

BSC

Calculation/Analysis Change Notice

1. QA: QA
2. Page 1 of 3

Complete only applicable items.

3. Document Identifier: 000-00C-MGR0-03400-000		4. Rev.: 00A	5. CACN: 001
6. Title: Release Fractions for Spent Nuclear Fuel and High-Level Waste			
7. Reason for Change: <p>This calculation determines the airborne release fractions and respirable fractions for spent nuclear fuel and high-level radioactive waste for the preclosure consequence analyses. This CACN is needed because CR-12175 identified two conditions in the document as shown below.</p> <p>(1). Suitability for intended use of some design inputs, including two reports from Center for Nuclear Waste Regulatory Analysis (CNWRA) were not clearly addressed in the report. It is identified that some outside reference sources listed in Section 6.1.1 are justified and are appropriate for the intended use. However, not every outside source used in the calculation report was justified as appropriate for the intended use, which is required by the procedure Calculations and Analyses (EG-PRO-3DP-G04B-00037, Revision 10, Section 3.2.2.F),</p> <p>(2). The calculation report was approved on Nov. 5, 2007, which was the date that a new revision of the Calculation and Analyses (EG-PRO-3DP-G04B-00037, Revision 10) went into effect. The calculation report cited Revision 9 in Section 2.1.</p> <p>This CACN to the calculation <i>Release Fractions for Spent Nuclear Fuel and High-Level Waste</i> will not change the conclusion of the report. It provides justification of suitability for intended use of the outside sources that were not justified in the current report. The results of the CACN are not expected to change any citation, table or figure in LA, and will not affect the LA safety case.</p> <p>This CACN provides justifications that the cited outside references used as direct inputs are appropriate for their intended use. There are 17 references that require this justification. .</p> <p>As indicated in CR-12175, the calculation report was approved on Nov. 5, 2007, which was the date that a new revision of the <i>Calculation and Analyses</i> (EG-PRO-3DP-G04B-00037, Revision 10) went into effect. The calculation report cited Revision 9 in Section 2.1. It was determined that this calculation is in compliance with Revision 10 of EG-PRO-3DP-G04B-00037. This CACN changes Reference 2.1.3 in Section 2.1 to revision 10 of EG-PRO-3DP-G04B-00037.</p> <p>An error was identified by Quality Engineering that Input Category (Column 7) in DIRS report includes "Equation", which is not allowed by procedure PA-PRO-0301.</p> <p>An error was identified in Reference 2.2.17, Section 2.2, where the TIC number was not provided. In addition, some citations of Reference 2.2.71 were incorrectly referenced as Reference 2.2.69 in the document.</p>			
8. Supersedes Change Notice:		<input type="checkbox"/> Yes If, Yes, CACN No.: _____ <input checked="" type="checkbox"/> No	
9. Change Impact:			
Inputs Changed:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Results Impacted:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Assumptions Changed:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Design Impacted:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

10. Description of Change

This CACN does not result in change to the calculation method and conclusions of the calculation.

Affected calculation pages: 17, 18, 35, 45, 50, 53, 56, 57, 72, 78, and 88. DIRS report is modified.

In Section 2.1, p.17, update Reference 2.1.3 from Rev. 9 to Rev. 10 of EG-PRO-3DP-G04B-00037:

2.1.3 EG-PRO-3DP-G04B-00037, Rev. 10. *Calculations and Analyses*. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG. 20071018.0001.

In Section 4.3.4, p.35, add the following justification for intended use of inputs from Reference 2.2.53 after the last paragraph on p.35:

The PULF equation cited from Reference 2.2.53 is applicable to this calculation. It is from a reliable source, Sandia National Laboratories. The information cited from this reference has been used in other peer reviewed documents, including a DOE handbook (DOE-HDBK-3010-94) (Reference 2.2.24, Section 4.3.3), and an American National Standard (ANSI/ANS-5.10-1998) (Reference 2.2.6, p.15).

In Section 6.1.5, p.56, add the following justification for intended use of inputs from Reference 2.2.73 after the last full paragraph on p.56:

The release fractions for crud cited from Reference 2.2.73 is applicable to this calculation. It is from a reliable source, Sandia National Laboratories. The information cited from this reference has been used in other peer reviewed documents, including NUREG/CR-6487 (Reference 2.2.4), which is cited in NUREG-1617 (Reference 2.2.64).

In Section 6.4, p. 78, add the following justification for intended use of inputs from Reference 2.2.10, 2.2.26, 2.2.44, 2.2.3, 2.2.28, 2.2.34, 2.2.27 and 2.2.80 before the last full paragraph on p.78:

Information of fuel oxidation used as inputs in this section is applicable to this calculation, which is shown when each of the following references is used. References 2.2.10, 2.2.26, and 2.2.44 are peer reviewed articles in the technical journal – *Nuclear Technology*. References 2.2.3, 2.2.28, and 2.2.34 are reviewed reports from the credible sources – U.S. Nuclear Regulatory Commission, Electric Power Research Institute, and Pacific Northwest National Laboratory. References 2.2.27 and 2.2.80 are from the proceedings of the conferences related to the nuclear waste. References 2.2.27 is cited by another reviewed document, CNWRA-93-006 (Reference 2.2.54). Information cited in Reference 2.2.80 is supported by other reviewed reports (References 2.2.30, and 2.2.31). All above references provide either experimental data or results of literature searches on fuel oxidation studies.

In Section 6.5, p. 88, add the following justification for intended use of inputs from Reference 2.2.9, 2.2.43, 2.2.45, 2.2.61, 2.2.40, 2.2.42, and 2.2.54 before Section 6.5.1 on p.88:

This section considers high burnup spent nuclear fuel, which has some unique features that are not associated with low burnup fuel discussed in the previous sections. Information on high burnup spent nuclear fuel cited in this section is applicable to this calculation, which is shown when each of the following references is used. References 2.2.9, 2.2.43, 2.2.45 and 2.2.61 are peer reviewed articles in the technical journals – *Journal of Nuclear Materials* and *Nuclear Technology*. References 2.2.40, 2.2.42, and 2.2.54 are reviewed reports from the sources – Center for Nuclear Waste Regulatory Analyses, and Swedish Nuclear Power Inspectorate. The two CNWRA reports (References 2.2.40, and 2.2.54) are data collections of fission gas released from other peer reviewed documents. All above references provide either experimental data or results of literature search on high burnup spent nuclear fuel studies.

The identified errors in Rev. 00A DIRS report are corrected in Rev. 00A CACN 001 DIRS report, which only includes the inputs where the changes of the DIRS report are made. Block 7 was changed from “Equation” to “N/A”; Block 6 was changed from “Direct Input” to “Indirect Input”; and Block 8 was changed from “Qualified” to “N/A”, because “Equation” should be indirect input per PA-PRO-0301. For the future revision of this calculation, both Rev. 00A and Rev. 00A CACN 001 DIRS reports should be used.

In Section 2.2, p.18, update Reference 2.2.17 TIC number from “to be submitted” to “259181”:


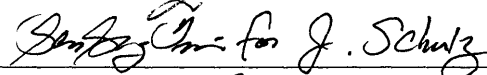



2.2.17 Colle, J.Y; Hiernaut, J.-P.; Papaioannou, D.; Ronchi, C.; and Sasahara, A. 2006. “Fission Product Release in High-Burn-Up UO₂ Oxidized to U₃O₈” *Journal of Nuclear Materials*, 348, 229-242. [New York, New York]: Elsevier. TIC: 259181. 179470

Some citations of Reference 2.2.71 in the document was incorrectly referenced as Reference 2.2.69. Change “Reference 2.2.69 [DIRS 103695]” to “Reference 2.2.71 [DIRS 103685]” in the following location:

p.45 – lines 7 and 10 in the second paragraph; p.50 – line 13 in the second to last paragraph; p.53 – line 3 in the first paragraph; p.57 line 3 in the second to last paragraph; and p.72 – line 4 in the second to last paragraph.

11.

REVIEWS AND APPROVAL

Printed Name	Signature	Date
11a. Originator: D. W. Wu		8/25/2008
11b. Checker: J. Schulz		8/25/2008
11c. EGS: S. S. Tsai		8/25/2008
11d. DEM: M. Frank		8/25/08
11e. Design Authority: B. Rusinko		8/26/08