From: Amy Cubbage
To: Fawcett, Russ M. (GNF); Hinds, David H (GE Energy); Kinsey, James C (GE Infra Energy); Leonard, William (GE Infra Energy Non-GE); Moen, Stephan C. (GE Infra Energy); Sedney, Kathy K. (GE Infra Energy); Stramback, George B. (GE Infra Energy); White, Frostie (GE Infra Energy Non-GE)
Date: Sun, Nov 12, 2006 3:04 PM
Subject: Supplemental Request for Information on Response to RAI Letter #53 (MFN-06-350)

Kathy -

See attached request for supplemental RAI responses regarding RAIs 4.3-2, 4.4-35, and 4.4-39.

The request for supplemental response contains proprietary information. Please verify that the non-proprietary version (also attached) does not contain proprietary information by Friday 11/17, so Martha can add it to ADAMS.

If you have any questions regarding this request for supplement, please contact Martha at 301-415-4115.

Thanks,
Amy

CC: Barillas, Martha; Yarsky, Peter

Mail Envelope Properties (45577E61.423 : 18 : 35676)

Subject: Supplemental Request for Information on Response to RAI Letter #53 (MFN-06-350)
Creation Date Sun, Nov 12, 2006 3:04 PM
From: Amy Cubbage

Created By: AEC@nrc.gov

Recipients
ge.com
david.hinds (David H (GE Energy) Hinds)
frostie.white (Frostie (GE Infra Energy Non-GE) White)
george.stramback (George B. (GE Infra Energy) Stramback)
jim.kinsey (James C (GE Infra Energy) Kinsey)
kathy.sedney (Kathy K. (GE Infra Energy) Sedney)
william1.leonard (William (GE Infra Energy Non-GE) Leonard)

gene.GE.com
stephan.moen (Stephan C. (GE Infra Energy) Moen)

gnf.com
Russ.Fawcett (Russ M. (GNF) Fawcett)

nrc.gov
MCB CC (Martha Barillas)

nrc.gov
PXY1 CC (Peter Yarsky)

Post Office	**Route**
	ge.com
	gene.GE.com
	gnf.com
	nrc.gov
	nrc.gov

Files	**Size**	**Date & Time**
MESSAGE	924	Sunday, November 12, 2006 3:04 PM
non-prop version InformationMFN-06-350Feedback.pdf	31234	Sunday, November 12, 2006 2:50 PM
SensitiveInformationMFN-06-350Feedback.pdf	40712	Sunday, November 12, 2006 2:52 PM

Options

Expiration Date:	None
Priority:	Standard
ReplyRequested:	No
Return Notification:	None
Concealed Subject:	No
Security:	Standard

Junk Mail Handling Evaluation Results
Message is not eligible for Junk Mail handling
Message is from an internal sender

Junk Mail settings when this message was delivered
Junk Mail handling disabled by User
Junk Mail handling disabled by Administrator
Junk List is not enabled
Junk Mail using personal address books is not enabled
Block List is not enabled

From: "Martha Barillas" <MCB@nrc.gov>
To: "Sedney, Kathy K. (GE Infra, Energy)" <kathy.sedney@ge.com>
Date: 12/26/2006 4:04:43 PM
Subject: Fwd: Supplemental Request for Information on Response to RAI Letter #53 (MFN-06-350)

Kathy,
Please verify the request below.
Thank You,
Martha

>>> Amy Cubbage 11/12/2006 3:04 PM >>>
Kathy -

See attached request for supplemental RAI responses regarding RAIs 4.3-2, 4.4-35, and 4.4-39.

The request for supplemental response contains proprietary information. Please verify that the non-proprietary version (also attached) does not contain proprietary information by Friday 11/17, so Martha can add it to ADAMS.

If you have any questions regarding this request for supplement, please contact Martha at 301-415-4115.

Thanks,
Amy

CC: "Amy Cubbage" <AEC@nrc.gov>

From: "White, Frostie (GE Infra, Energy, Non-GE)" <frostie.white@ge.com>
To: "Martha Barillas" <MCB@nrc.gov>
Date: 01/10/2007 4:26:38 PM
Subject: [WARNING: MESSAGE ENCRYPTED]FW: Proprietary Information Verification Request

Martha,

I sent out this request on 11/13/06 to out group and on 11/15/06 I called and let you know that no additional info was proprietary and could be placed in ADAMS.

Sorry for the confusion; I will respond by email to these requests so that you will have a written record to go by.

Frostie

Frostie A. White, PhD
Regulatory Affairs
910-675-6880
GE Nuclear

-----Original Message-----
From: Sedney, Kathy K. (GE Infra, Energy)
Sent: Wednesday, January 10, 2007 2:59 PM
To: White, Frostie (GE Infra, Energy, Non-GE)
Subject: FW: Proprietary Information Verification Request

Frostie,

FYI and action.

Thanks,

Kathy

-----Original Message-----
From: Martha Barillas [mailto:MCB@nrc.gov]
Sent: Wednesday, January 10, 2007 11:10 AM
To: Sedney, Kathy K. (GE Infra, Energy)
Cc: Amy Cubbage
Subject: Proprietary Information Verification Request

Kathy,
Attached is an email sent to you on 11/12 and 12/26 requesting GE confirm whether any additional information should be marked proprietary and to inform NRC if this is the case. I am not aware if GE has provided a response to NRC's request. I have postponed placing this email as sent to you in November in ADAMS because the content in RAI 4.4-35 may contain PROPRIETARY information, but need GE to confirm if that is the case. Please provide GE's response to me by January 12, 2007.

Thank You,

Martha C. Barillas
Project Manager-ESBWR
NRO/DNRL/NGE1
301.415.4115
mcb@nrc.gov

CC: "Sedney, Kathy K. (GE Infra, Energy)" <kathy.sedney@ge.com>

Mail Envelope Properties (45A55A03.388 : 23 : 62344)

Subject: [WARNING: MESSAGE ENCRYPTED]FW: Proprietary Information Verification Request
Creation Date 01/10/2007 4:25:58 PM
From: "White, Frostie (GE Infra, Energy, Non-GE)" <frostie.white@ge.com>

Created By: frostie.white@ge.com

Recipients
nrc.gov
MCB (Martha Barillas)

ge.com
kathy.sedney CC (Kathy K. (GE Infra Energy) Sedney)

Post Office	**Route**
	nrc.gov
	ge.com

Files	**Size**	**Date & Time**
MESSAGE	1441	01/10/2007 4:25:58 PM
Mail		
Mime.822	104392	

Options

Expiration Date:	None
Priority:	Standard
ReplyRequested:	No
Return Notification:	None
Concealed Subject:	No
Security:	Standard

<u>Staff Supplemental Request for Information on Response to RAI Letter #53 (MFN-06-350)</u>
1. Comments on response to RAI 4.3-2

Part (a) of the response states that the in-channel void fraction expected for the ESBWR is similar to those in-channel void fractions of those plants included in NEDC-33239P as an update to the experience database. These in-channel void fraction ranges, depicted for the ESBWR are within the same range as those experienced for high power density fuels in extended power uprated (EPU) plants, labeled as A through E in NEDC-33239P.

These plants form the experience database for validation of the lattice depletion and core simulator codes, as applied to the ESBWR. Part (d) of the response indicates that core follow data from plants A through E are applicable to the expected conditions for the ESBWR core and fuel design. Part (b) of the response indicates that the associated biases and uncertainties remain valid for the ESBWR.

The uncertainty analyses applied in NEDC-33237P is based on NRC-approved methodologies in NEDC-32694P-A. The staff does not find this methodology acceptable for application to EPU

plants, or plants with normal conditions of operation similar to currently operating BWRs with expanded operating domains. Therefore, the staff does not find that the response adequately justifies the current uncertainty analyses based on the database referenced.

Per the conditions of NEDC-32601P-A, the following actions must be taken to apply the approved methodology for power distribution uncertainties for SLMCPR determination.

- The TGBLA fuel rod power calculational uncertainty should be verified when applied to new fuel designs

- The effect of the correlation of rod power calculation uncertainties should be reevaluated to insure the accuracy of the R-factor uncertainty when the methodology is applied to a new fuel lattice

- The 3D-MONICORE bundle power calculational uncertainty should be verified when applied to new fuel and core designs

The uncertainty analysis in NEDC-33237P references a power peaking uncertainty of [[ ]] value quoted in NEDC-33239P. This value is inconsistent with the value of [[ ]] referenced in NEDC-33173P, based on the [[ ]]. Explain this inconsistency. Provide the value for local (pin) peaking factor uncertainty based on the MCNP and TGBLA06 calculations provided in NEDC-33239P using the [[ ]] as described in Section 2.2.1.2 of NEDC-33173P, taking into account manufacturing and channel bow uncertainties.

FLN 2001-017 dated October 1, 2001, details the applicability of the R-factor methodology in NEDC-32505P-A to GE14 fuel lattices. Provide an explanation for the applicability of the methodology for the same lattice with reduced flow conditions relative to currently operating BWRs with GE14 fuel. Evaluate the R-factor uncertainty based on the local (pin) power peaking uncertainty calculated based on the [[ ]]. The bundle power calculational uncertainty in NEDC-33237P is based strictly on the value quoted in NEDC-32601P-A. The justification for this uncertainty is that the calculated bundle uncertainties from NEDE-33179P are reportedly lower. Table 9-14 in NEDE-33179P quotes a bundle power uncertainty of [[ ]] for the gamma thermometer configuration proposed for the ESBWR core. Explain why [[ ]] is used in NEDC-33237P, while [[ ]] is calculated in NEDE-33179P. NEDE-33179P recommends the use of the [[ ]] value in safety limit analyses, explain this discrepancy. Describe the components of the [[ ] in terms of the [[ ]] uncertainty, the [[ ]] uncertainty, the [[ ]] uncertainty, and the additional uncertainties arising from the use of [[ ]] discrete gamma thermometers instead of continuous TIP instrumentation for power shape monitoring, calibration, and adaption within 3D-MONICORE. Specifically describe the determination of the “GT to nTIP Bundle Uncertainty.” Provide an analysis showing the bundle power calculational uncertainty applying the [[ ]] for the [[ ]] uncertainty. The value of the [[ ]] uncertainty of [[____]] in NEDC33173P is inconsistent with the value of [[ ]] shown in Table 9-14 of NEDE-33179P. Provide an evaluation of the exposure dependent OLMCPR based on uncertainty analyses consistent with the prescriptions in NEDE-33179P.

NEDC-33242P does not describe how local power peaking uncertainties are taken into account for the MLHGR limit. Provide an evaluation of the exposure dependent MLHGR limit including local (pin) power peaking uncertainties that are consistent with the procedures quoted in

Section 2.2.1.2 of NEDC-33173P.

Update NEDE-33179P, NEDC-33237P, NEDC-33239P, NEDC-33242P, and the DCD accordingly.

2. Comments on response to RAI 4.4-35

Three figures were provided in the response, were all three calculations performed using TGBLA06AE5 (T6E5) or is the 40% void fraction calculation performed using T6E4? The response indicates that the bias is consistent for each gadolinia loading, however, it shows that the bias does increase with increasing void fraction. The response does not discuss any impact on nuclear parameter or reactivity coefficient uncertainties or biases as a result. How is the void dependence of the bias accounted for in production calculations or uncertainty analyses? Given the fuel design and current equilibrium core pattern, do any of the poison loaded regions of the core experience void fractions as high as 70%? Discuss this bias in terms of the production code used to perform the analyses in Chapter 4 of the DCD and NEDC-33239P. If the unmodified version of TGBLA06 was used for the analyses in the DCD and NEDC-33239P, justify the relevance of the results shown in the response in terms of plutonium isotopics.

3. Comments on response to RAI 4.4-39

It is not clear from the response if the TRACG calculations were performed based on a supplied PANACEA Wrap-up file. In which case, these calculations may not represent a fully independent analysis. The response should be modified to include a qualitative discussion of the mechanisms through which thermal hydraulic communication occurs through the liquid bypass, and subsequently ensures that the core outlet pressure is nearly uniform across the core. Provide a simple figure showing the liquid water level in the bypass relative to the top of the fuel bundles. Provide the height difference between the top of the bundle and the liquid water level.