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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 66– TRACG Model Description – RAI Numbers 21.6-70, 21.6-73 and 21.6-74**

Enclosure 1 contains GE's response to the subject NRC RAIs transmitted via the Reference 1 letter.

If you have any questions or require additional information regarding the information provided here, please contact me.

Sincerely,

Kathy Sedney for

James C. Kinsey
Project Manager, ESBWR Licensing

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Reference:

1. MFN 06-377, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 66 Related to the ESBWR Design Certification Application*, October 10, 2006

Enclosures:

1. MFN 07-050 – Response to Portion of NRC Request for Additional Information Letter No. 66 – TRACG Model Description – RAI Numbers 21.6-70, 21.6-73 and 21.6-74

cc: AE Cubbage USNRC (with enclosures)
GB Stramback GE/San Jose (with enclosures)
eDRF 0062-0857

# Enclosure 1

# MFN 07-050

# Response to Portion of NRC Request for

# Additional Information Letter No. 66

# Related to ESBWR Design Certification Application

# TRACG Model Description

# RAI Numbers 21.6-70, 21.6-73 and 21.6-74

**NRC RAI 21.6-70:**

*On page 6-156 of NEDE-32176P, Rev. 3, the alternate bounding approach to address the effects of the noncondensable distribution in the suppression pool is described. Mixing in the wetwell vapor space is also treated empirically, to conservatively evaluate the wetwell temperature and to model the region near the vacuum breakers in the upper wetwell vapor region. A discussion should be included, either in this section, or in Section 7.11.2.1 (with a pointer), to address the empirical modeling approach used.*

**GE Response:**

Page 6-156 of Ref. 21.6-70-1 describes an optional turbulent mixing model in TRACG04. This model is not currently being used for any application. Application procedures have been developed for specific applications to obtain conservative treatment of mixing phenomena in the drywell, suppression pool and wetwell gas space (Ref. 21.6-70-2). Section 7.11.1.2 points out that a conservative procedure has been developed based on test data for the drywell volume. Similarly, Section 7.11.2.1 should have referenced the conservative treatment of mixing in the upper wetwell region. The following text will be incorporated into this section in the next revision of the TRACG Model Description:

> "Test data from PANDA [7] show that the top of the wetwell gas space which receives leakage flow from the drywell through the vacuum breakers is at a higher temperature than the lower part of the gas space due to thermal stratification. In the TRACG nodalization of the wetwell gas space, stratification is forced by restricting the flow between cells in the top two levels of the gas space by specifying an irreversible frictional loss. This approach produces conservatively high local gas space temperatures in the vicinity of leakage."

**References:**

21.6-70-1 GE PROPRIETARY INFORMATION "TRACG Model Description" NEDE-32176P, Rev.3, Class III, April 2006.

21.6-70-2 GE PROPRIETARY INFORMATION "TRACG Application for ESBWR" NEDC-33083P-A, Class III, March 2005.

**Affected Documents:**

No DCD Tier 2 changes will be made in response to this RAI.

Licensed Topical Report "TRACG Model Description" NEDE-32176P, Rev.3, Class III, April 2006NEDE-32176P, Rev 3 will be revised as described above.

**NRC RAI 21.6-73:**

*Section 7.11.7.5 of NEDE-32176P, Rev. 3, contains two paragraphs which are nearly the same to describe the single-phase friction factor but vary in the method used to evaluate the Reynolds number. Please clarify and correct as appropriate - discuss separately for single-phase flow and twophase flow conditions, with appropriate pointers to the models in Section 6.2.*

**GE Response:**

The second paragraph in Section 7.11.7.5 of Ref. 21.6-73-1 should be deleted. This was inadvertently duplicated from Section 7.11.5.1 in the same reference. Deletion of the second paragraph corrects the editing deviation and adds clarity to the discussion of the friction factor for single and two phase flow. Therefore, no further discussion is included with this response.

**Reference:**

21.6-73-1 GE PROPRIETARY INFORMATION "TRACG Model Description" NEDE-32176P, Rev.3, Class III, April 2006.

**Affected Documents:**

No DCD Tier 2 changes will be made in response to this RAI.

Licensed Topical Report "TRACG Model Description" NEDE-32176P, Rev.3, Class III, April 2006 will be revised to implement deletion of the second paragraph in Section 7.11.7.5.

**NRC RAI 21.6-74:**

*Ref [8]: TRACG Qualification for ESBWR, NEDC-33080P, August 2002, was updated to Revision 1, dated May 2005 to reflect newer version of TRACG04A (9-Apr-2004). Why has GE chosen to use the outdated code version to support TRACG qualification for the ESBWR? (Also note that in ltr MFN 06-159, NEDC-33030P is dated November 2002: August 2002 is correct date.)*

**GE Response:**

GE did not choose to use an outdated code version; GE used the latest version available of TRACG to execute the qualification cases to support TRACG qualifications for the ESBWR. Therefore, reference [8] contained in Ref. 21.6-74-1, will be updated as follows,

[8] J. R. Fitch, et al., TRACG Qualification for ESBWR, NEDC-33080P, Rev. 1, GE Proprietary Report, May 2005.

This update will be implemented in the next revision of Ref. 21.6-74-1.

No reference was found in MFN 06-159 for NEDC-33030P.

**Reference:**

21.6-74-1 GE PROPRIETARY INFORMATION "TRACG Model Description" NEDE-32176P, Rev.3, Class III, April 2006.

**Affected Documents:**

No DCD changes will be made in response to this RAI.

Licensed Topical Report "TRACG Model Description" NEDE-32176P, Rev.3, Class III, April 2006 will be revised as described above.