# Model Error Resolution Document

*Complete only applicable items.*

QA: QA
Page 1 of 4

**INITIATION**

| 1. Originator: | 2. Date: | 3. ERD No. |
|---|---|---|
| Kevin G. Mon | 4/4/2008 | ANL-EBS-MD-000003 ERD01 |

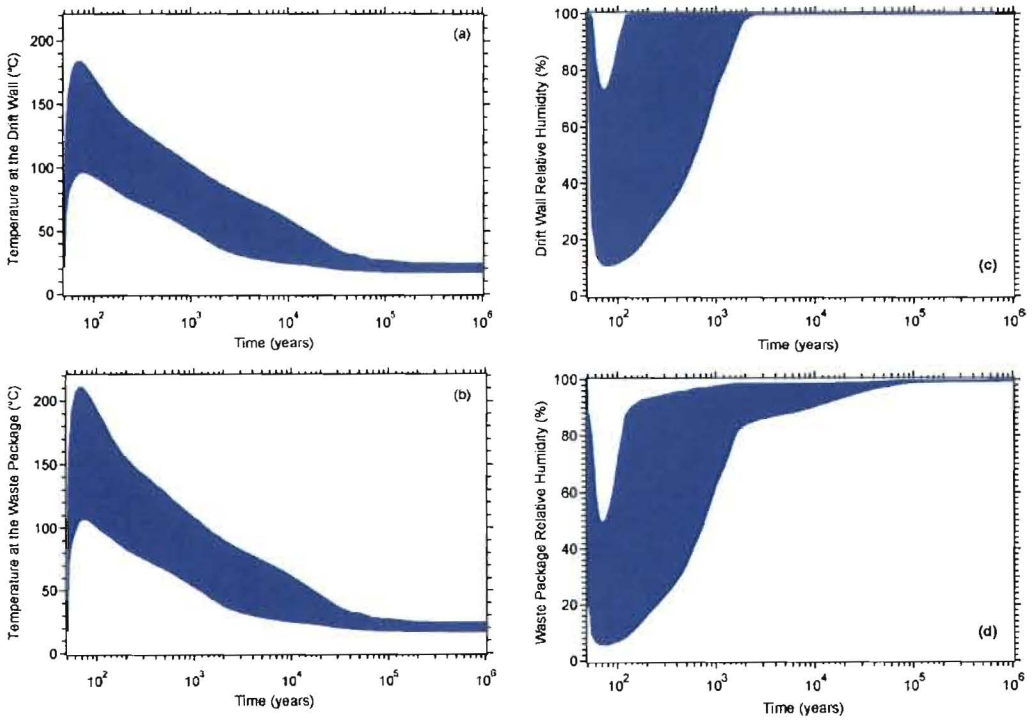
| 4. Document Identifier: | 5. Document Title: |
|---|---|
| ANL-EBS-MD-000003 REV 03 | General Corrosion and Localized Corrosion of Waste Package Outer Barrier |

6. Description of and Justification for Change (Identify applicable CRs and TBVs):

Description of Changes:

In regard to TBV-8527:

1. TBV-8527 is on the use of results from *Multiscale Thermohydrologic Model* (SNL 2007 [DIRS 181383] which is now replaced by SNL 2008 [DIRS 184433]) in *General Corrosion and Localized Corrosion of Waste Package Outer Barrier* (SNL 2007 [DIRS 178519]). Figure 6-2 of *General Corrosion and Localized Corrosion of Waste Package Outer Barrier* (SNL 2007 [DIRS 178519]) is changed as shown below. The sources for Figure 6-2 are changed to "SNL 2008 [DIRS 184433], Figures 6.3-76[a] and 6.3-81[a]" and the graphics are changed to be more consistent with those shown in the current *Multiscale Thermohydrologic Model* (SNL 2008 [DIRS 184433]).




Source: SNL 2008 [DIRS 184433], Figures 6.3-76[a] and 6.3-81[a].

Figure 6-2. Waste Package and Drift Wall Temperature and Relative Humidity Ranges

**CONCURRENCE**

| | Printed Name | Signature | Date |
|---|---|---|---|
| 7. Checker | Gopal C. De | Gopal De | 04/08/2008 |
| 8. QCS/QA Reviewer | Brian Mitcheltree | Brian Mitcheltree | 4/8/08 |

**APPROVAL**

| | | | |
|---|---|---|---|
| 9. Originator | Kevin G. Mon | Kevin Mon | 04/08/08 |
| 10. Responsible Manager | Paul Dixon | Paul D | 4-10-08 |

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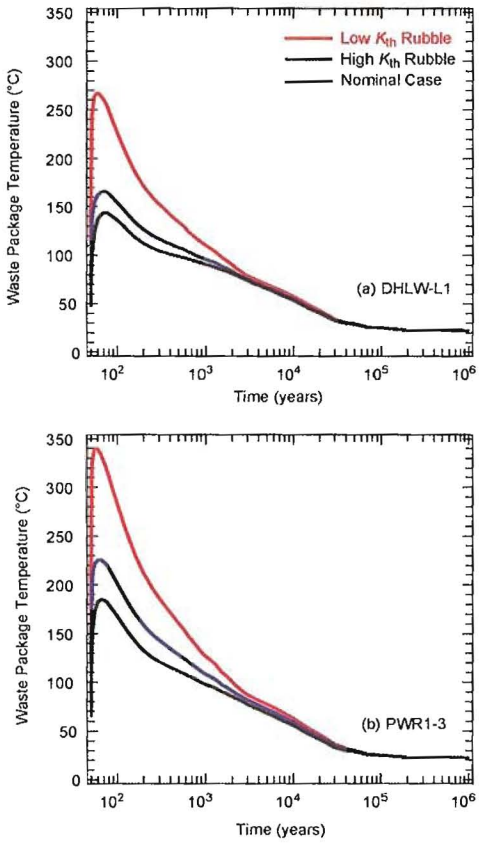
Figure 6-3 of *General Corrosion and Localized Corrosion of Waste Package Outer Barrier* (SNL 2007 [DIRS 178519]) is changed as shown below. The source for Figure 6-3 is changed to "SNL 2008 [DIRS 184433], Figure 6.3-82[a]" and the graphics are changed to be more consistent with those shown in the current *Multiscale Thermohydrologic Model* (SNL 2008 [DIRS 184433]).




Source: SNL 2008 [DIRS 184433], Figure 6.3-82[a].

NOTE: Low and high $K_{th}$ indicate low and high thermal conductivity, respectively, of the rubble formed in a collapsed drift.

Figure 6-3. Waste-Package Temperature Histories for the Defense High-Level Waste/Department of Energy Spent Nuclear Fuel-Long (DHLW-L1) Waste Package and 21-Pressurized Water Reactor Absorber Plate Commercial Spent Nuclear Fuel (PWR1-3) Waste Package for the Nominal (intact drift) Case and Low and High Rubble Thermal-Conductivity Collapsed-Drift Cases

Also, the following changes are made to replace [DIRS 181383] with [DIRS 184433] throughout the document:

a) The first two sentences in Section 6.3.1 which read "Figure 6-2 shows a summary of the range of waste package and drift wall temperature and relative humidity histories for the repository (SNL 2007 [DIRS 181383], Figures 6.3-74[a] and 6.3-79[a]). The influence of the low-probability seismic collapsed-drift scenario on in-drift thermalhydrologic conditions is shown in Figure 6-3 (SNL 2007 [DIRS 181383], Figure 6.3-80[a])." are modified to read "Figure 6-2 shows a summary of the range of waste package and drift wall temperature and relative humidity histories for the repository (SNL 2008 [DIRS 184433], Figures 6.3-76[a] and 6.3-81[a]). The influence of the low-probability seismic collapsed-drift scenario on in-drift thermal hydrologic conditions is shown in Figure 6-3 (SNL 2008 [DIRS 184433], Figure 6.3-82[a])."

b) The last sentence of paragraph three in Section 6.4.4.2 which reads "The waste package surface temperature is 120°C or below when the drift wall exposure temperature is 100°C or below (e.g., SNL 2007 [DIRS 181383], Figures 6.3-67 and 6.3-69)." is modified to read "The waste package surface temperature is 120°C or below when the drift wall exposure temperature is 100°C or below (e.g., SNL 2008 [DIRS 184433], Figures 6.3-67 and 6.3-69)."

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c) The second-to-last reference on p. 9-10 (Section 9.1) which reads "181383 SNL 2007. *Multiscale Thermohydrologic Model.* ANL-EBS-MD-000049 REV 03 AD01. Las Vegas, Nevada: Sandia National Laboratories." Is modified to read "184433 SNL 2008. *Multiscale Thermohydrologic Model.* ANL-EBS-MD-000049 REV 03 AD 02. Las Vegas, Nevada: Sandia National Laboratories. ACC: DOC.20080201.0003. "

In regard to CR 11721:

2. In Appendix VIII (p. VIII-2) of ANL-EBS-MD-000003 REV 03 the metadata for the solution composition of cell number 24 is not correct. The correct solution composition is 3.5m NaCl + 0.525 m $KNO_3$, not 3.5 m NaCl + 0.175 m $KNO_3$ as listed. Also, for cell number 25 the correct nitrate-to-chloride ratio is 0.05, not 0.18 as listed.

In addition, clarifications are added and typos corrected as indicated below:

3. The second sentence of Section 6.4.3.2.1 which reads "As shown in Appendix IV, several distributions were evaluated including the uniform distribution, the normal distribution, the log-normal distribution, and the gamma distribution." is modified to read "As shown in Appendix IV (output DTN: MO0612WPOUTERB.000, file: WEIBULL_Fit-a.xmcd), several distributions were evaluated including the uniform distribution, the normal distribution, the log-normal distribution, and the gamma distribution."
4. The first sentence of the fifth paragraph of Section 6.4.4.8.2 (p. 6-107) which reads "The literature data available for less corrosion-resistant materials than Alloy 22 (e.g., carbon steel and stainless steel) (Hunkeler and Boehni 1983 [DIRS 162221]; Marsh et al. 1991 [DIRS 162234]; Mughabghab and Sullivan 1989 [DIRS 162235]; Sharland et al. 1991 [DIRS 162238]; Ishikawa et al. 1991 [DIRS 162222]) clearly show that a penetration growth law of the form of Equation 6-42 is appropriate, and that a value of n = 0.5, the theoretically predicted value, is justifiable." is modified to read "The literature data available for less corrosion-resistant materials than Alloy 22 (e.g., carbon steel and stainless steel) (Hunkeler and Boehni 1983 [DIRS 162221]; Marsh et al. 1991 [DIRS 162234]; Mughabghab and Sullivan 1989 [DIRS 162235]; Sharland et al. 1994 [DIRS 162238]; Ishikawa et al. 1994 [DIRS 162222]) clearly show that a penetration growth law of the form of Equation 6-42 is appropriate, and that a value of n = 0.5, the theoretically predicted value, is justifiable." The dates of references [DIRS 162238] and [DIRS 162222] are changed from 1991 to 1994.
5. The second sentence of the fifth paragraph in Section 6.4.6.2.1 (p. 6-120) which reads "This comparison was carried out in 1 M NaCl at 90°C and 6 m NaCl + 0.9 m $KNO_3$ at 80°C and 100°C." is modified to read "This comparison was carried out in 1 M NaCl at 90°C and 6 m NaCl + 0.9 m $KNO_3$ at 100°C." No data at 80°C in 6 m NaCl + 0.9 m $KNO_3$ is presented.
6. In Section 7.2.1, the third sentence of the second paragraph on page 7-5 which reads "For example, Alloy C (UNS N06455) specimens exposed for 44 years to a marine environment at North Carolina's Kure Beach (i.e., with salt air and alternate wetting and drying, as well as the presence of surface deposits) (Baker 1988 [DIRS 154510], p. 134 and Table 6) indicate that passivity was maintained over this long exposure period as evidenced by the observation of a mirror like surface finish after surface deposits were removed." is modified to read "For example, Alloy C (UNS N10002) specimens exposed for 44 years to a marine environment at North Carolina's Kure Beach (i.e., with salt air and alternate wetting and drying, as well as the presence of surface deposits) (Baker 1988 [DIRS 154510], p. 134 and Table 6) indicate that passivity was maintained over this long exposure period as evidenced by the observation of a mirror like surface finish after surface deposits were removed." The UNS number for Alloy C is changed from N06455 to N10002.

Justification for Change:

In regard to TBV-8527:

During development of *Multiscale Thermohydrologic Model,* ANL-EBS-MD-000049 REV 03 ADD 01 (SNL 2007 [DIRS 181383] which is now replaced by ANL-EBS-MD-000049 REV 03 ADD 02, SNL 2008 [DIRS 184433]), changes were made such that the figure numbers of two figures referenced by ANL-EBS-MD-000003 REV 03 were changed. Graphical changes were also made. However, these figures from ANL-EBS-MD-000049 REV 03 which are referenced by ANL-EBS-MD-000003 REV 03 are used as indirect inputs. Therefore, the changes in item 1), above, are not relevant to safety or waste isolation and do not have any impact on the results of the Safety Analysis Report or the Total System Performance Assessment.

In regard to CR 11721:

The output DTNs for ANL-EBS-MD-000003 REV 03 [DIRS 178519], DTN: MO0612WPOUTERB.000 [DIRS 182035] and DTN: MO0703PAGENCOR.001 [DIRS 182029] were evaluated. It was found that these typos were not present in the data files used to generate the output from these technical products. Therefore, these typos are not relevant to safety or waste isolation and do not have any impact on the results of the Safety Analysis Report or the Total System Performance Assessment.

In regard to the clarifications and typos identified in items 3 through 6:

These corrections do not affect the technical product output of ANL-EBS-MD-000003 REV 03 and are not relevant to safety or waste isolation and do not have any impact on the results of the Safety Analysis Report or the Total System Performance Assessment.

Analysis of Impacted Documents:

The changes listed in items 1 through 6 have no impact on the conclusions of or the outputs from ANL-EBS-MD-000003 REV 03. Therefore,

# Model
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| Kevin G. Mon | 4/4/2008 | ANL-EBS-MD-000003 ERD01 |

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there is no impact on the following documents that cite ANL-EBS-MD-000003 REV 03: TDR-MGR-MD-000058 Rev. 00, ANL-DS0-NU-000001 Rev. 00, ANL-EBS-GS-000001 Rev. 02, ANL-EBS-MD-000033 Rev. 06, ANL-NBS-HS-000057 Rev. 00, ANL-WIS-MD-000024 Rev. 01, ANL-WIS-MD-000027 Rev. 00, ANL-WIS-PA-000001 Rev. 03, CAL-DN0-NU-000002 Rev. 00C, MDL-WIS-PA-000005 Rev. 00, Addendum 01, MDL-WIS-PA-000005 Rev. 00, Miscld 01, MDL-WIS-PA-000005 Rev. 00, Miscld 02, MDL-WIS-PA-000005 Rev. 00, Miscld 03, TDR-MGR-MD-000037 Rev. 02, TDR-MGR-MD-000056 Rev. 00, TDR-PCS-SE-000001 Rev. 05, Addendum 01, TDR-TDIP-ES-000001 Rev. 01, TDR-TDIP-ES-000006 Rev. 00, TDR-TDIP-ES-000009 Rev. 00, TDR-WIS-PA-000014 Rev. 00, DOE/EIS-0250-S1D Miscld 05, DOE/EIS-0250-S1D Miscld 17, LASAR-2.03.06, and TDR-TDIP-ES-000001 Rev. 00.