Model Error Resolution Document

Complete only applicable items.

INITIATION

1. Originator:	2. Date:	3. ERD No.
Kenneth Rehfeldt	April 7, 2008	MDL-WIS-PA-000005 ERD 01

4. Document Identifier:	5. Document Title:
MDL-WIS-PA-000005 REV 00 AD 01	TOTAL SYSTEM PERFORMANCE ASSESSMENT MODEL/ANALYSIS FOR THE LICENSE APPLICATION

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

The purpose of this ERD is to identify and analyze impacts of changes to MDL-WIS-PA-000005 REV 00 AD 01 needed to address the following TBVs:

TBV-9222
TBV-9075
TBV-9013
TBV-9015
TBV-9082
TBV-9086
TBV-9132
TBV-9139

The analyses and impacts are presented in the attachment to the ERD.

CONCURRENCE

	Printed Name	Signature	Date
7. Checker	David Mohr	David E Mohr	4/10/08
8. QCS/QA Reviewer	John Devers	John K Devers	04/10/08

APPROVAL

9. Originator	Kenneth Rehfeldt	Kenneth Rehfeldt	04/10/08
10. Responsible Manager	Paul Dixon	Paul	4-11-08

I. BACKGROUND INFORMATION

TBV-9222: DTN: MO0712PBANLNWP.000 (titled Probabilistic Analysis of Navy Waste Packages) is an indirect input source to the TSPA-LA AMR (SNL 2008 [DIRS 183478]). The values cited were verified, but there is a typographical error in the name of the one of the files from the DTN as cited in the TSPA-LA AMR. The error is corrected in this ERD.

TBVs-9075, -9082, and -9132: The TSPA-LA AMR cited the Revision 00 version of the FEP DTN (MO0706SPAFEPLA.001 [DIRS 181613]). When the FEP analysis report (ANL-WIS-MD-000027 REV 00, SNL 2008 [DIRS 183041]) was approved, a revised version of the FEP DTN (MO0706SPAFEPLA.001 [DIRS 185200]) became available. The text in the TSPA-LA AMR can not always be verified using the Revision 00 version of the DTN. The suggested change to the TSPA-LA AMR is to replace the Revision 00 citation with citation of Revision 01 of the DTN. All verification is then made against the revised version. Corrections as a result of the update to Revision 01 of the FEP DTN are provided in this ERD.

TBVs-9015, -9086, and -9139: The TSPA-LA AMR citation to the FEP methods report (ANL-WIS-MD-0000026 REV 00, SNL 2008 [DIRS 179476]) is often incorrect and the citation should be to the FEP analysis report (SNL 2008 [DIRS 183041]). The corrected citations are provided as appropriate in this ERD.

TBV-9013: The citations to the simulation of net infiltration model report (MDL-NBS-HS-000023 REV 01 AD 01, SNL 2008 [DIRS 182145]) were verified except in two instances that are corrected in this ERD.

II. INPUTS AND SOFTWARE

One new input to this analysis is the revision to the FEP DTN (MO0706SPAFEPLA.001 [DIRS 185200]). This DTN is qualified product output of the FEP analysis report (SNL 2008 [DIRS 183041]).

No software is used in the analysis presented in this ERD.

III. IMPACT EVALUATION

TBV-9222: DTN: MO0712PBANLNWP.000 [DIRS 184664] is qualified product output of the waste package flooding report (CAL-DN0-NU-000002 REV 00C, SNL 2008 [DIRS 184078]). The DTN is cited in the TSPA-LA AMR on page 6.7-7, where the specific file name given as the source of the exceedance frequency is *Nonlith LC Calculation Rev03.mxd.* The values cited have been verified against file *Nonlith LC Calculation Rev03.xmcd* and the pdf version of that file *Mathcad Nonlith LC Calculation Rev03.pdf.* This error in the file name is typographical and is corrected by the following revised sentence from page 6.7-7, where deleted text is indicated by a strikethrough and added text has been underlined:

> The frequency of seismic events that result in a rupture of one or more DSs from large rock block impacts is evaluated to be 1.17×10^{-6} (yr^{-1}) (DTN: MO0712PBANLNWP.000_R0 [DIRS 184664], Nonlith LC Calculation Rev03.~~mxd~~xmcd).

Impact Analysis

This change is typographical only and does not impact the values used in the TSPA-LA AMR, nor does it alter any of the conclusions or output of the report. As well, because there are no substantive changes to the TSPA-LA AMR, there are no impacts to downstream users such as the SAR.

TBVs-9075, -9082, and -9132: These three TBVs all relate to the use of Revision 00 of the product output DTN (MO0706SPAFEPLA.001 [DIRS 181613]) of the FEP analysis report (SNL 2008 [DIRS 183041]). The product output DTN was revised when the FEP analyses document was approved. The revised DTN is MO0706SPAFEPLA.001 [DIRS 185200] and was extensively changed from the Revision 00 version originally cited. Several corrections to the TSPA-LA AMR are presented below.

First, on pages 1-31, 6.1.4-14, 6.3.3-11, T6.3.3-5, 6.3.5-3 (5 times), 6.3.5-4 (6 times), 6.3.5-5, 6.3.5-24, 6.3.6-2 (2 times), 6.3.6-6, T6.3.6-1 (2 times in Table 6.3.6-1), 6.3.7-16, 6.3.9-19, 6.3.10-11, 6.6-11, 6.6-12, 6.6-19 (2 times), T7.9-11, E-13, E-14 (2 times), and I-1 (2 times), change the reference citation from DTN: MO0706SPAFEPLA.001_R0 [DIRS 181613] to DTN: MO0706SPAFEPLA.001_R1 [DIRS 185200].

Second, on pages 6.1.1-3 (2 times) and 6.1.1-4, the citations to the FEP DTN are not appropriate because they refer to process details that are better described in the associated FEP documents (SNL 2008 [DIRS 179476]; SNL 2008 [DIRS 183041]). Therefore, the following specific sentences are revised on page 6.1.1-3:

> Additional analyses and refinements were conducted during the transition from the TSPA-SR FEP list to the TSPA-LA FEP list (~~DTN: MO0706SPAFEPLA.001_R0 [DIRS 181613]~~SNL 2008 [DIRS 179476]).
>
> These FEP identification actions resulted in a comprehensive TSPA-LA FEP list containing 374 FEPs (~~DTN: MO0706SPAFEPLA.001_R0 [DIRS 181613]~~SNL 2008 [DIRS 183041]).

On page 6.1.1-4, the following sentence is revised:

> The FEP screening process included input from subject matter experts, as documented in ~~the *LA FEP List and Screening* (DTN: MO0706SPAFEPLA.001_R0 [DIRS 181613]~~SNL 2008 [DIRS 183041], Section 6.1).

Third, on page 6.3.6-2, the following sentence is replaced to be consistent with the most recent version of the FEP justification for FEP 2.1.03.10.0A. The deleted sentence is:

> ~~Stress corrosion cracks may occur, but advection of liquid water through stress corrosion cracks in the WPs is excluded for the following reasons (DTN: MO0706SPAFEPLA.001_R0 [DIRS_181613], FEP Number 2.1.03.10.0A): (1) capillary behavior allows water to reside indefinitely within the crack without flow, and (2) surface tension opposes hydraulic pressure that may be present at the outlet, and (3)~~

~~stress corrosion cracks are tight, rough, and tortuous, which limits the transient response to dripping water.~~

The replacement sentence is:

> Advective flow of water (and by inference, solids) in through-wall cracks in the SCC-damaged waste package is excluded on the basis of low consequence (DTN: MO0706SPAFEPLA.001_R1 [DIRS 185200]) because the amount of advective water flow through the cracks will be severely limited by the combined effects of: (1) protection by drip shields (even damaged ones) against drift seepage; (2) limitations on the extent of waste package damage from to seismic events; (3) tight and highly tortuous crack pathways for advective liquid flow; and (4) plugging of cracks by compact cemented agglomerates of corrosion products and mineral precipitates.

Fourth, on page T6.3.5-1 (Table 6.3.5-1 footnote), the cited DTN does not contain Table 7.1. The footnote "a"should be revised as follows:

> Excluded FEPs, as shown in SNL 2008 [DIRS 183041] ~~DTN: MO0706SPAFEPLA.001_R0 [DIRS 181613]~~, Table 7.1.

Fifth, on page 6.3.5-4, the text states that seismic-induced rockfall is included for the drip shields and waste packages. However, the rockfall is excluded per FEP 1.2.03.02.0B. The text is revised as follows:

> Seismic-induced drift collapse ~~rockfall~~ is included as a degradation mechanism for both DSs and WPs in the Seismic Scenario Class (DTN: MO0706SPAFEPLA.001_R1~~0~~ [DIRS 185200 ~~181613~~], FEP Numbers 1.2.03.02.0C ~~and 1.2.03.02.0B~~). The Seismic Scenario Class conceptual model and TSPA-LA Model implementation are discussed in Section 6.6.

Sixth, in Table 7.9-1, for entry CMT-062105-121205-14, the discussion of the advances in the FEPs screening process are best described in the FEP document. The last sentence is therefore revised as follows:

> A detailed discussion of the FEPs screening process, including the WP and DS degradation due to stress corrosion cracking, is presented in the FEPs documents (SNL 2008 [DIRS 179476] and SNL 2008 [DIRS 183041]). ~~database (DTN: MO0706SPAFEPLA.001 [DIRS 181613]).~~

The final change related to these three TBVs is the update of the FEP DTN reference citation on page 9-69. The revision is given below:

185200 ~~181613~~	MO0706SPAFEPLA.001. FY 2007 LA FEP List and Screening. Submittal date: 03/05/2008 ~~06/20/2007~~.

Impact Analysis

There are no impacts of these changes for TBVs-9075, -9082, and -9132 to the results or outputs of the TSPA-LA AMR. The changes update the reference to the FEPs DTN, but do not change the values as applied in the TSPA-LA AMR. Although a number of other reports directly cite MDL-WIS-PA-000005 REV 00 and REV 00 AD01, there are no impacts from the changes presented in the ERD.

TBVs-9015, -9086, and -9139: In several places in the TSPA-LA AMR, the FEP methods report (SNL 2008 [DIRS 179476]) is cited, but in some of the cases, the citation should have been to the FEP analysis report (SNL 2008 [DIRS 183041]). In another instance, the section cited is incorrect. Specific changes are provided below:

On page 6.1.1-2, the Section 6.1.4.1 cited does not exist in the cited document and should be corrected. The revised sentence is:

> The iterative FEP analysis process was initiated to support the TSPA for the Site Recommendation (TSPA-SR) and continued through the TSPA-LA FEP analysis, as described in Features, Events, and Processes for the Total System Performance Assessment: Methods (SNL 2008 [DIRS 179476], Section 6.1.~~4.1~~).

On page 7.9-15 , in section 7.9.3.3, a reference is made to the document that revised the FEP database. The document cited should be the FEP analysis report (SNL 2008 [DIRS 183041]) and the revised sentence is as follows:

> Since the time this effort was completed, the Project has revised its entire FEPs database (SNL 2008 [DIRS 183041 ~~179476~~]) in order to implement a further enhanced screening process of the FEPs on the repository performance as well as the transparency and traceability of the individual FEPs' screening logic.

In Appendix L, reference is made to specific FEPs and inclusion or exclusion justifications. The cited document is the FEP methods report (SNL 2008 [DIRS 179476]), which does not contain the justifications. Rather, the reference should be to the FEP analysis report (SNL 2008 [DIRS 183041]). Two revised sentences are given below, from pages L-9 and L-10, respectively:

> Localized corrosion of the DS is excluded as a DS degradation mechanism (SNL 2008 [DIRS 183041 ~~2007 [DIRS 179476]~~], FEP Number 2.1.03.03.0B).

> However, it is not expected that any water would be able to flow through such cracks and the DS would retain its effectiveness as a barrier to seepage (SNL 2008 [DIRS 183041] ~~2007 [DIRS 179476]~~, FEP Number 2.1.03.10.0B).

Impact Analysis

There are no impacts to the TSPA-LA AMR analyses, results, or outputs as a result of the changes related to TBVs-9015, -9086, and -9139. The changes are limited to updating the reference from the FEP methods report (SNL 2008 [DIRS 179476]) to the FEP analysis report

(SNL 2008 [DIRS 183041]). The changes to the source for FEP information do not impact any of the other documents that cite the TSPA-LA AMR (MDL-WIS-PA-000005 REV 00 or REV 00 AD01).

TBV-9013: The TSPA-LA AMR cites the simulation of net infiltration report (SNL 2008 [DIRS 182145]) in numerous places. The citations are verified with the exception of two locations. The first exception is a typographical error in a figure and section callout. The second exception is an incorrect statement that is corrected in this ERD.

On page 6.3.1-6, the following sentence is corrected to identify the correct cited section:

> Parameters sampled for the Present-Day Climate State LHS simulations include the annual average of the natural logarithm of the amount of daily rainfall on days with precipitation, plant height, maximum rooting depth, soil depth for soil depth class 4, bulk saturated hydraulic conductivities of bedrock IHUs 405 and 406, holding capacity of soil group 5/7/9, readily evaporable water, minimum transport coefficient, evaporation layer depth, and the slope of the normalized difference vegetation index-basal transpiration coefficient function (SNL 2008 [DIRS 182145], Table 6.5.5.1-1, Section 6.5.5.1 ~~Table 6.5.1.1-1, Section 6.5.1~~, and SNL 2008 [DIRS 184077], Section 3).

The other error is on page 1-15, where it is stated that the five surficial soil depth classes are based on differences in soil texture. This statement is only partially true in that soil texture is one component of field mapping of soils. A revised statement is given below.

> For the infiltration modeling, mapped surficial, unconsolidated deposits were reconfigured into five surficial soil classes based on data from boreholes, field surficial deposits mapping, and the geologic framework model ~~differences in soil texture~~ (SNL 2007 [DIRS 182145], Sec. 6.5.2.4).

Impact Analysis

The are no impacts to the TSPA-LA AMR analyses, results, conclusions, or outputs from the changes made from TBV-9013. No downstream document is impacted by the changes made in this ERD.

IV. ANALYSIS RESULTS AND CONCLUSIONS

The corrections presented in the ERD are focused almost exclusively on updating several reference citations to the FEPs DTN or FEPs documents. The values in the TSPA-LA AMR have been verified, so the only changes are editorial in nature to present the most recent reference or to update a citation. These changes ensure that the most recent version of several references are cited in the TSPA-LA AMR, but do not alter the inputs, outputs, analyses, results, or conclusions of the TSPA-LA AMR.