	Scientific Analysis/Calculation Error Resolution Document *Complete only applicable items.*	QA: QA Page 1 of 3

INITIATION

1. Originator:	2. Date:	3. ERD No.
Wendy Mitcheltree	4/02/08	ANL-NBS-HS-000057 ERD 01

4. Document Identifier:	5. Document Title:
ANL-NBS-HS-000057 REV 00	Postclosure Analysis of the Range of Design Thermal Loadings

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

Introduction: This document was created to make changes in order to resolve 2 TBV's (9203 and 9204).

1.) TBV-9203:

Background Information Summary: The incorrect document was cited for an Indirect Input. Currently ANL-WIS-MD-000026 REV 00, SNL 2007 [DIRS 179476] is cited 31 times; in all cases ANL-WIS-MD-000027 REV 00 SNL 2008 [DIRS 183041] should be cited instead. There is no change to the information used only the DIRS#.

AMR changes : Replace **SNL 2007 [DIRS 179476]** with **SNL 2008 [DIRS 183041]** on the following pages: Section 6.5, pp. 6-139 (twice on page); and 6-141 (twice on page); Table 6.5-2 pp.6-142, 6-144 through 6-154 (cited 21 times in the Table); Section 7.1, pp. 7-3,and 7-5 (twice on page); Section 7.2 pp. 7-10, and 7-11

Section 8.1, p. 8-5: remove citation to SNL 2007 [DIRS 179476]
Add as follows:

183041 SNL (Sandia National Laboratories) 2008. *Features, Events, and Processes for the Total System Performance Assessment: Analyses.* ANL-WIS-MD-000027 REV 00. Las Vegas, Nevada: Sandia National Laboratories. ACC: DOC.20080307.0003.

Impact Evaluation/Results: All of the changes are reflected on a corrected DIRS report for ANL-NBS-HS-000057 REV 00. There is no impact on the conclusions of the report, the information is correctly cited but a correction was made to the DIRS number for traceability.

2.) TBV-9204

Background Information Summary: The incorrect year was cited in 8 instances; currently the text cites SNL 2007 [DIRS 178871]; it should be changed to SNL 2008 [DIRS 178871]. In 4 instances the incorrect DIRS number was cited as SNL 2007 [DIRS 178871]; and should be changed to SNL 2008 [DIRS 183041].

CONCURRENCE

	Printed Name	Signature	Date
7. Checker	Susan Boggs	Susan Boggs	4/3/08
8. QCS/QA Reviewer	Robert E. Spencer	Robert E. Spencer	4/3/08

APPROVAL

9. Originator	Wendy Mitcheltree	Wendy Mitcheltree	4/3/08
10. Responsible Manager	Paul Dixon	Paul Dixon	4-3-08

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

AMR changes :

Change SNL 2007 [DIRS 178871] to SNL 2008 [DIRS 178871] as follows: Section 6.1.1, p. 6-3; Table 6.5-2 pp.6-144 (cited 4 times on page), .6-145 (cited 2 times on page) and Section 8.1, p. 8-7.

SNL 2007 [DIRS 178871] was cited incorrectly in four instances; the citation is being changed from SNL 2007 [DIRS 178871] to SNL 2008 [DIRS 183041] in Table 6.5-2, p.6-146 as follows:

2.1.03.04.0A	Hydride cracking of waste packages	Excluded	WP	Excluded WP Waste package temperatures approaching 400°C could be produced by the anticipated range of thermal loading combined with seismically induced drift collapse immediately after repository closure (Section 6.4.2.5); however, temperature in excess of 500°C is required to initiate hydride cracking of Alloy 22 **(SNL 2008 [DIRS 183041]).**
2.1.03.04.0B	Hydride cracking of drip shields	Excluded	WP	Drip shield peak temperature approaching 400°C could be produced by the anticipated range of thermal loading combined with seismically-induced drift collapse immediately after repository closure (Section 6.4.2.5); however, such temperatures are insufficient to initiate hydride cracking of Titanium Grade 7. Other environmental conditions in the repository must be met simultaneously with the temperature condition (greater than 80°C), but these other conditions are very unlikely **(SNL 2008 [DIRS 183041]).**
2.1.06.06.0B	Oxygen embrittlement of drip shields	Excluded	WP	Oxygen embrittlement of titanium depends on diffusion of interstitial oxygen into the metal at temperatures greater than 340°C **(SNL 2008 [DIRS 183041]).**Although drip shield peak temperature approaching 400°C could be produced by the anticipated range of thermal loading combined with seismically induced drift collapse immediately after repository closure (Section 6.4.2.5), such temperatures are insufficient to significantly change the diffusion coefficient of oxygen. This can be demonstrated using the same approach with an Arrhenius-type equation, to re-calculate the diffusion coefficient of 8.8×10^{-18} cm^2 /sec at 300°C to a value at 400°C. The result shows negligible increase SNL 2007 **(SNL 2008 [DIRS 183041]).** The thermal peak will be of insufficient duration to cause any oxygen embrittlement, which would require the drip shield to sustain a temperature of 400°C for more than 108 years. Regardless, for drift collapse this representation is suitable for use with the range of thermal loading because of the low risk associated with drift collapse near the peak of the thermal period (Section 6.5.1).

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

Impact Evaluation/Results: All of the changes are reflected on a corrected DIRS report for ANL-NBS-HS-000057 REV 00. There is no impact on the conclusions of the report, the information is correctly cited but a correction was made to the year and DIRS# for traceability.

Additional (non-TBV related) error: A typographical error was noticed during checking, in two instances, a FEP should be identified as excluded not included. The AMR is being corrected as follows (see bold text):

AMR changes:
Section 6.5, p.6-141 and Section 7.1, p. 7-4: 1.2.03.02.0B -- Seismic-induced rockfall damages EBS components **(excluded).**

Impact Evaluation/Results: No changes are needed for the DIRS report for ANL-NBS-HS-000057 REV00. There is no impact on the conclusions of the report; ANL-NBS-HS-000057 REV00 is not the true source for the information on the inclusion or exclusion of a FEP.

Below is a list of AMR's that use ANL-NBS-HS-000057 REV 00 (DIRS# 179962) as a source: 000-00C-DS00-00600-000-00F , 000-00C-DSC0-00100-000-00B , 800-00C-WIS0-00500-000-00B , 800-00C-WIS0-00600-000-00B , 800-00C-WIS0-00700-000-00A , 800-IED-MGR0-00403-000 Rev. 00B , ANL-DS0-NU-000001 Rev. 00, ANL-EBS-MD-000049 Rev. 03, Addendum 01, ANL-WIS-MD-000020 Rev. 01, Addendum 01, ANL-WIS-MD-000027 Rev. 00, CAL-DN0-NU-000002 Rev. 00C , TDR-TDIP-ES-000006 Rev. 00, TDR-TDIP-ES-000009 Rev. 00, TDR-TDIP-ES-000010 Rev. 00, LASAR-1.02.01 , LASAR-1.03.01 , LASAR-1.03.02 , LASAR-1.03.04 ,and LASAR-2.03.05 As stated, above there is no impact, there were no text changes other than the DIRS number citation.