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FINAL FEASIBILITY STUDY REPORT AND PROPOSED PLAN FOR OPERABLE UNIT 4 RESPONSE TO COMMENTS JUNE 1994

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DOE-FN EPA
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RESPONSES

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FINAL
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AND
OPOSED PLAN
OPERABLE UNIT 4
RESPONSE TO COMMENTS

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

JUNE 1994

U.S. Department of Energy
Fernald Field Office

FINAL
FEASIBILITY STUDY REPORT AND PROPOSED PLAN
FOR OPERABLE UNIT 4
RESPONSE TO COMMENTS

Fernald Environmental Management Project
Fernald, Ohio

June 1994

U.S. Department of Energy
Fernald Field Office

Section

Note: The USEPA did not have any additional comments on the Final Proposed Plan for Remedial Actions at Operable Unit 4.

SECTION 1.0

RESPONSE TO U.S. EPA COMMENTS

FINAL

FEASIBILITY STUDY/PROPOSED PLAN

FOR

OPERABLE UNIT 4

(Transmitted May 9, 1994)

SECTION 1.1

U.S EPA REGION V

FS COMMENTS

BY

PAT VAN LEEUWEN

U.S. EPA Region V FS Comments

by

Pat Van Leeuwen

17) Commenting Organization: U.S. EPA Commentor: Van Leeuwen
Section #: Table D.3-6 Page #: D-3-22 Line #: Code:
Original Comment #: 17
Comment: The SA values presented for the Dermal Contact while Bathing pathway are CT values, RME values. See discussion in the RI review also.
Response: Agreed.
Action: Table D.3-6 will be revised to incorporate the parameter values contained in the Final Baseline Risk Assessment. The risks presented elsewhere in Appendix D will be recalculated using these parameter values.
Comment #2: **I am confused by the response. I did not see the indicated change in the SA values presented for the Dermal Contact While Bathing pathway in Table D.3-5.**

I also reviewed the added Dermal Contact with Soil/Sediment parameter values presented in the same table. The SA values for the last 4 receptor populations (RME On-Property Farmer through Off-Property Resident Farmer) are total body surface area values; it appears that the CT Water Contact values were used instead of the RME Soil Contact (should be 25% of SA) values.
Response: **Agreed. The values in this table are in error. These are typos as the correct values were used in the risk assessment calculations.**
Action: **The dermal exposure parameters have been corrected in Table D.3-5.**

Comment #3: Although the past two "Actions" indicate a change in the SA values presented for the Dermal Contact While Bathing pathway in Table D.3-5, I still do not see this change reflected in the report. The CT values are still listed for the RME exposures. Perhaps these corrections had not yet been made in the RI Final Baseline Risk Assessment tables which were used here. Also, footnote "h" is incorrect (this was also reported in the RI review); the references to p 8-17, p 8-7, Table 10-1, etc. are not consistent with the document listed as EPA 1992 (a?). Correct reference also.

The Dermal Contact with Soil/Sediment parameter values presented in the same table are acceptable.
Response: This table (D.3-5) was derived from the OU4 Baseline Risk Assessment, but the latest change for this dermal exposure pathway was not made for this table. This will have no impact on the OU4 FS risk assessment as the only contaminant which was considered for the groundwater pathway was U-238. Since radionuclides are not evaluated for dermal absorption pathways, this parameter change will not change the risk values.
Action: Change the surface area (SA) value to 23,000 cm^2. The footnote to the table will be corrected.

Commenting Organization: U.S. EPA Commentor: Van Leeuwen
Section #: Table D.3-9 Page #: D-3-35 Line #: Code:
Original Comment #: 18

Comment: A) Where did the Cancer SF of 17 for the carcinogenic PAHs come from? There are no Cancer SFs for dermal exposure to PAHs. This exposure is expressed in a semi-quantitative manner: in general, it is assumed that the risk from dermal exposure to PAHs is at least as great as the risk from oral exposure. B) I do not understand the value or discussion of the cadmium oral RfD. Who did these calculations? Who reviewed the values? The HEAST office in ECAO, Cincinnati, reports that the IRIS value of 5e-4 is the only verified RfD for cadmium. C) The RfD for fluoranthene (IRIS) is 4e-2, not 4e-1. D) What is the basis of the RfD calculation for thallium? Most thallium salts have RfDs in the 7-9e-5 range. E) Re the use of "QUAL", this should only be used if the contaminant is indeed discussed qualitatively. It makes no sense to discuss qualitatively carcinogenic effects from exposure to non-carcinogens. Reserve the designation for valid applications.

Response: Agreed.

Action: Table D.3-9, as well as Tables D.3-10 and D.3-11, will be replaced with Tables D.4-1 through D.4-4 from the Final Baseline Risk Assessment. The risks presented elsewhere in Appendix D will be recalculated using these parameter values.

Comment #2:
a) **The response to this comment is acceptable.**
b) **The response to this comment is acceptable.**
c) **Fluoranthene, as well as many other chemicals, was eliminated as a COC in the revised Table D.3-9. Actually, the list of 34 COCs was reduced to 19 in the revision. What is the basis for the elimination of all these contaminants at this stage of the document?**
d) **The RfD for thallium appears plausible.**
e) **The response to this comment is acceptable.**

Response: **As stated in Section 2.2.1, only those contaminants which had a risk greater than 10^{-7} or a HI of less than 0.1 for a particular media were retained as COCs for the FS. In revising the FS for the December submittal it was discovered that not all tables were consistent. The tables of the FS, including Appendix D, were edited to be consistent and contaminants were deleted from some tables.**

Action: **None.**

Comment #3:
a) The response to this comment is acceptable.
b) The response to this comment is acceptable.
c) The response requires some further explanation. If a chemical is retained as a COC in one medium, it should be retained in all media if multiple pathway exposures to the same chemical by any receptor are likely. Explain how the multiple pathway exposure assessment was affected in this Operable Unit assessment.
d) The RfD for thallium appears plausible.
e) The response to this comment is acceptable.

Response: 18c) Multimedia pathways were considered for all COCs even when the COC was not originally considered to be a COC for that medium. For example, COCs in the soil were evaluated for air particulate exposures as well as for direct contact exposure. In addition, the migration potential for the COC to move into groundwater was considered as well. U-238 was the only COC which was determined to migrate into groundwater. It would not be appropriate to consider GW COCs as COCs for soil under the existing fate and transport conditions.

Action: No Action.

19) Commenting Organization: U.S. EPA Commentor: Van Leeuwen
Section #: D.3.3.1 Page #: D-3-34 Line #: 14-17 Code:
Original Comment #: 19

Comment: I have previously commented that inhalation RfCs should be used when provided; contractors should not calculate RfDs from RfCs.

Response: The inhalation RfCs were taken from the OU4 Baseline Risk Assessment. In the RI Report for Operable Unit 4 Section D.4, the method of calculation was presented. This method is also referenced in RAGS.

Action: No Action.

Comment #2: **I have previously commented that inhalation RfCs should be used when provided, contractors should not calculate RfDs from RfCs. It is apparent that this calculation presents an opportunity for error.**

This document, page D-3-43, lines 9-10, indicated that RfD values were derived from RfC values by multiplying the latter by the default inhalation rate of 20 m^3/day. HEAST, March 1992, page 27, indicates that the RfC may be converted to a corresponding inhaled RfD by dividing by 70 kg, multiplying by 20 m^3/day and adjusting by an appropriate absorption factor. HEAST further stated that "this conversion, however, may often be technically incorrect, and the appropriateness of doing this must be evaluated on a case-by-case (read chemical-by-chemical) basis." It is clear that the method described in the FS, Section D.3 is incorrect, it is not clear whether the RfD values derived in the RI Report are in error. At the least, this potential problem with derived inhalation RfD values should be discussed in the document.

Response: **The text on page D-3-43 (previously D-3-14) is incorrect, in that the division of the RfC by 70 was left out. The text will be corrected and the uncertainty section will be amended to include a discussion on this conversion. It should be noted that the conversion was performed as in the Baseline Risk Assessment and the RfD values in the Baseline Risk Assessment were used in the FS Risk Assessment.**

Action: On page D-3-43, line 9, insert after ". . .by", "dividing the RfC values by 70 kg and by".

On page D-5-5, insert after the first paragraph:

> "An important element of uncertainty for the inhalation pathways is the conversion of RfCs to RfDs by using default conversion factors. This presumes that the concentration effects on the lung is a function of dose per body weight. Many of the RfCs are derived from inhalation exposures of animals in which the toxic effects are on the lungs and not related to body weight, but rather are a function of concentration. An example of this is HCl toxicity, where the toxic effect is on the lungs and is a function of the concentration of HCl. For those cases where the toxic effect is systemic such as in mercury toxicity, then the conversion to dose per body weight may be appropriate. However, in the case of children, not correcting for body weight may lead to an under estimation of the HI. The approach chosen for this risk assessment was to use the dose related RfD approach as the toxic effects from the Operable Unit 4 COCs

are more to be systemic. The order of uncertainty using this approach is within the uncertainty of the determination of RfCs.

Comment #3: The response to this comment is acceptable. However, please note that the Exposure Assessment Group (EAG) will be issuing additional RfC values; many of these will not convert to a RfD value using this generic equation. The issue should be revisited in future OU reports.

Response: The issue will be re-visited. All new RfCs will be reviewed prior to conversion. The assumption is that EAG provides the documentation to make the determination that this equation is not appropriate.

Action: No Action.

TABLE D.3-5
(Continued)

Pathway Parameters	Trespassing Child Age 6-18	Expanded Trespasser Child Age 6-18	Expanded Trespasser Adult 18-50	RME On-Property Farmer Age 1-70	CT On-Property Resident Farmer Age 1-70	On-Property Resident Child Age 1-6	Off-Property Resident Farmer Age 1-70
Inhalation of Volatiles Released from Household Water Uses							
IR (m^3/hr)	N/A	N/A	N/A	0.63	0.63	0.63	0.63
ET (hr/d)	N/A	N/A	N/A	0.25[b]	0.17[b]	0.33[b]	0.25[b]
EF (d/yr)	N/A	N/A	N/A	350[d]	275[b]	350[d]	350[d]
ED (yr)	N/A	N/A	N/A	70	9[e]	6	70
BW (kg)	N/A	N/A	N/A	70	70	15	70
AT-Noncancer (d)[f]	N/A	N/A	N/A	25550	3285	2190	25550
AT-Cancer (d)[g]	N/A	N/A	N/A	25550	25550	25550	25550
Incidental Ingestion of Soil/Sediment							
IR (g/hr)	0.1	0.1	0.1	0.18	0.122	0.2	N/A
FI (unitless)	0.25	0.1	0.05	1	1	1	1
EF (d/yr)	52	110	40	350[d]	275[b]	350[d]	350[d]
ED (yr)	12	12	32	70	9[e]	6	70
BW (kg)	43	43	70	70	70	15	70
AT-Noncancer (d)[f]	4380	4380	11680	25550	3285	2190	25550
AT-Cancer (d)[g]	25550	25550	25550	25550	25550	25550	25550

See footnotes at end of table.

TABLE D.3-5
(Continued)

Pathway Parameters	Trespassing Child Age 6-18	Expanded Trespasser Child Age 6-18	Expanded Trespasser Adult 18-50	RME On-Property Farmer Age 1-70	CT On-Property Resident Farmer Age 1-70	On-Property Resident Child Age 1-6	Off-Property Resident Farmer Age 1-70
Dermal Contact While Bathing							
SA (m^2)	N/A	N/A	N/A	2.3[b]	2.3[b]	0.8[b]	2.3[b]
PC (cm/hr)	N/A	N/A	N/A	csv	csv	csv	csv
ET (hr/d)	N/A	N/A	N/A	0.25[b]	0.17[b]	0.33[b]	0.25[b]
EF (d/yr)	N/A	N/A	N/A	350[d]	275[b]	350[d]	350[d]
ED (yr)	N/A	N/A	N/A	70	9[e]	6	70
BW (kg)	N/A	N/A	N/A	70	70	15	70
AT-Noncancer (d)[f]	N/A	N/A	N/A	25550	3285	2190	25550
AT-Cancer (d)[g]	N/A	N/A	N/A	25550	25550	25550	25550
Dermal Contact With Soil/Sediment							
SA (m^2)	0.41	0.41	0.57	0.57	0.5	0.2	0.57
DA (cm/m^2)	1	1	1	csv	csv	csv	csv
ABS	csv	csv	csv	csv	csv	csv	csv
EF (d/yr)	52	110	40	350[d]	275[b]	350[d]	350[d]
ED (yr)	12	12	32	70	9[e]	6	70
BW (kg)	43	43	70	70	70	15	70
AT-Noncancer (d)[f]	4180	4180	11680	25550	3285	2190	25550
AT-Cancer (d)[g]	25550	25550	25550	25550	25550	25550	25550

footnotes at end of table.

TABLE D.3-5
(Continued)

Pathway Parameters	Trespassing Child Age 6-18	Expanded Trespasser Child Age 6-18	Expanded Trespasser Adult 18-50	RME On-Property Farmer Age 1-70	CT On-Property Resident Farmer Age 1-70	On-Property Resident Child Age 1-6	Off-Property Resident Farmer Age 1-70
Inhalation of Dusts, Volatiles, and Radon							
DR (mrem/hr)	csv	csv	csv	csv	csv	csv	N/A
ET Indoors (hr/d)	N/A	N/A	N/A	18.3	19.8	22	N/A
ET Outdoors (hr/d)	4	2	1	5.7	4.2	2	N/A
EF (d/yr)	52	110	40	350	275	350	N/A
ED (yr)	12	12	32	70	9	6	N/A
BW (kg)	43	43	70	70	70	15	N/A
Ingestion of Vegetables and Fruit							
IR (g/d)	N/A	N/A	N/A	122	78[b]	101.5[i]	122
FI (unitless)	N/A	N/A	N/A	1	1	1	1
EF (d/yr)	N/A	N/A	N/A	350[d]	275[b]	350[d]	350[d]
ED (yr)	N/A	N/A	N/A	70	9[e]	6	70
BW (kg)	N/A	N/A	N/A	70	70	15	70
AT-Noncancer (d)[f]	N/A	N/A	N/A	25550	3285	2190	25550
AT-Cancer (d)[g]	N/A	N/A	N/A	25550	25550	25550	25550
Ingestion of Meat							
IR (g/d)	N/A	N/A	N/A	75	50[b]	29	75
FI (unitless)	N/A	N/A	N/A	1	1	1	1
EF (d/yr)	N/A	N/A	N/A	350[d]	275[b]	350[d]	350[d]
ED (yr)	N/A	N/A	N/A	70	9[e]	6	70

See footnotes at end of table.

TABLE D.3-5
(Continued)

Pathway Parameters	Trespassing Child Age 6-18	Expanded Trespasser Child Age 6-18	Expanded Trespasser Adult 18-50	RME On-Property Farmer Age 1-70	CT On-Property Resident Farmer Age 1-70	On-Property Resident Child Age 1-6	Off-Property Resident Farmer Age 1-70
BW (kg)	N/A	N/A	N/A	70	70	15	70
AT-Noncnacer (d)[f]	N/A	N/A	N/A	25550	3285	2190	25550
AT-Cancer (d)[g]	N/A	N/A	N/A	25550	25550	25550	25550
Ingestion of Milk							
IR (L/d)	N/A	N/A	N/A	0.3	0.2[b]	0.9	0.3
FI (unitless)	N/A	N/A	N/A	1	1	1	1
EF (d/yr)	N/A	N/A	N/A	350[d]	275[b]	350[d]	350[d]
ED (yr)	N/A	N/A	N/A	70	9[e]	6	70
BW (kg)	N/A	N/A	N/A	70	70	15	70
AT-Noncancer(d)[f]	N/A	N/A	N/A	25550	3285	2190	25550
AT-Cancer(d)[g]	N/A	N/A	N/A	25550	25550	25550	25550

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[a]Parameter values obtained from Final RI Report for Operable Unit 4 (November 1993), Table D.3-12.
[b]Special guidance from EPA Region V.
[c]Drinking water consumption rate of 1.4 L/day from NRC (Nuclear Regulatory Commission), 1977, U.S. Nuclear Regulatory Commission Regulatory Guide 1.109; NCRP (National Council on Radiation Protection) Report No. 76.
[d]Guidance from EPA (1991a), OSWER Directive: 9285.7-01B.
[e]Guidance from EPA (1991b), Interim Final, OSWER Directive: 9285.6-03.
[f]Calculated as the product of ED (years) x 365 days/year.
[g]Averaging time for carcinogens calculated as the product of 70 years x 365 days/year.
[h]EPA (1992a), "Dermal Exposure Assessment: Principles and Applications, EPA/600/8-91/011B.
[i]Guidance from EPA (1989), Interim Final, p. 6-36.

footnotes at end of table.

SECTION 1.2

U.S EPA REGION V

CRARE COMMENTS

BY

PAT VAN LEEUWEN

Commenting Organization: U.S. EPA Commentor: Van Leeuwen
Section #: Table K.3-1 Page #: Line #: Code:
Original Comment #: 8

Comment: Recreational User Definition. The parameter values for the recreational scenarios presented in Table K.3-1 were judged by USEPA and Ohio EPA as not being very conservative. We expect to see the development of the recreational user scenarios reflect more closely the idea that the area may revert to a very attractive area for hunters, hikers, bikers, etc.

Response: The description of the recreational user scenario has been modified in accordance with agreements reached at the December 1, 1993 meeting with EPA. No change to exposure parameters were necessitated, but a more complete description of this scenario including a name change to "expanded trespasser" has been provided in both the FS Section 2 and CRARE Section K.5.1.4.

Action: Modified Section K.5.1.4 and provided reference to Section K.5.1.4 discussion in Section K-3.2 per response.

Comment #2: Both U.S. EPA and Ohio EPA had noted in the prior review that the parameter values for the recreational scenario presented in Table K.3-1 were not very conservative. U.S. EPA expected to see the development of the expanded trespasser scenario reflect a more conservative approach, as we discussed at the December 1, 1993 meeting. We did not expect that our agreement to a tiered approach and inclusion of an expanded trespasser scenario constituted acceptance of the minimal exposure values presented here and in the FS report. A casual glance at any exposure pathway shows that the Expanded Trespass scenario does not represent much increase over the Current Land Use Scenario - e.g., a look at the incidental ingestion of soil/sediment pathway shows that the total soil ingestion and (15.6 gm) of the adolescent in the Current Land Use Trespass scenario has been reduced to 13.2 gm in the Adolescent (Child) Expanded Trespasser scenario, so that the total exposure by ingestion for trespassers aged 6-50 represents only a 20% increase over the original exposure scenario. For noncarcinogens this would result in a less conservative exposure and less risk.

Response: See response to USEPA (Pat VanLeeuwen) FS Comment No. 11.

Action: See action for USEPA (Pat VanLeeuwen) FS Comment No. 11.

Comment #3: Recreational User Definition. How will the information in the position paper "Expanded Trespasser Receptor Scenario", included as Attachment A be included in this report?

Response: To a certain extent the land use scenarios and receptors in Attachment D.II of Appendix D of the Operable Unit 4 FS are based on the presentations developed for the CRARE. The Operable Unit 4 CRARE was reviewed after this attachment was prepared to ensure that the principles were adhered to by the CRARE. The CRARE did incorporate a current land use with a future term scenario that was not considered in the Operable Unit 4 FS risk assessment. The CRARE did not make any changes in the PRGs/PRLs or develop new PRGs/PRLs. So there was no need to use the PRL development process outlined in the attachment. Thus, the information has been already incorporated as appropriate.

Action: No Action.

Commenting Organization: U.S. EPA Commentor: Van Leeuwen
Section #: Page #: K-7-55 Line #: Code:
Original Comment #: 13

Comment: Toxicological Profiles. A) I have commented on omissions in tox profiles in prior OU4 reviews. Please review these. The Lead Tox Profile, page K-7-55, does not include a discussion of the EPA OSWER Directive on Lead Soil Clean-up Levels or the EPA Lead IEUBK Model, leading the reader to mistakenly conclude that the health effects of lead cannot be addressed in the risk assessment.

B) I did not see any Tox Profile for PAHs or the many COCs that were omitted as discussed above. These may need to be included.

Response: A) Agreed.

Action: A) Discussions have been added to the lead toxicity profile as requested.

Response: B) Since the CRARE is a postremediation document, it is reasonable to anticipate that most, if not all, of the COCs in the environmental media would be gone or isolated from the environment. Therefore, it is not appropriate to discuss the omitted COCs in the CRARE.

Comment #2: The inclusion to the leading profile is acceptable. Regarding the Tox Profiles for PAHs I am not certain I understand the elimination of PAHs in the final screening, as it cannot be determined whether any or all PAHs will degrade. PAHs continue to be major COCs at most Superfund sites because they often do not degrade depreciable, especially if they are tightly bound to the soil or if other chemicals toxic to microorganisms are also present in the soil. The presentation here seems to indicate that PAHs need not be considered for remediation.

Response: It must be remembered that the CRARE starts after all remediation is complete, including groundwater remediation. This is at least 50 years in the future. The PAHs have been infrequently detected throughout the site at levels generally less than 10 mg/kg. Many of the surface soils containing PAHs will have been removed and the level of PAH contamination will have been greatly reduced. In addition, the biodegradation over this period of time was estimated using conservative decay coefficients found in the literature. It was estimated that 99.9% of the PAHs would decay in this time period. Given the infrequent detection, the relative low levels and the biodegradation rates, the PAHs were screened out.

Action: No Action.

Comment #3: Toxicological Profiles. The inclusion to the Lead Tox Profile is acceptable.

Regarding the elimination of PAHs in the final screening, based on degradation, the April 11, 1994 Memorandum from ECAO and Attachment: "Risk Assessment Issue Paper: Review of Degradation of PAHs in Soil", raise serious questions about the validity of this elimination. The use of degradation half-lifes obtained under laboratory conditions to eliminate other chemicals using this screening process is likewise subject to the same criticism. It is very disconcerning to me that the only chemicals retained in the CRARE as COCs are those for which there is not degradation data! Surely there is something wrong with the process.

I also detected some concern from ECAO over whether a 100-year degradation period was reasonable for the site, and suggest that perhaps this issue needs to be revisited. Since carcinogens are considered to have no threshold, a 70 year exposure is not necessary to produce an adverse effect; a short exposure to residual levels of some site carcinogens might be all that is needed to produce the response. Noncarcinogens might also produce adverse health effects from short term exposures. Perhaps the effect of

exposure to average concentrations of residual chemicals over successive future time periods would provide a better evaluation.

Response: DOE agrees that the elimination of the PAHs as COCs is a matter to be considered carefully. Your comment raises issues that need to be addressed. In addressing these issues, several points are raised, some of which have been discussed in previous responses.

The first point is that the CRARE is considering risks after all remediation has been completed and the contaminant sources have been removed or remediated. It is known that there are PAHs present in the wastes at OU1 and OU2, but these materials will either be removed, treated, and/or put in a disposal location and would no longer contribute to the residual risk. PAHs are present in the surface soils, but soil data contouring has indicated that when the soils are removed and treated due to Uranium or other COC contamination, all other COCs will be remediated. The likelihood of significant amounts of PAH contamination remaining after remediation is remote. The major source of PAH contamination to be biodegraded is then only small isolated pockets of surface soil PAHs with concentrations of less than 5000 ug/kg. Even if only 90% is degraded in 70 years; instead of 99.9% (a factor of 100), then the PAH concentration would be 500 ug/kg which is just above the detection limit of 330 ug/kg. This would be a different issue if Tar Mats or Tar Pits were present at the FEMP.

The second point is that the CRARE will be rewritten for subsequent operable unit's feasibility studies. DOE has previously stated in the responses to Operable Unit 4 FS comments that the PAH degradation issue will be revisited in future editions of the CRARE. In addition, the leading remedial alternatives for Operable Unit 1 and Operable Unit 2 have changed and the alternatives for Operable Unit 5 are under consideration at this time. The COC list presented for the Operable Unit 4 CRARE is now out of date. The Operable Unit 5 FS and CRARE are re-examining the PAH issue and other COC issues.

An interesting point was raised in your concern about using laboratory data for the decay half-lives. This is an important component of uncertainty for much of the fate and transport parameters used in risk assessments, where actual site data is rarely available. In addition, most of the slope factors and reference doses are based on laboratory data and human data is available for only the more common industrial chemicals. In this case, as with the toxicology data, the best available data was used and scientific judgement was used to derive and use the decay factor for the PAHs. It is true that if the COC did not have a decay value, then it was not eliminated as a COC. This is the conservative approach. The reason why most of the COCs with decay values were eliminated is that the period of 100 years was sufficiently long enough for decay to occur. This exception to this was Aroclor 1260.

The final point raised in your comments was the issue of considering a 70-year decay period versus looking at a shorter decay period. It is agreed that cancer can be initiated in a shorter period of time, but a shorter period of exposure will also lead to a lower risk. There is then a trade-off, the risk increases as exposure time increases, but the risk also decreases with longer exposure periods due to degradation and transport.

Action: No additional actions required.