



Scientific Analysis/Calculation Error Resolution Document

Complete only applicable items.

QA: QA ^{met} 5-20-10
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1. Document Number: ANL-NBS-MD-000009	2. Revision/Addendum: 03/01	3. ERD: 01
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4. Title: Soil-Related Input Parameters for the Biosphere Model	5. No. of Pages Attached: 12 of 5-20-10
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6. Description of and Justification for Change (Identify affected pages, applicable CRs and TBVs):

I Background Information Summary

This ERD is prepared to address Condition Report 13403 and in part, Action 004 of Condition Report 12947. CR 13403 identified an omission of one reference from a list of references qualified for intended use, while CR 12947 raised multiple issues associated with the model report *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]) that are addressed in this ERD.

CR 13403: This Corrective Action was initiated because *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]) includes an omission error and requires a text correction. This ERD is prepared to correct the omission error justifying its use of DIRS 177310 as a direct input to ANL-NBS-MD-000009, REV 03 AD 01 [DIRS 179993]).

CR 12947 Action 004: This Corrective Action was initiated because *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]) includes typographical errors and requires text corrections. This ERD is prepared to make the changes described in CR 12947 Action 004.

II Inputs and/or Software

No new input sources or software are used in this ERD.

III Analysis and Results

In order to address CR 13403 and CR 12947, changes to the text of *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]) are necessary and are described in this ERD.

(see attached)

	Printed Name	Signature	Date
7. Checker	Patricia Bernot Robert Howard	<i>Palmer Vaughn for Patricia Bernot</i> <i>Robert Howard</i>	5/19/10 19 May 2010
8. QCS/QA Reviewer	Peter Persoff	<i>Peter Persoff</i>	05/19/2010
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10. Responsible Manager	Palmer Vaughn	<i>Palmer Vaughn</i>	5/20/10

(Continued from Block 6)

The detailed changes are listed below. New text is marked as blue text ([example](#)) and deleted/replaced text is indicated by red text ([example](#)).

CR 13403:

In Section 4.1.4.1.1 on pg. 4-7 (1st sentence of paragraph) of *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]), the text states:

“Most enhancement factor data were collected by Joseph H. Shinn and are documented in Lawrence Livermore National Laboratory reports (Shinn et al. 1994 [DIRS 177228]; Shinn et al. 1997 [DIRS 177222]; Shinn 1998 [DIRS 177230]; Shinn 2002 [DIRS 177225]; Shinn 2003 [DIRS 177226]), in the journal Health Physics (Shinn et al 1989 [DIRS 177231]; Shinn et al. 1997 [DIRS 177223]), and in the proceedings of the International Conference on Precipitation Scavenging (Shinn 1992 [DIRS 160115]; Shinn et al. 1982 [DIRS 177224]). Shinn is a leading expert on measurements of resuspension and enhancement factor and he developed experimental methods used to measure these processes. Of the remaining two references not authored by Shinn, one was published in Journal of Aerosol Science (Kashparov et al. [DIRS 177229]) and the other in Health Physics (Johnston et al. 1992 [DIRS 177227]).”

This sentence is to be replaced with the following:

“Most enhancement factor data were collected by Joseph H. Shinn and are documented in Lawrence Livermore National Laboratory reports (Shinn et al. 1994 [DIRS 177228]; Shinn et al. 1997 [DIRS 177222]; Shinn 1998 [DIRS 177230]; [Church and Shinn et al. 2000 \[DIRS 177310\]](#); Shinn 2002 [DIRS 177225]; Shinn 2003 [DIRS 177226]), in the journal Health Physics (Shinn et al 1989 [DIRS 177231]; Shinn et al. 1997 [DIRS 177223]), and in the proceedings of the International Conference on Precipitation Scavenging (Shinn 1992 [DIRS 160115]; Shinn et al. 1982 [DIRS 177224]). Shinn is a leading expert on measurements of resuspension and enhancement factor and he developed experimental methods used to measure these processes. [Dr. Shinn is a co-author of Church et al. 2000 \[DIRS 177310\]; the first author, Dr. Bruce W. Church, was assistant Manager for Environment, Safety, Security and Health at the Nevada Operations Office \(NV\) of the U.S. Dept. of Energy, and served as a health physics advisor to the Government of Australia on remedial actions at the former nuclear weapons site at Maralinga.](#) Of the remaining two references not authored by Shinn, one was published in Journal of Aerosol Science (Kashparov et al. [DIRS 177229]) and the other in Health Physics (Johnston et al. 1992 [DIRS 177227]).”

This text correction has no impact on the results or conclusions to this report, any of its downstream documents, or the license application.

CR 12947 Action 004, Issue 526:

Typographical errors were found in a reference used throughout this report. All incorrect references to “[Shinn et al. 1982 \[DIRS 177224\]](#)” are replaced with “[Shinn et al. 1983 \[DIRS](#)

177224]”. This error occurs in the following sections of *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]):

- Section 4.1, Table 4.1-1 (Enhancement factor for resuspension row) on pg. 4-1
- Section 4.1.4.1 (3rd bullet of first paragraph) on pg. 4-6
- Section 4.1.4.1.1 (1st paragraph) on pg. 4-7
- Section 4.1.4.2 (4th paragraph) on pg. 4-8
- Section 6.5.1.3 (3rd paragraph) on pg. 6-27
- Section 6.5.2.2 on pg. 6-29 (1st paragraph)
- Section 6.5.2.2, Table 6.5-1. Summary of Enhancement Factor Measurements on pg. 6-32
- Occurs twice in Section 6.5.2.2 on pg. 6-34 (3rd paragraph on this page)
- Section 6.5.2.3, Table 6.5-2. Measured Values of the Enhancement Factor under Undisturbed Soil Conditions on pg. 6-37
- Section 6.5.3.3 (3rd paragraph) on pg. 6-46

These editorial changes do not affect the results or conclusions of this report, any of its downstream documents, or the license application.

CR 12947 Action 004, Issue 529:

An incorrect table number reference was used in this report. In Section 6.3.1 on pg. 6-13 (top of page) of *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]), the text states:

"The maximum organic matter content for Amargosa Valley soils is less than 0.8% (Table 6.2-3), and therefore the native soils are not classified as organic in texture (i.e., they do not contain more than 30% organic matter)."

This sentence is replaced with the following:

"The maximum organic matter content for Amargosa Valley soils is less than or equal to 0.8% (Table 6.2-2), and therefore the native soils are not classified as organic in texture (i.e., they do not contain more than 30% organic matter)."

This editorial change does not affect the results or conclusions of this report, its downstream documents, or the license application.

CR 12947 Action 004, Issue 532:

In Tables 6.3-6 and 7.1-1[a], the low bound for the partition coefficient for uranium is in error by an order of magnitude, per file *Kd Bounds.xls* in Appendix A. Based on Table 6.3-5 the selected value of *Mean ln(Kd)* for uranium is 3.5. The selected value of *SD ln(Kd)* is 3.2. The file *Kd bounds.xls* calculates the geometric mean as $GM = e^{Mean \ln(Kd)}$ and the geometric standard deviation as $GSD = e^{SD \ln(Kd)}$. These calculations yield values of $GM = 33.115452$ and $GSD = 24.53253$. Finally, using the equation for the low bound of the lognormal distribution taken at the 95% confidence interval ($GM \times GSD^{-1.96}$) and not rounding the GM and GSD prior to calculation, the value for the lower bound equates to 6.3×10^{-2} , not 6.3×10^{-1} as stated in *Soil-*

Related Input Parameters for the Biosphere Model (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]).

In Table 6.3-6 “Lognormal Distribution Parameters for Partition Coefficients” on pg. 6-17 of *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]) the table entry for uranium low bound states:

“ 6.3×10^{-1} ”

This entry should be:

“ 6.3×10^{-2} ”

In Table 7.1-1[a], “Lognormal Distribution Parameters for Partition Coefficients,” on pg. 7[a] of *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]) the table entry for uranium low bound states:

“ 6.3×10^{-1} ”

This entry should be:

“ 6.3×10^{-2} ”

These transcription errors do not affect other values within these tables or other calculations within this report. These changes do, however, affect output DTN: MO0609SPASRPBM.004 and some downstream documents. To maintain traceability, however, changes to Tables 6.3-6 and 7.1-1[a] are considered to be ‘on hold’ until updates are made to corresponding downstream documents. See Section IV for details.

CR 12947 Action 004, Issue 536:

An incorrect section number is referenced in this report. In Section 6.4.1 (3rd paragraph) on pg. 6-18 of *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]), the text states:

"Table 6.4-1 reproduces the values of elemental partition coefficients (see Section 6.2), the corresponding leaching removal rate constant, as well as the time required to reach 50% and 95% equilibrium."

This sentence is replaced with the following:

"Table 6.4-1 reproduces the values of elemental partition coefficients (see Section 6.3), the corresponding leaching removal rate constant, as well as the time required to reach 50% and 95% equilibrium."

This editorial change does not affect the results or conclusions of this report, its downstream documents, or the license application.

CR 12947 Action 004, Issue 541:

An incorrect section number is referenced in this report. In Section 6.4.3 on pg. 6-22 of *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]), the text states:

"Using the conversion factor introduced in Section 6.3.1, this is equivalent to the surface soil loss rate of $2.24 \times 10^{-1} \text{ kg m}^{-2} \text{ yr}^{-1}$."

This sentence is replaced with the following:

"Using the conversion factor introduced in Section 6.4.2, this is equivalent to the surface soil loss rate of $2.24 \times 10^{-1} \text{ kg m}^{-2} \text{ yr}^{-1}$."

This editorial change does not affect the results or conclusions of this report, its downstream documents, or the license application.

CR 12947 Action 004, Issue 546:

The offending sentence is a synthesis of information from all three sources, i.e., Burley 1990 [DIRS 177220], p. 5-3; Burley 1990 [DIRS 177220], p. 5-7; and Shinn 1998 [DIRS 177230], p. 2. The references, regardless of where they are placed within this short sentence, still support it. The sentence is revised for clarity.

In Section 6.5.2.1 (1st paragraph) on pg. 6-28 of *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]), the text states:

"When deposited on soil, plutonium attaches itself to the larger, less mobile particles of soil or soil aggregates as a result of adhesive forces between the plutonium particles and the soil substrate (Burley 1990 [DIRS 177220], pp. 5-3 and 5-7; Shinn 1998 [DIRS 177230], p. 2)."

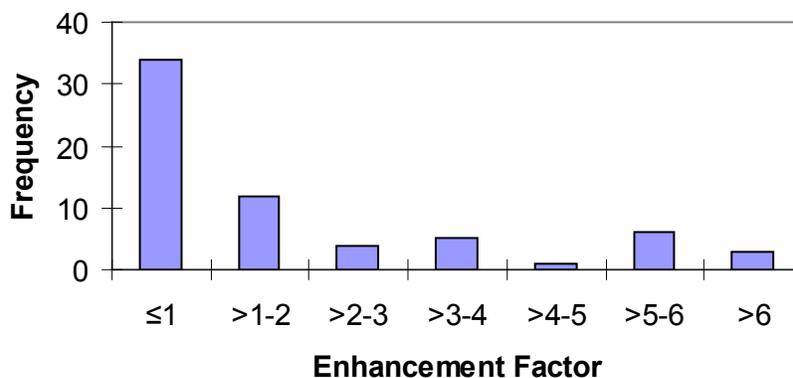
This sentence is replaced with the following:

"When deposited on soil, plutonium attaches itself to the larger, less mobile particles of soil (Burley 1990 [DIRS 177220], pp. 5-3) or soil aggregates (Shinn 1998 [DIRS 177230], p. 2) as a result of adhesive forces between the plutonium particles and the soil substrate (Burley 1990 [DIRS 177220], p. 5-7)."

These editorial changes do not affect the results or conclusions of this report, its downstream documents, or the license application.

CR 12947 Action 004, Issue 551:

The histogram in Figure 6.5-1 does not show the appropriate bin intervals. The intervals should include the greater than sign (>) on the lower interval number. Figure 6.5-1 on pg. 6-35 of *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]) is replaced with Figure 6.5-1 below showing the correct binning intervals:



Source: Plot produced in Excel file *Distributions of Enhancement Factors.xls* (Appendix A).

Figure 6.5-1. Distribution of Measured Enhancement Factors

The corrections to the bin intervals used in developing Figure 6.5-1 are discussed in this ERD, therefore it is not necessary to update the data CD associated with Appendix A. The correction to this table does not affect the results or conclusions of this report, its downstream documents, or the license application.

CR 12947 Action 004, Issue 553:

An incorrect DIRS number was used in a reference of this report. In Table 6.5-2 on pg. 6-37 of *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]), the table entry states:

"Shinn et al. 1989 [DIRS 177223], Table 4"

This entry is replaced with the following:

"Shinn et al. 1989 [DIRS 177231], Table 4"

This editorial change does not affect the results or conclusions of this report, its downstream documents, or the license application.

CR 12947 Action 004, Issue 570:

An incorrect section number is referenced. In Section 6.5.3.6 (3rd paragraph) on pg. 6-55 of *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]), the text states:

"These values agree with the enhancement factors under the conditions of no active soil disturbance calculated in Section 6.5.3.4 for the representative TSP distributions."

This sentence is replaced with the following:

"These values agree with the enhancement factors under the conditions of no active soil disturbance calculated in Section 6.5.3.5 for the representative TSP distributions."

In Section 6.5.3.6 on pg. 6-56 (2nd paragraph) of *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]), the text states:

“The calculations in Section 6.5.3.4 indicate that when soil is actively disturbed and the MMAD of suspended particulates increases, a reduction of contaminant concentration in airborne particulates relative to that of bulk soil occurs.”

This sentence is replaced by the following:

“The calculations in Section 6.5.3.5 indicate that when soil is actively disturbed and the MMAD of suspended particulates increases, a reduction of contaminant concentration in airborne particulates relative to that of bulk soil occurs.”

These editorial changes do not affect the results or conclusions of this report, its downstream documents, or the license application.

CR 12947 Action 004, Issue 572:

Undisturbed soil is referred to, when it should refer to disturbed soil. In Section 6.5.3.6 on pg. 6-56 (2nd paragraph) of *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]), the text states:

*“Based on these values it is recommended that a triangular distribution be used to represent the enhancement factor for the **undisturbed soil** with a minimum of 0.4, mode of 1 (no enhancement), and a maximum value of 1.5.”*

This sentence is replaced by the following:

*“Based on these values it is recommended that a triangular distribution be used to represent the enhancement factor for the **disturbed soil** with a minimum of 0.4, mode of 1 (no enhancement), and a maximum value of 1.5.”*

This typographical correction does not affect the results or conclusions of this report, its downstream documents, or the license application.

CR 12947 Action 004, Issue 573:

An incorrect title and DIRS number were used as a reference used in this report. All incorrect references to “*GoldSim User’s Guide (GoldSim Technology Group 2003 [DIRS 166227])*” are replaced with “*User’s Guide, GoldSim Probabilistic Simulation Environment (GoldSim Technology Group 2003 [DIRS 166226])*”. This error occurs in the following sections of *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]):

- Section 4.1.2.4 on pg. 4-5 (top of page)
- Section 6.3.2 on pg. 6-14 (3rd paragraph)
- Section 6.3.2 on pg. 6-15 (2nd paragraph)
- Section 6.5.3.3 on pg. 6-48 (1st paragraph)

- Section 6.7.5 on pg. 6-69 (last paragraph)
- Section 6.7.5 on pg. 6-70 (1st paragraph)
- Section 8.1 on pg. 8-4

These editorial changes do not affect the results or conclusions of this report, any of its downstream documents, or the license application.

CR 12947 Action 004, Issue 580:

An incorrect table number is referenced in this report. In Section 6.5.3.5 (1st paragraph) on pg. 6-50 of *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]), the text states:

"The surface area of these particles can be estimated by assuming that the representative particle size is an average (1.25 μm) for the range from 0.5 to 2 μm , where 0.5 μm was chosen as a cut-off point for the coarse (mineral) fraction of suspended particulate matter (EPA 2004 [DIRS 175978], Figure 2-8), and that clay constitutes about 9% of the mass of Amargosa Valley Soil (Table 6.5-2)."

This sentence is replaced with the following:

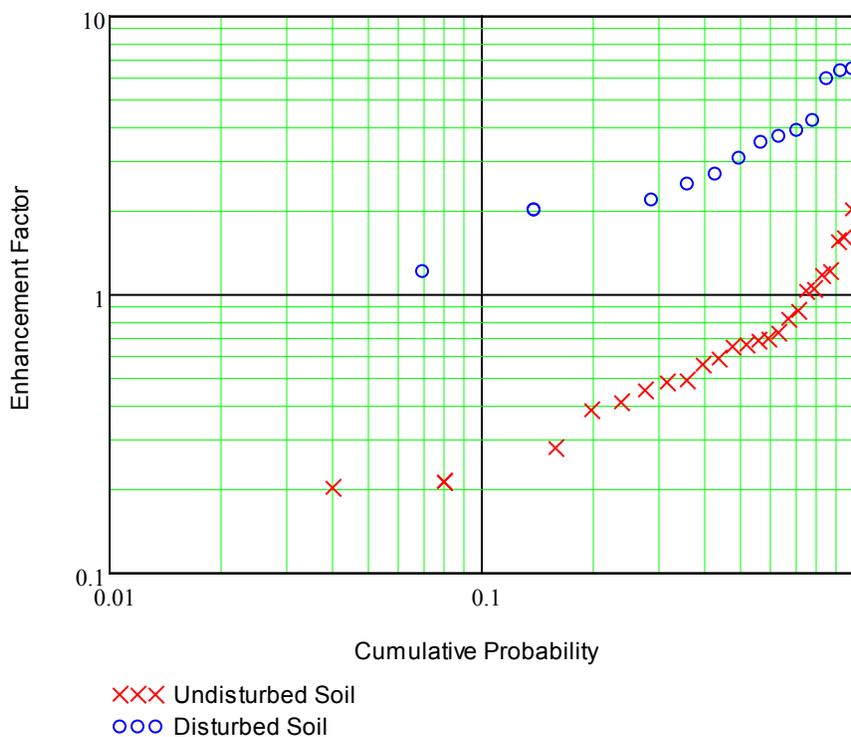
"The surface area of these particles can be estimated by assuming that the representative particle size is an average (1.25 μm) for the range from 0.5 to 2 μm , where 0.5 μm was chosen as a cut-off point for the coarse (mineral) fraction of suspended particulate matter (EPA 2004 [DIRS 175978], Figure 2-8), and that clay constitutes about 9% of the mass of Amargosa Valley Soil (Table 6.5-4)."

This editorial change does not affect the results or conclusions of this report, its downstream documents, or the license application.

CR 12947 Action 004, Issue 581:

In Appendix A CD file *EFS for undisturbed and disturbed soil.mcd*, enhancement factors for undisturbed soil were taken from several references listed in Table 6.5-2 rather than Table 6.5-3 of the report. Also, enhancement factors for the disturbed soil were taken from several references listed in Table 6.5-3 rather than Table 6.5-4 of the report. The first number for the matrix AD0 should be 4.2 instead of 7.2. For AD0, as it is a CDF (sorted from largest to smallest), the order needs to be changed. The values 6.5, 6.4 and 6 move up. The value of 4.2 is placed in the 4th position. These corrections result in changes to Figure 6.5-2.

Figure 6.5-2 on pg. 6-39 of *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]) is replaced with Figure 6.5-2 below showing the correct enhancement factor CDFs. The corrections to calculations used in developing the replacement Figure 6.5-2 are discussed in this ERD, therefore it is not necessary to update the data CD associated with Appendix A.



Source: Figure produced in Mathcad file *EFs for Undisturbed and Disturbed Soil.mcd* (Appendix A).

Figure 6.5-2. Graph of Enhancement Factors for Undisturbed and Disturbed Soil Conditions

Changes to this figure are negligible at this scale; therefore do not affect the results or conclusions of this report, its downstream documents or the license application.

CR 12947 Action 004, Issue 582:

Incorrect file names were referenced in this report. In Tables 6.5-5 and 6.5-6 on pages 6-54 and 6-55, Figures 6.5-3, 6.5-4, 6.5-5, 6.5-6, 6.5-7, 6.5-8 and 6.5-9 on pages 6-44, 6-45, 6-47, 6-51 (also in 1st paragraph after figure 6.5-6 on pg.6-51), 6-52 (also in 2nd paragraph after figure 6.5-7 on pg.6-52, cited 3 times), and 6-53 of *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]), the referenced Mathcad file names begin with:

“Particle Size Distribution for...”

These entries should all be replaced with:

“Size Distribution for...”

This editorial correction does not affect the results or conclusions of this report, its downstream documents, or the license application.

CR 12947 Action 004, Issue 584:

An incorrect table number is referenced. In Appendix A on pg. A-2 (4th paragraph) of *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]), the text states:

"The GM and GSD were taken from Table 6.3-5."

This sentence is replaced with the following:

"The GM and GSD were taken from Table 6.3-6."

This editorial change does not affect the results or conclusions of this report, its downstream documents, or the license application.

CR 12947 Action 004, Issue 588:

Calculations of SMR (Surface-to-Mass Ratio) are not consistent with Eq. 6.5-6. In the text, it is said that the Surface_to_mass Ratio is conditional on the density, ρ . The density term ($6/\rho$) cancels out when the enhancement factor is estimated from these data. Therefore, the value of the density itself is not important. A footnote is to be added to Figure 6.5-7 indicating that every Surface_to_mass Ratio should be multiplied by $6/\rho$.

In Figure 6.5-7 on pg. 6-52 of *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]), a footnote is added that states:

"NOTE: SMR is conditional on the density, ρ , and every SMR term is multiplied by $(6/\rho)$. The density term $(6/\rho)$ cancels out when the enhancement factor is estimated from these data."

Clarification of use of the density term is discussed in this ERD, therefore it is not necessary to update the data CD associated with Appendix A. The addition of this note does not affect the results or conclusions of this report, its downstream documents, or the license application.

CR 12947 Action 004, Issue 589:

An incorrect section number is referenced. In Appendix A on pg. A-2 (last paragraph) of *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]), the text states:

"These Mathcad files are "clones" of the file Size Distributions for Soil and TSP.mcd, except that MMADs, GSDs, and lower cut-off particle diameter were modified for the sensitivity study, as described in Section 6.5.3.4 (Tables 6.5-5 and 6.5-6)."

This sentence is replaced with the following:

"These Mathcad files are "clones" of the file Size Distributions for Soil and TSP.mcd, except that MMADs, GSDs, and lower cut-off particle diameter were modified for the sensitivity study, as described in Section 6.5.3.5 (Tables 6.5-5 and 6.5-6)."

This editorial change does not affect the results or conclusions of this report, its downstream documents, or the license application.

CR 12947 Action 004, Issues 590 and 593:

No basis has been provided for the lower integration limit used in the small and large modes used to calculate the surface-to-mass ratio. Also, the upper integration limits are not consistent with the reference given. The reference given was incorrect and the corrected reference shows the basis for the lower integrations limits as well. The text is revised to show clarify this change.

In Section 6.5.3.5 on pg. 6-52 (last paragraph) of *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]), the text states:

“The upper integration limits for the small and large modes were selected at 100 μm and 300 μm , respectively, which is consistent with the distributions of suspended mass shown in that reference (Pinnick et al. 1985 [DIRS 159577], Figure 4).”

This sentence is replaced with the following:

“The integration limits for the small mode were selected as 0.5 to 100 μm , while the integration limits for the large mode were selected as 10 to 300 μm . These are consistent with the distributions of suspended mass shown in that reference (Pinnick et al. 1985 [DIRS 159577], Figure 3).”

This clarification does not affect the results or conclusions of this report, its downstream documents, or the license application.

CR 12947 Action 004, Issue 592:

An incorrect reference was used in this report. In Section 6.5.3.5 on pg. 6-52 (last paragraph) of *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]), the text states:

“The total surface-to-mass ratio is then calculated as a weighted average of the surface-to-mass ratios for the modes, with the weights being fractions of the TSP mass in those modes calculated from the data in Table 1 of the report by Pinnick et al. (1985 [DIRS 159577]).”

This sentence is replaced with the following:

“The total surface-to-mass ratio is then calculated as a weighted average of the surface-to-mass ratios for the modes, with the weights being fractions of the TSP mass in those modes calculated from the data in Table 3 of the report by Pinnick et al. (1985 [DIRS 159577]).”

This editorial change does not affect the results or conclusions of this report, its downstream documents, or the license application.

IV Impact Evaluation

Many of the changes made in this ERD are editorial in nature. These editorial changes do not affect the results or conclusions of the parent report or the addendum to *Soil Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]). The editorial changes do not affect downstream documents, related documents or the license application.

The transcription error discussed in Issue 532 has the potential to impact other documents because it is an error of an order of magnitude, which can be significant. Documents that were checked for potential impact are listed below and impacts are discussed.

Controlled documents that cite ANL-NBS-MD-000009 REV 03 [DIRS 177400] and have been checked for potential impact include the following:

- 000-00C-MGR0-02500-000-00A: *Site Specific Input Files for Use with GENII Version 2*

The document *Site Specific Input Files for Use with GENII Version 2* (000-00C-MGR0-02500-000-00A) is impacted by the change in low bound of the partition coefficient for uranium. Tables 44 and 77 give the lower bound of the partition coefficient for uranium of 6.3E-01 L/kg. Based on the calculation discussed above in Issue 532, this value should be 6.3E-02 L/kg. The order of magnitude error in this value does not affect the results or conclusions of the *Site Specific Input Files for Use with GENII Version 2* (000-00C-MGR0-02500-000-00A), because the Preclosure Safety Assessment, which these inputs are developed for, only uses the mean values of the partition coefficient distributions; therefore these changes can be considered to be ‘on hold.’

Tables 44 and 77 of *Site Specific Input Files for Use with GENII Version 2* (000-00C-MGR0-02500-000-00A) cite DTN: MO0609SPASRPBM.004 as a source for the values of the partition coefficient. This DTN is product output of *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009) therefore; this data package has also been checked for potential impact due to ‘on hold’ changes in this ERD. Table 1 of this DTN is impacted by the error in the low bound of the partition coefficient for uranium. Table 1 shows the minimum of the low bound of the partition coefficient for uranium as 6.3E-01 L/kg. Based on the calculations discussed above in Issue 532, this value should be 6.3E-02 L/kg. To maintain traceability between *Soil-Related Input Parameters for the Biosphere Model* (ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993]) and output DTN: MO0609SPASRPBM.004, the correction to the DTN is considered to be ‘on hold’ as well.

Controlled documents that cite ANL-NBS-MD-000009 REV 03 AD 01 [DIRS 179993] and have been checked for potential impact include the following:

- ANL-WIS-MD-000027 REV 00 AD 01: *Features, Events, and Processes for the Total System Performance Assessment: Analyses*
- MDL-MGR-MD-000001 REV 02: *Biosphere Model Report*

Changes made in this ERD have no impact on *Features, Events, and Processes for the Total System Performance Assessment: Analyses* (ANL-WIS-MD-000027 REV 00 AD 01).

The *Biosphere Model Report* (MDL-MGR-MD-000001 REV 02) is impacted by the error in the low bound of the partition coefficient for uranium. Table 6.6-3 (which cites output DTN: MO0609SPASRPBM.004) shows the minimum of the soil solid-liquid partition coefficient for uranium as 6.3E-01 L/kg. Based on the calculations discussed above in Issue 532, this value should be 6.3E-02 L/kg. The change in the low bound results in less than a 4% decrease in the BDCF values for the uranium isotopes (^{232}U , ^{233}U , ^{234}U , ^{235}U , ^{236}U , and ^{238}U). Since uranium isotopes are not the key radionuclides that contribute to the dose calculated in the TSPA model, and the BDCF change is relatively small, the impact of using an incorrect low bound value for the uranium partition coefficient has an insignificant effect on downstream models and documents, REV and therefore can be considered to be ‘on hold.’

The *LASAR Section 2.3.10* is impacted by the error in the low bound of the partition coefficient for uranium. Table 2.3.10-10 shows the minimum of the soil solid-liquid partition coefficient for uranium as 6.3E-01 L/kg. Based on the calculations discussed above in Issue 532, this value should be 6.3E-02 L/kg. The change in the low bound results in less than a 4% decrease in the BDCF values for the uranium isotopes (^{232}U , ^{233}U , ^{234}U , ^{235}U , ^{236}U , and ^{238}U). Since uranium isotopes are not the key radionuclides that contribute to the dose calculated in the TSPA model, and the BDCF change is relatively small, the impact of using an incorrect low bound value for the uranium partition coefficient has an insignificant effect on downstream models and documents, and therefore can be considered to be ‘on hold.’

In addition, an evaluation revealed that the *Total System Performance Assessment Model/Analysis for the License Application* (MDL-WIS-PA-000005 REV 00 AD 01), the *Environmental Impact Statement* (DOE/EIS-0250) and the *Supplemental Environmental Impact Statement* (DOE/EIS-0250F-S1) are not impacted by this ERD. The License Application Safety Analysis Report (LASAR) was also checked for potential impact in a variety of ways including searching for citations to the parent document and relevant keywords.

V References

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- 179993 SNL (Sandia National Laboratories) 2007. *Soil-Related Input Parameters for the Biosphere Model*. ANL-NBS-MD-000009 REV 03 AD 01. Las Vegas, Nevada: Sandia National Laboratories. ACC: [DOC.20070927.0004](#).

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