-short half-lives and were thus excluded from Table 4-4, as stated on lines 6 and 7 of page 4-14. Adding these radionuclides to this table adds little to the methodology, presented in the Work Plan Addendum since these radionuclides will be assumed to be present in secular equilibrium with their long-lived precursors during any exposure assessment involving that precursor.

b. Calcium, iron, potassium and sodium are common elements which have not been detected above background concentrations in any operable unit to date. Therefore they were not listed in Table 4-4. Antimony (Sb) in runoff is already being considered as part of the investigation of contamination in existing media (Operable Unit 5). Minor amounts may be present in Operable Unit 1 (Pit 5 and the Burn Pit at concentrations of 10 to 30 ppm).

Action: Antimony will be added to the list of chemicals in the Operable Unit 1 column of Table 4-4.

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39. Commenting Organization: OEPA Commentor:
Pg. # 15 Section # 5.1.4.2 Paragraph # Sent./Line # 30-34
Original Comment # 3

Comment: Is the visitor receptor being evaluated under this scenario? If so, how will the individual's exposure differ from the trespasser?

Response: Yes, the visitor receptor is being evaluated under the current land-use scenarios. The visitor is assumed to make regular visits to the same location on the property for a specific purpose. The trespasser is assumed to involve an individual who moves about the property in a random manner.

Action: No text change is required.

40. Commenting Organization: OEPA Commentor:
Pg. # 29 Section # 6.1.4.7 Paragraph # Sent./Line # 4
Original Comment # 4

Comment: Complete reference for Petrucci, 1977 is not provided.

Response: DOE agrees. The reference will be changed to Cember, 1983.

Action: On page 6-29, line 4, change "(Petrucci 1977)" to "(Cember 1983)". Add following reference to Reference List:

"Cember, H., 1983, Introduction to Health Physics, Pergamon Press, Inc., New York, NY."

41. Commenting Organization: OEPA Commentor:
Pg. # 28 Section # 6.1.4.7 Paragraph # Sent./Line # 14
Original Comment # 5

Comment: Why include very short-lived species, such as Ra-224 (half-life of .009918 years or 3.62 days), when secular equilibrium assumptions can be used? In computer modeling chain decay isotopes, it is common to only model the longer-lived species. Using the assumption of secular equilibrium, the mass of short-lived intermediate species can be calculated based on the ratio of the parent and daughter half-lives. Thus, in modeling over a period of years, decades and centuries, one would not expect to include species with half-lives that are on the order of years.

Response: Radium-224 was included in response to an earlier request from EPA. The fate and transport modeling will generally assume secular equilibrium to lessen the number of constituents that must be tracked through the model. Secular equilibrium will not be assumed for all radionuclides in decay series since processed materials found at the FEMP may not be in secular equilibrium (and for some radionuclides secular equilibrium may not occur for many years).

Action: Insert the following text in Section 9.2.2.1, page 9-4, below line 15:

"The slope factor can be the HEAST value for a particular radionuclide, or it can be the sum of the HEAST slope factors for that radionuclide and its short-lived progeny to account for ingrowth during storage and or environmental transport."

42. Commenting Organization: OEPA Commentor:
Pg. # 27 Section # 6.1.4.7 Paragraph # Sent./Line # 3
Original Comment # 6

Comment: While radioactive decay follows first-order decay, daughter products are produced. There is no discussion of daughter products and how these will be handled. All radioactive decay can be simplified into 4 decay chains. For long-term analysis (thousands of years) these chains are simplified into 3, 4 or 5 species each. Inclusion of daughter products is of particular importance over long periods of time as the daughter will have different sorption and radiologic characteristics.

In saturated groundwater transport, the SWIFT III code can be used to model the 4 decay chains with a multitude of components in each chain. In the vadose zone, the SESOIL code cannot address this issue. How will daughter products be addressed in the vadose zone?

Response: As noted by both Comment No. 41 and its response, secular equilibrium can be and has been assumed, where appropriate, during fate and transport modeling at the site. Specific discussions on which species are modeled for each waste unit will be presented the individual Operable Unit and site-wide risk assessments. The statement "All radioactive decay can be simplified into 4 decay chains." is incorrect. See the Kocher (1984) reference for details.

Action: No action is required.

43. Commenting Organization: OEPA Commentor:
Pg. # 28 Section # 6.1.4.7 Paragraph # Sent./Line #
Original Comment # 7

Comment: References for half-lives are not provided. There should exist an accessible reference to check these reported values.

Response: These half-lives are taken from Kocher, 1981. Radioactive Decay Data Tables, Technical Information Center, U.S. Department of Energy.

Action: In Table 6-5, page 6-28, add footnote reference "" to "Half-Life" and the following footnote to the bottom of the table:

"* Kocher 1981"

44. Commenting Organization: OEPA Commentor:
Pg. # 28 Section # 6.1.4.7 Paragraph # Sent./Line # 13

Original Comment # 8

Comment: The half-life for Pu-239 is 2.44E+4 years, but Pu-240 is only 6,540 years. These should be entered separately as they are in different decay chains.

Response: Unfortunately, these two radionuclides are reported as Pu-239/240 because some of their alpha particle energies are indistinguishable by radiochemical analysis. Thus, they cannot be reported separately. The decision was made to model the fate and transport of this "constituent" as Pu-239 (the longer-lived of the two), and assess its health impacts based on the radiotoxicity of Pu-240 (having the greater slope factor of the two).

Action: No text change is required.

45. Commenting Organization: OEPA Commentor:
Pg. # 28 Section # 6.1.4.7 Paragraph # Sent./Line #

Original Comment # 9

Comment: Why are so few isotopes listed? While Table 6-5 is consistent with Table 4-4, there are other long-lived isotopes which should be considered. These include: Np-237, U-233, Th-229, U-236 and Pu-242.

Response: Np-237 is on line 4 of the table. Since the Work Plan Addendum was last issued, the risk assessment staff has been made aware of the presence of U-233 in some drummed materials stored on the property. DOE is unaware that Th-229 and Pu-242 have been detected at the site. U-236 is suspected of being present in some areas of the site but is not included in table because quantities of U-236 will be included with U-235 since the two are indistinguishable by radiochemical analysis and since the slope factor for U-235 is available and the slope factor for U-236 is not.

Action: Add U-233 to Tables 4-4 and 6-5. OEPA has implied in its comment that it has information on the presence of Th-229 and Pu-242 at the FEMP. DOE requests that this information be immediately forwarded, in writing, to DOE at Fernald for inclusion in the Preliminary Site-wide Baseline Risk Assessment.

46. Commenting Organization: OEPA Commentor:
Pg. # 28 Section # 6.1.4.7 Paragraph # Sent./Line #

Original Comment # 10

Comment: Why include radioactive decay of isotopes whose half-life is significantly greater than the period of stimulation. On page 18, line 21, the period for stimulation is up to 1,000 years. It would seem reasonable to exclude isotopes greater than 10,000 years from any decay processes.

Response: They are included to insure consistency in the modeling approach. DOE agrees that it will make little difference in the final results of the risk assessment, but it will demonstrate consistency with less confusion for the general public.

Action: No text change is required.

47. **Commenting Organization:** OEPA **Commentor:**
Pg. # 33 **Section #** 7.4.2.1 **Paragraph #** **Sent./Line #** 1-2
Original Comment # 11

Comment: The ability of a red fox to capture and consume a white-tailed deer at any age is debatable. It is highly improbable that white-tailed deer make up any portion of the red fox diet at the FEMP. Statements such as this indicate the need for DOE to support such assumptions with either site-specific data or references to peer-reviewed literature.

Response: The assumption was red fox feeding on a road-killed deer. In accordance with OEPA's suggestion at the March 12, 1992 meeting on ecological issues, this pathway will be eliminated.

Action: On Page 7-33, Line 1, delete "or white-tailed deer."

48. **Commenting Organization:** OEPA **Commentor:**
Pg. # **Section #** 10 **Paragraph #** **Sent./Line #**
Original Comment # 12

Comment: The references for U.S. EPA 1991 documents are incorrect throughout this section (i.e., EPA 1991e should be EPA 1991f). Please correct this section.

Response: DOE agrees with the comment. The references will be corrected.

Action: In Section 10.0, evaluate all references for EPA 1991 and make consistent with List of References.

49. **Commenting Organization:** OEPA **Commentor:**
Pg. # 4 **Section #** 10.1.1 **Paragraph #** **Sent./Line #** 9-13
Original Comment # 13

Comment: This sentence suggests DOE intends to conduct an ecological risk assessment for each operable unit. Is this DOE's intention or will the ecological assessment be conducted during the OU5 RI? Please clarify the text.

Response: It is DOE's intent to conduct baseline ecological assessments for the Preliminary Baseline Risk Assessment and the Operable Unit 5 RI. In addition, ecological impacts of proposed remedial actions will be addressed in operable unit FS reports. This will be clarified in the text.

Action: Modify page 10-4, lines 12-13 to read:

"addressed as PRGs are modified based on the results of the ecological risk assessments in the Site-Wide Characterization Report and the Operable Unit 5 RI Report."

50.	Commenting Organization: OEPA Pg. # 7 Original Comment # 14	Section # 10.1.2.3	Commentor: Paragraph #	Sent./Line #
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Comment: Table 10-3. The paragraph and table fail to adequately define how DOE will address perched groundwater as potable water supplies. The paragraph and table should clearly define this aspect of perched groundwater so that Remedial Investigations can be geared to making this determination and appropriate PRGs can be developed for specific perched water zones (i.e., Plant 2/3 area).

Response: Generally, perched water pockets with sustained yields greater than 200 gallons per day (a conservative water use estimate) will be considered suitable as a potable water source.

Action: No text change is required.

51.	Commenting Organization: OEPA Pg. # Original Comment # 15	Section # 10.3	Commentor: Paragraph #	Sent./Line #
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Comment: Table 10-5. The model needs to be corrected to define Alternatives 5A and 5B as off-site disposal options.

Response: Table 10-5 is provided as an example format/method for evaluating alternatives and information on the table should be viewed as preliminary. We agree that alternatives 5A and 5B are off-site disposal.

Action: Table 10-5 will be revised to indicate that Alternatives 5A and 5B are for "off-site disposal".

 27/28