



Model Error Resolution Document

QA
Page 1 of 7

Complete only applicable items

1. Document Number:	MDL-NBS-HS-0000019	2. Revision/Addendum:	REV 01 AD 01	3. ERD:	02
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4. Title: Abstraction of Drift Seepage

5. No. of Pages Attached: 6

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 12414 which is associated with the model report *Abstraction of Drift Seepage* (MDL-NBS-HS-000019 REV 01 [DIRS 169131]) and its addendum (MDL-NBS-HS-000019 REV 01 AD 01 [DIRS 181244]).

CR 12414: This CR was initiated because *Abstraction of Drift Seepage* (MDL-NBS-HS-000019 REV 01 AD 01 [DIRS 181244]) includes text and schematic drawings that have probabilities of greater than 1.0. The CR describes text and figure changes that are to be made to the AMR and the SAR. This ERD is prepared to make the changes described in CR 12414.

II Inputs and/or Software

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

III Analysis and Results

CR 12414

In order to address CR 12414, changes to the text and figures of *Abstraction to Drift Seepage* (MDL-NBS-11S-000019 REV 01 AD 01 [DIRS 181244]) are necessary and are described in this ERD.

(see attached)

7. CONCURRENCE

	Printed Name	Signature	Date
Checker	James T. Kam		11/14/08
QCS/QA Reviewer	Peter Persoff		11/14/2008

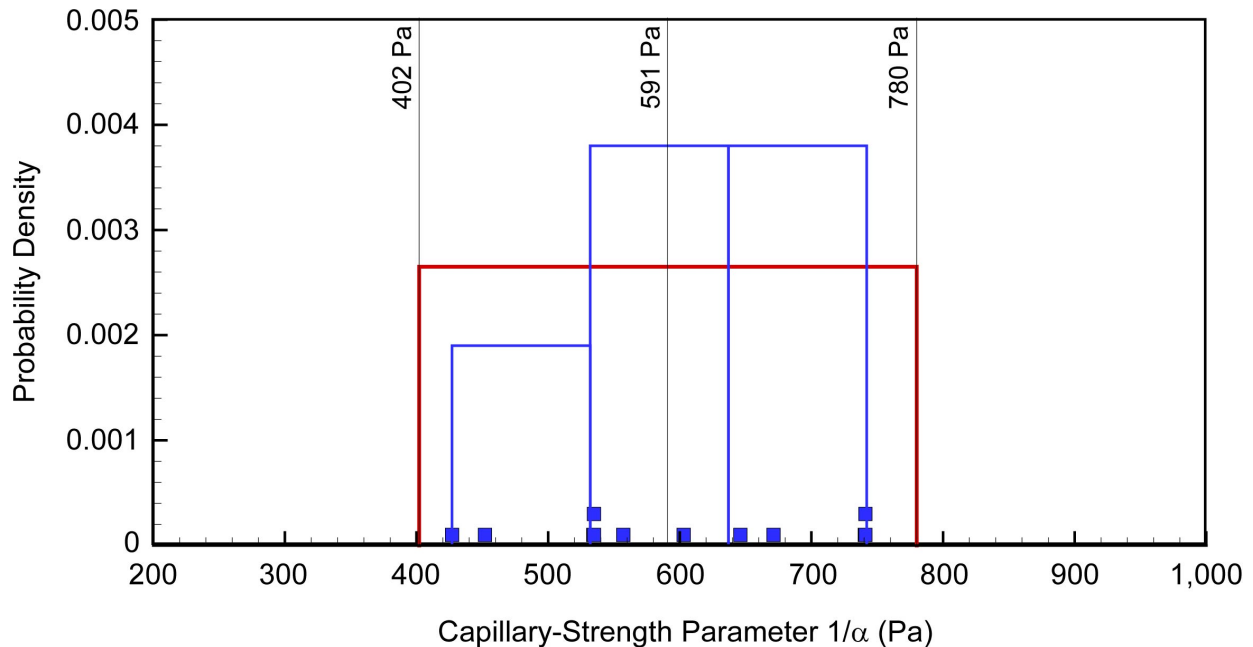
8. APPROVAL

Originator	Alicia Aragon		11/14/08
Responsible Manager	Robert MacKinnon		11/14/08

SCI-PRO-006.3-R1

(Continued from Block 6)

Figure 6.6-2 on pg. 6-113 of *Abstraction to Drift Seepage* (MDL-NBS-HS-000019 REV 01 AD 01 [DIRS 181244]), appears to be correct, however, the y-axis label needs to be updated as the data contained thereon is also based on probability density. Figure 6.6-2 is to be replaced with the figure shown below.

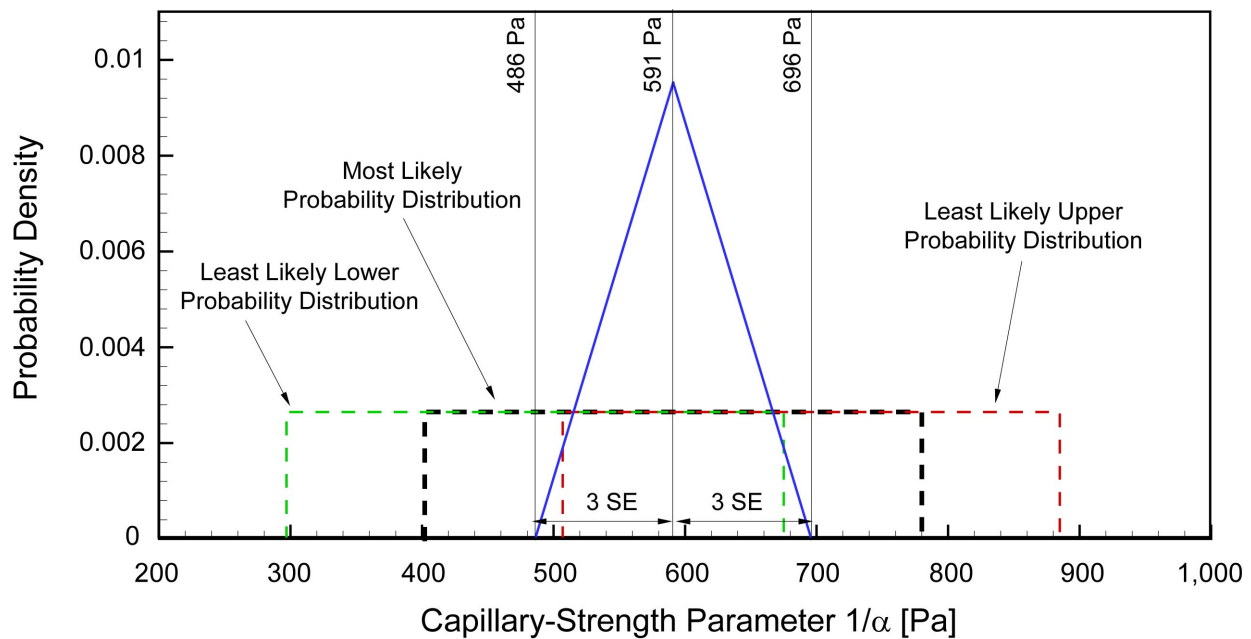


Source DTN: LB0302SCMREV02.002 [DIRS 162273].

NOTE: Vertical lines indicate mean and range of distribution. Blue symbols indicate calibrated sample values.

Figure 6.6-2. Histogram and Related Probability Distribution for Spatial Variability of Capillary-Strength Parameter 1/α, Using Statistical Parameters Based on Method A

Figure 6.6-3 on pg. 6-116 of *Abstraction to Drift Seepage* (MDL-NBS-HS-000019 REV 01 AD 01 [DIRS 181244]), appears to be correct, however, the y-axis label needs to be updated as the data contained thereon is also based on probability density. Figure 6.6-3 is to be replaced with the figure shown below.



NOTE: The blue line assigns a probability to the mean of the uniform-shaped spatial variability distribution. The black dashed line shows the most likely spatial probability distribution (at the peak of the triangular distribution). The green and the red dashed lines show the least likely spatial probability distributions (at the minimum and the maximum of the triangular distribution); based on statistical parameters summarized in Table 6.6-2. SE denotes standard error.

Figure 6.6-3. Schematic Showing the Triangular Probability Distribution (Blue Line) for Covering Uncertainty of the Capillary-Strength Parameter by Varying the Mean of the Spatial Probability Distribution, Using Statistical Parameters Based on Method A

In Section 6.6.3 on page 6-117 (1st full paragraph, line 13) of *Abstraction to Drift Seepage* (MDL-NBS-HS-000019 REV 01 AD 01 [DIRS 181244]), the text states:

“Stress-redistribution effects are more prominent in the repository rocks at Yucca Mountain; they give rise to considerable increases in fracture permeability that extend to a distance of a few meter measured from the drift crown (see Figures 6.5.1-1 and 6.6.1-1 in BSC 2004 [DIRS 169864]).”

This sentence is to be replaced with the following:

“Stress-redistribution effects are more prominent in the repository rocks at Yucca Mountain; they give rise to considerable increases in fracture permeability that extend to a distance of a few meters measured from the drift crown (see Figures 6.5.1-1 and 6.6.1-1 in BSC 2004 [DIRS 169864]).”

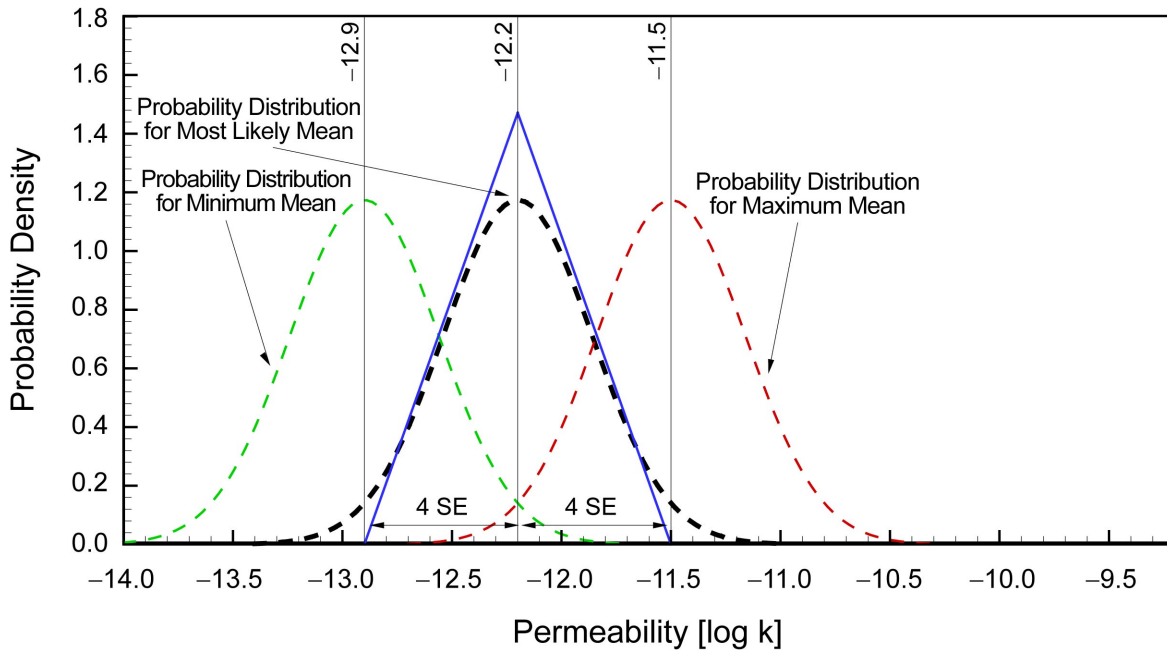
In Section 6.6.3.3 on page 6-135 (1st paragraph, 3rd sentence) of *Abstraction to Drift Seepage* (MDL-NBS-HS-000019 REV 01 AD 01 [DIRS 181244]), the text states:

“The most likely spatial variability distribution is the one defined in Section 6.6.3.2, with a probability of 1.47 corresponding to the peak value of the triangular distribution.”

This sentence is to be replaced with the following:

“The most likely spatial variability distribution is the one defined in Section 6.6.3.2, with a probability density value of 1.47 corresponding to the peak value of the triangular distribution.”

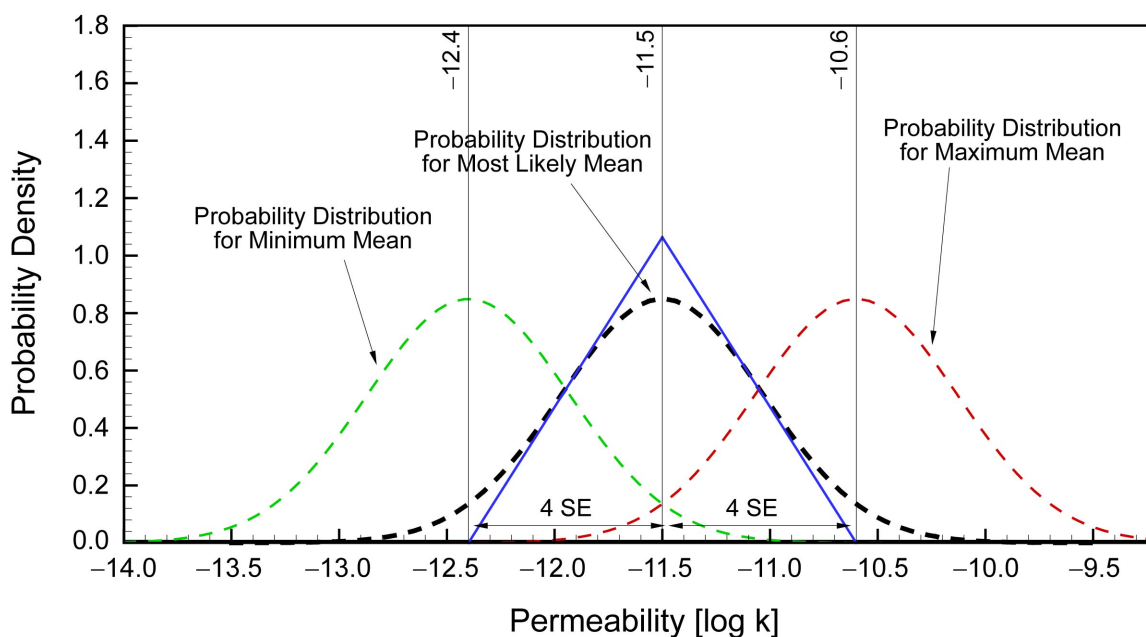
Figure 6.6-7 on page 6-136 of *Abstraction to Drift Seepage* (MDL-NBS-HS-000019 REV 01 AD 01 [DIRS 181244]) also needs correction to the y-axis label. Figure 6.6-7 is to be replaced with the figure below.



NOTE: The blue line assigns a probability to the mean of the normal-shaped spatial variability distribution. The black dashed line shows the most likely spatial probability distribution (at the peak of the triangular distribution). The green and the red dashed lines show the least likely spatial probability distributions (at the minimum and the maximum of the triangular distribution). Based on Tables 6.6-3, 6.6-4, 6.6-5 and 6.6-6 as well as discussion in Sections 6.6.3.2 and 6.6.3.3. Permeability values in \log_{10} of unit m^2 . SE denotes standard error.

Figure 6.6-7. Schematic Showing Triangular Probability Distribution (Blue Line) for Covering Uncertainty of Permeability in the Tptpmn Unit by Varying the Mean of the Spatial Probability Distribution

Figure 6.6-8 on pg. 6-137 of *Abstraction to Drift Seepage* (MDL-NBS-HS-000019 REV 01 AD 01 [DIRS 181244]) assigns a probability to the mean of the normal-shaped spatial variability distribution a value greater than 1.0. The data contained in this figure is based on probability density; therefore a change is needed to the y-axis label. Figure 6.6-8 is to be replaced with the figure shown below.



NOTE: The blue line assigns a probability to the mean of the normal-shaped spatial variability distribution. The black dashed line shows the most likely spatial probability distribution (at the peak of the triangular distribution). The green and the red dashed lines show the least likely spatial probability distributions (at the minimum and the maximum of the triangular distribution). Based on Tables 6.6-3, 6.6-7, 6.6-8, and 6.6-9 as well as discussion in Sections 6.6.3.2 and 6.6.3.3. Permeability values in \log_{10} of unit m^2 . SE denotes standard error.

Figure 6.6-8. Schematic Showing Triangular Probability Distribution (Blue Line) for Covering Uncertainty of Permeability in the Tptpl Unit by Varying the Mean of the Spatial Probability Distribution

In Section 6.7.3[a] on page 6-49[a] of *Abstraction to Drift Seepage* (MDL-NBS-HS-000019 REV 01 AD 01 [DIRS 181244]), the text states:

“Revision to Parent Report, page 6-34, bottom paragraph, sentences five through nine:”

This statement is to be replaced with the following:

“Revision to Parent Report, page 6-134, bottom paragraph, sentences six through nine:”

The changes to *Abstraction to Drift Seepage* (MDL-NBS-HS-000019 REV 01 AD 01 [DIRS 181244]) discussed above are all editorial in nature and have no effect on the results or conclusions of this report or any of its downstream documents.

IV Impact Evaluation

Three of the changes made in *Abstraction to Drift Seepage* (MDL-NBS-HS-000019 REV 01 AD 01 [DIRS 181244]) are to be incorporated in the corresponding SAR Figures in accordance with AP-REG-022: 2.3.3-24 (corresponding to Figure 6.6-2), 2.3.3-25 (corresponding to Figure 6.6-3) and 2.3.3-26 (corresponding to Figure 6.6-8). These changes will not affect LA technical baseline or conclusions to the SAR.

The changes to *Abstraction to Drift Seepage* (MDL-NBS-HS-000019 REV 01 AD 01 [DIRS 181244]) discussed above have no effect on the conclusion of the AMR or the model output to TSPA. These changes also have no effect on the downstream documents, listed below, that cite *Abstraction of Drift Seepage* (MDL-NBS-HS-000019 REV 01 [DIRS 169131]) or its addendum (MDL-NBS-HS-000019 REV 01 AD 01 [DIRS 181244]).

Controlled documents that cite MDL-NBS-HS-000019 REV 01 [DIRS 169131] include the following:

- ANL-EBS-GS-000002 REV 01: *Geochemistry Model Validation Report: External Accumulation Model*
- ANL-EBS-MD-000003 REV 03: *General Corrosion and Localized Corrosion of Waste Package Outer Barrier*
- ANL-EBS-MD-000027 REV 03: *Drift Degradation Analysis*
- ANL-EBS-MD-000037 REV 04 ACN 01: *In-Package Chemistry Abstraction*
- ANL-EBS-MD-000037 REV 04 AD 01: *In-Package Chemistry Abstraction*
- ANL-EBS-MD-000049 REV 03 AD 02: *Multiscale Thermohydrologic Model*
- ANL-EBS-MD-000074 REV 01 AD 01: *Analysis of Dust Deliquescence for FEP Screening*
- ANL-NBS-HS-000005 REV 03: *In Situ Field Testing of Processes*
- ANL-NBS-HS-000045 REV 00: *Post-Processing Analysis for THC Seepage*
- ANL-NBS-HS-000047 REV 01: *THC Sensitivity Study of Heterogeneous Permeability and Capillary Effects*
- MDL-EBS-MD-000001 REV 00 AD 01: *In-Drift Natural Convection and Condensation Model Report*
- MDL-NBS-HS-000002 REV 03: *Seepage Model for PA Including Drift Collapse*
- MDL-NBS-HS-000004 REV 03: *Seepage Calibration Model and Seepage Testing Data*
- MDL-NBS-HS-000015 REV 02: *Drift-Scale Coupled Processes (DST and TH Seepage) Models*
- MDL-NBS-HS-000016 REV 01: *Drift-Scale Radionuclide Transport*
- MDL-NBS-HS-000017 REV 01: *Drift Scale THM Model*

Controlled documents that cite MDL-NBS-HS-000019 REV 01 AD 01 [DIRS 181244] include the following:

- ANL-EBS-MD-000049 REV 03 AD 02: *Multiscale Thermohydrologic Model*
- ANL-NBS-HS-000057 REV 00: *Postclosure Analysis of the Range of Design Thermal Loadings*
- ANL-WIS-MD-000024 REV 01: *Postclosure Nuclear Safety Design Bases*
- ANL-WIS-MD-000024 REV 01 ACN 01: *Postclosure Nuclear Safety Design Bases*
- ANL-WIS-MD-000027 REV 00: *Features, Events, and Processes for the Total System Performance Assessment: Analyses*
- ANL-WIS-MD-000027 REV 00 ACN 01: *Features, Events, and Processes for the Total System Performance Assessment: Analyses*
- ANL-WIS-PA-000001 REV 03: *EBS Radionuclide Transport Abstraction*
- MDL-NBS-HS-000006 REV 03 AD 01: *UZ Flow Models and Submodels*
- MDL-NBS-HS-000006 REV 03 AD 01 ACN 01: *UZ Flow Models and Submodels*

- MDL-NBS-HS-000006 REV 03 AD 01 ERD 01: *UZ Flow Models and Submodels*
- MDL-WIS-PA-000005 REV 00 AD 01: *Total System Performance Assessment Model/Analysis for the License Application*
- TDR-MGR-MD-000056 REV 00: *Performance Confirmation Annual Report Fiscal Year 2007*
- TDR-PCS-SE-000001 REV 05 AD 01: *Performance Confirmation Plan*