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Proprietary Notice
This letter forwards GNF proprietary information in accordance with 10CFR2.390. Upon the removal of Enclosure 1, the balance of this letter may be considered non-proprietary.

MFN 06-350

Docket No. 52-010

September 29, 2006

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555-0001

Subject: **Response to Portion of NRC Request for Additional Information Letter No. 53 Related to ESBWR Design Certification Application – DCD Chapter 4 and GNF Topical Reports – RAI Numbers 4.3-2, 4.3-5, 4.4-25, 4.4-30, 4.4-35, 4.4-39, 4.4-51**

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

Enclosure 1 contains GNF proprietary information as defined by 10 CFR 2.390. GNF customarily maintains this information in confidence and withholds it from public disclosure. A non proprietary version is provided in Enclosure 2.

The affidavit contained in Enclosure 3 identifies that the information contained in Enclosure 1 has been handled and classified as proprietary to GNF. GE hereby requests that the information of Enclosure 1 be withheld from public disclosure in accordance with the provisions of 10 CFR 2.390 and 9.17.

If you have any questions about the information provided here, please let me know.

Sincerely,

George Stramback for

David H. Hinds
Manager, ESBWR

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Enclosures:

1. MFN 06-350 - Response to Portion of NRC Request for Additional Information Letter No. 53 Related to ESBWR Design Certification Application – DCD Chapter 4 and GNF Topical Reports – RAI Numbers 4.3-2, 4.3-5, 4.4-25, 4.4-26, 4.4-28, 4.4-29, 4.4-30, 4.4-35, 4.4-39, 4.4-51 – GNF Proprietary Information
2. MFN 06-350 - Response to Portion of NRC Request for Additional Information Letter No. 53 Related to ESBWR Design Certification Application – DCD Chapter 4 and GNF Topical Reports – RAI Numbers 4.3-2, 4.3-5, 4.4-25, 4.4-26, 4.4-28, 4.4-29, 4.4-30, 4.4-35, 4.4-39, 4.4-51 – Non Proprietary Version
3. Affidavit – Jens G. M. Andersen – dated September 29, 2006

Reference:

1. MFN 06-288, Letter from U. S. Nuclear Regulatory Commission to Mr. David H. Hinds, *Request for Additional Information Letter No. 53 Related to ESBWR Design Certification Application,* August 16, 2006

cc: AE Cubbage USNRC (with enclosures)
AA Lingenfelter GNF/Wilmington (w/o enclosures)
GB Stramback GE/San Jose (with enclosures)
eDRFs 58-7001, 58-7161, 58-8769, 59-0322, 57-2772, 58-3969, 58-9718

ENCLOSURE 2

MFN 06-350

Partial Response to RAI Letter No. 53 Related to ESBWR

Design Certification Application

DCD Chapter 4 and GNF Topical Reports

RAI Number 4.3-2, 4.3-5, 4.4-25, 4.4-30, 4.4-35, 4.4-39, 4.4-51

Non-Proprietary

Non-Proprietary Notice

IMPORTANT NOTICE

This is a non-proprietary version of the Enclosure 1 of MFN 05-350, which has the proprietary information removed. Portions of the document that have been removed are indicated by an open and closed bracket as shown here [[ ]].

NRC RAI 4.3-2

In DCD Tier 2, Section 4.3.2, titled Nuclear Design Analytical Methods, the staff noted that most of the references do not reflect recent BWR operating experience. Please provide the experience database in tabulated form, (including as much detail as possible), pertinent to expected operation of the ESBWR, and operation with high exit void fractions. Specifically:

(a) Demonstrate quantitatively and qualitatively that the current lattice and simulator (depletion) code suite have been validated in regions characteristic of ESBWR operation, such as low mass flows and of high void fractions.

(b) Demonstrate quantitatively and qualitatively, that the Lattice/Depletion code systems and associated uncertainties and biases established for these codes (especially for reactivity coefficients, including void coefficients) remain valid for the neutronic and thermal-hydraulic conditions predicted for the ESBWR operation.

(c) Demonstrate quantitatively and qualitatively, that the fuel isotopic validations and testing performed in the Lattice/Depletion code systems remain applicable for prolonged operation under high void conditions for the fuel lattice designs that would be used for the expected ESBWR.

(d) Provide any validation data in support of the GE neutronic methodology prediction capability by comparison to gamma scans and TIP data. Specifically, the staff is looking for core follow benchmarking based on present fuel designs, operating strategies, and core conditions, similar to those strategies and core conditions expected for ESBWR operation. This request pertains to any recent fuel, such as the GE-14, in particular for first cycle and second cycle fuel operation.

GE Response

a) DCD Tier 2, Section 4.3.2 references the documentation upon which licensing approval was provided for the nuclear methods. It also references the licensing topical report NEDC-33239P, which was submitted in part to update the experience database that is relevant to ESBWR. The ESBWR fuel will experience in-channel void fraction conditions that are within the experience base of the current operating high power density fuel designs. NEDC-33239P provides the operational parameters for a subset of GE's experience database for such reactors. Plants A through E are described in general parameters in Table 1-14 of NEDC-33239P. In terms of the parameters given in that table, the ESBWR has 1132 bundles with a power density of 54.3 kW/l and a nominal core flow of 78.5 Mlbm/hr. The bundle mass flow and corresponding bundle exit void fraction for the ESBWR core is compared in Figure 4.3-2.1 to those of the operating experience database plants from NEDC-33239P for representative points during the operating cycle. The bundle exit void fraction is plotted as a function of bundle mass flow for every bundle in the selected core state points.

The bundle exit void conditions and bundle mass flows for Figure 4.3-2.1 are explicitly tabulated in Table 4.3-2.1.

By examining the data presented in Figure 4.3-2.1 and Table 4.3-2.1, it can be seen that the major difference in the ESBWR operating state is the in-channel mass flow. The adequacy of the void quality correlations at lower mass flow conditions is addressed in the response to ESBWR RAI 4.4-2. (See MFN 06-297). For examination of the void fraction range of the ESBWR relative to the operating BWRs, it is concluded that the current lattice and simulator code suite has been validated in the void fraction (moderator density) regions characteristic of the ESBWR core.

b) NEDC 33239P, Section 1.3 provides the lattice physics methods qualification bases. These bases, which cover a range of void and temperature conditions, apply directly to the GE14 lattices for ESBWR, since these are essentially identical to the lattices of GE14 for the operating BWR fleet. As seen in Figure 4.3-2.1, the range of in-channel exit void conditions in the ESBWR is essentially the same as the operating BWR fleet. It is reasonable to conclude that the Lattice/Depletion code system performs similarly for similar conditions, as determined by operating fleet experience, in particular for core reactivity as given by the eigenvalue comparisons in Figure 1-26 of NEDC-33239P. It is further concluded that the associated uncertainties and biases of the Lattice/Depletion system (such as reactivity coefficients) continue to be valid when applied over the range of conditions expected for the ESBWR core and fuel design.

c) As in response to (b) above, with essentially identical in-channel void fraction characteristics as the operating BWR fleet, it is reasonable to conclude that the fuel isotopic validations and testing performed in the Lattice/Depletion code systems remain applicable for use with ESBWR fuel.

d) The documentation of gamma scans results, core tracking results and data tabulation, BWR cold critical results and tabulations, and TIP comparisons can be found in Sections 1.6.3, 1.6.4, 1.6.5, and 1.6.6, respectively, of NEDC-33239P, "GE14 for ESBWR Nuclear Design Report". These data, particularly the core follow data and TIP comparisons for the plants listed in Table 1-14 of the report, all of which contain GE14 fuel in first and second cycles of operation, are applicable to the conditions expected for the ESBWR core and fuel design.

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

Figure 4.3-2.1 Sample of Experience Database for Exit Void Fractions

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Table 4.3-2.1: Tabulation of Samples from Experience Database for Exit Void Fractions

	ESBWR		Plant A		Plant B		Plant C		Plant D		Plant E (CycleA)		Plant E (CycleB) -	
Sample No.	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction
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	ESBWR		Plant A		Plant B		Plant C		Plant D		Plant E (CycleA)		Plant E (CycleB)	
Sample No.	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction
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	ESBWR		Plant A		Plant B		Plant C		Plant D		Plant E (CycleA)		Plant E (CycleB)	
Sample No.	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction
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	ESBWR		Plant A		Plant B		Plant C		Plant D		Plant E (CycleA)		Plant E (CycleB)	
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	ESBWR		Plant A		Plant B		Plant C		Plant D		Plant E (CycleA)		Plant E (CycleB)	
Sample No.	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction
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	ESBWR		Plant A		Plant B		Plant C		Plant D		Plant E (CycleA)		Plant E (CycleB)	
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	ESBWR		Plant A		Plant B		Plant C		Plant D		Plant E (CycleA)		Plant E (CycleB)	
Sample No.	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction
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	ESBWR		Plant A		Plant B		Plant C		Plant D		Plant E (CycleA)		Plant E (CycleB)	
Sample No.	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction
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	ESBWR		Plant A		Plant B		Plant C		Plant D		Plant E (CycleA)		Plant E (CycleB)	
Sample No.	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction	Mass Flow (lb/hr)	Channel Exit Void Fraction
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NRC RAI 4.3-5

DCD Tier 2, Figure 4.3-3 on page 4.3-14, shows that the Moderator Temperature Coefficient (MTC) is slightly positive at lower temperature towards end of cycle (EOC). Provide additional discussion for each MTC curve in this figure.

GE Response

The Moderator Temperature Coefficient (MTC) is an aspect of the Boiling Water Reactor (BWR) core that is routinely evaluated as part of core and fuel design. The BWR core can exhibit a positive MTC; although, fleet operation experience has shown it is uncommon or otherwise manageable. The primary parameters that lead to a positive MTC are the critical control rod density, the gadolinia content present, the lattice geometry and the enrichment. The two most important parameters are the control rod density and the gadolinia content. As insertion of the control rod displaces water in the intra-assembly gap, controlled nodes tend to contribute to a negative MTC. Similarly, both gadolinia and control rods are strong local absorbers and as neutron migration area increases with moderator temperature both absorbers become more effective leading to a negative MTC. As the core is depleted through power operation both the critical control rod density and the gadolinia content reduces which can lead to positive temperature coefficients at low temperature for late cycle startups. It is noted that most, if not all, modern BWR fuel designs can be evaluated as having a positive MTC under certain conditions at moderator temperatures below hot standby; however, as the transient response of the core to a positive MTC is slow due to the time required to increase the coolant temperature, and reduce the fuel temperature after an initial power increase, a positive MTC does not pose a problem for reactivity control.

As can be seen in ESBWR DCD, Tier 2 Figure 4.3-3, a positive MTC is not expected until late in the cycle, and at low temperature.

ESBWR DCD Tier 2 Subsection 4.3.3.2.3 shall be replaced, in its entirety, as follows:

The moderator temperature coefficient is an aspect of the Boiling Water Reactor core that is routinely evaluated as part of core and fuel design. The moderator temperature coefficient is associated with the change in the water moderating capability. A negative moderator temperature coefficient during power operation provides inherent protection against power excursions. Hot standby is the condition under which the BWR core coolant has reached rated pressure and temperature and is the state point at which a negative moderator temperature coefficient is required. Once boiling begins, the core dynamic response is dominated by the void coefficient.

The BWR core can exhibit a positive moderator temperature coefficient; although, fleet operation experience has shown it is uncommon or otherwise manageable. The primary parameters that lead to a positive MTC are the critical control rod density, the gadolinia content present, the lattice geometry and the enrichment. The two most important parameters are the control rod density and the gadolinia content. As insertion of the control rod displaces water in the intra-assembly gap, controlled nodes tend to contribute to a negative MTC. Similarly, both gadolinia and control rods are strong local absorbers and as neutron migration area increases with moderator temperature both absorbers become more effective leading to a negative MTC. As the core is depleted through power operation both the critical control rod density and the gadolinia content reduces which can lead to positive temperature coefficients at low temperature for late cycle startups It is noted that most, if not all, modern BWR fuel designs can be evaluated as having a positive MTC under certain conditions at moderator temperatures below hot standby; however, as the transient response of the core to a positive moderator temperature coefficient during startup is slow due to the time required to increase the coolant temperature, and reduce the fuel temperature after an initial power increase, a positive moderator temperature coefficient does not pose a problem for reactivity control.

Analyses of the moderator temperature coefficient of the reference core design were performed, as described in Reference 4.3-8. The variation of the moderator temperature coefficient as a function of temperature is shown in Figure 4.3-3 for several exposure points in the reference fuel cycle.

The most limiting state condition was determined to be at the end of the reference fuel cycle for a critical core configuration. The results of the analyses at these conditions were that the moderator temperature coefficient is negative for all moderator temperatures above approximately 130°C.

The results of these analyses at these conditions confirm that the moderator temperature coefficient is negative for all moderator temperatures in the operating temperature range. Therefore, the moderator temperature coefficient criteria are met.

NRC RAI 4.4-25

Section 1.0 of NEDC-33237P, states that "appropriate procedures are used and biases are applied". Describe these procedures and biases.

GE Response

The phrase "appropriate procedures are used and biases are applied" used in Section 1.0 of NEDC-33237P refers to a systematic approach developed to apply GEXL14 to the ESBWR version of GE14. A detailed description of this approach was provided in Section 4.2 of the same report. To clarify the meaning of this phrase, the second paragraph of Section 1.0 will be revised as follows:

> The GEXL critical power correlation for conventional GE14 10x10 fuel (GEXL14) has been developed using data obtained from the ATLAS critical power test facility. GE14 fuel is currently producing power in BWRs worldwide with successful operating performance. Due to the similarity between the conventional BWR and ESBWR versions of GE14, the GEXL14 correlation can be applied to ESBWR applications, provided that the geometry differences between the two versions of GE14, however small these differences are between the two versions, are quantified and properly accounted for. First, the ATLAS critical power data for the conventional BWR version of GE14 is adjusted due to shortening of the heated length. A subchannel analysis model of GE14, previously qualified based on the ATLAS GE14 critical power data, is then used to quantify the effect of the geometry differences between the two GE14 versions on the critical power performance of the ESBWR version of GE14. This document describes the application of the GEXL14 critical power correlation to ESBWR GE14 (GE14E) fuel and the supporting analyses performed to quantify and subsequently account for the effect (on critical power) of the differences between GE14 for the conventional BWRs and GE14E for ESBWR.

Detailed descriptions of the supporting studies performed to quantify and account for the effect (on critical power) of the differences between GE14 and GE14E were provided in NEDC 33237P. A revision to NEDC-33237P will be made to provide additional details based on the responses to the RAIs on this report.

It should also be noted that the development of GEXL14 correlation is consistent with the existing procedures, and that independent verification and peer reviews were performed in the studies leading to the conclusions in NEDC 33237P to assure conservatism and compliance with quality assurance requirements.

While No DCD change will be made in response to this RAI, a revision will be made to NEDC-33237P.

NRC RAI 4.4-30

Table 4-2 of NEDC-33237P, gives Average ECPR values greater than 1.0. The preceding paragraph states that ECPRs less than 1.0 represent points for which the correlation is conservative, and those greater than 1.0 represent points where the correlation is conservative. Explain why the data with mass flux less than or equal to [[ ]] is [[ ]] for use for the GE14E design.

GE Response:

The data with mass flux less than or equal to [[ ]] listed in the first row of Table 4-2 include critical power data from Spacers 1 and 2. These data are inherently [[ ]] for use with GE14E because the critical power data modified for a heated length truncated at [[ ]] will clearly be less than the data which one would measure in an actual test performed with the truncated heated length. This [[ ]], implicit in the [[ ]] based on the data which include the dryout data from Spacers 1 and 2, suggests that the [[ ]] is less than the [[ ]] apparent [[ ]]. In other words, the data have been used in a conservative way and that the 2.8% non-conservatism in the ECPR is overestimated. In the application of GEXL14 for the ESBWR the 2.8% non-conservatism in the mean ECPR is automatically accounted for by an equivalent increase of 0.028 in the safety limit. This removes any bias in the GEXL correlation. Consequently a net conservatism is introduced by the conservative use of the data.

To avoid a misinterpretation of the phrase "based on the conservative treatment of the GE14 modified data" in the first paragraph on Page 4-9 of NEDC-33237P, the following revision will be made:

> The first data set in Table 4-2 shows the GEXL14 correlation statistics for GE14E based on the the GE14 data modified for [[ ]] and limited to mass flux equal to less than [[ ]].

NRC RAI 4.4-35

Section 1.3.1 of NEDC-33239P, Monte Carlo Benchmark Comparison, refers to [[ ]]. What is [[ ]]? Provide qualitative and quantitative justification.

GE Response:

[[

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

[[

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NRC RAI 4.4-39

*Section 1.5 of NEDC-33239P states it is assumed that [[
]]. Provide additional clarification regarding this assumption, that is, considering the chimney arrangement.*

GE Response:

In support of the resolution for the above RAI, the following two tasks are performed. Everywhere below, the use of "the assumption" refers to the assumption that [[
]].

1. From a well-established reference TRACG case, the differences in pressures across all radial rings and azimuthal sectors at two specific vessel levels are examined. [[

]]

2. A comparison of channel flow rates between the TRACG case and a comparable PANACEA case is performed. It assesses the impact of "the assumption" on channel flow rates. The TRACG case captures the flow rates through different channel groups without "the assumption" and forms the basis to compare the PANACEA case to.

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

NRC RAI 4.4-51

Section 3.1.2.1 of NEDC-33239P discusses bundle peaking. Are the bundle peaking values (both fuel pin and bundle) lower for the GE14E bundles? How do these compare to ABWR and BWR/6 values?

GE Response:

Section 3.1.2.1 of NEDC-33239P is meant to call attention to the lattice power peaking characteristics within the bundle. The ESBWR core is comprised of assemblies in an N-lattice configuration. There is nothing inherent in the ESBWR fuel that results in the pin power peaking being either lower or higher than in other plant types.

The N-lattice is applied to both the ABWR and the ESBWR and is similar to the C-lattice (GE BWR-4C and BWR-5C plants) in that the bundle pitch is evenly centered within the core with equal intra-assembly gap widths; although, the size of the intra-assembly gaps are larger owing to the slightly larger bundle pitch (6.1" for the N-lattice and 6.0" for the C-lattice). For contemporary GNF fuel, the S-lattice, which denotes the geometry of the BWR-6, is identical to the C-lattice. Note that the fuel assembly lateral geometry is otherwise identical between the N-lattice and the C-lattice. Given the slightly larger intra-assembly gaps in the N-lattice, the thermal neutron flux is relatively higher on the edge and therefore the 2D pin power peaking can be relatively higher as compared to the C-lattice geometry, all other factors being equal (such as enrichment and gadolinia distributions). In contrast, the D-lattice (GE BWR-2D, BWR-3D and BWR-4D) has asymmetric intra-assembly gap widths, with the gaps on the control blade sides being larger than that of the N-lattice. This results in increased thermalization of the neutron flux in this gap and higher edge rod pin power peaking for the D-lattice as compared to both the C-lattice and the N-lattice. To illustrate the magnitude of these different characteristics, ESBWR Reference lattice 81803 was analyzed in N-lattice, C-lattice and D-lattice configurations. The results of these lattice physics calculations at 40% in-channel void fraction, and void history, are illustrated in Figure 4.4-51-1.

It should be noted, that there is significant flexibility to achieve a target pin power peaking through nuclear design (e.g. enrichment and gadolinia distribution) and maximum pin power peaking at BOL typically ranges from [[ ]] depending on the design application.

To summarize ESBWR lattice peaking characteristics, the N-lattice exhibits edge rod peaking that is slightly higher at BOL than C-lattice cores and is slightly lower than D-lattice cores; however, the nuclear design of the lattice has a much more significant influence on maximum pin power peaking.

The bundle power peaking is not an attribute of the reactor core except that core size can influence inherent peaking somewhat (i.e. small cores tend to have larger flux gradients and higher bundle peaking as compared to large cores, all else being equal). Rather, it serves as a design parameter that can be adjusted in order to maintain compliance with thermal limits. The core average power density, bundle power peaking, axial power peaking and lattice pin power peaking all combine in the determination of LHGR. The ESBWR core has a moderate power density and can accommodate high power peaking values and maintain compliance with thermal mechanical LHGR limits. The core average power density, bundle power peaking and coolant flow rate are important parameters affecting MCPR. As the ESBWR coolant flow is lower than that for a typical forced circulation BWR, the maximum assembly power that provides adequate MCPR margins is lower than most forced circulation BWRs; although, the mild transient response and low OLMCPR offsets this some. As can be seen from ESBWR DCD Tier 2, Section 4.A, maximum bundle power peaking values vary between [[ ]]. In contrast, a low power density (~40 KW/L) forced circulation BWR with a favorable OLMCPR could accept bundle power peaking values above [[ ]] while a high power density (~60 KW/L) forced circulation BWR, operating at low flow, may only be able to accept bundle power peaking values similar to the ESBWR.

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No changes to the ESBWR DCD or NEDC-33239P are required.

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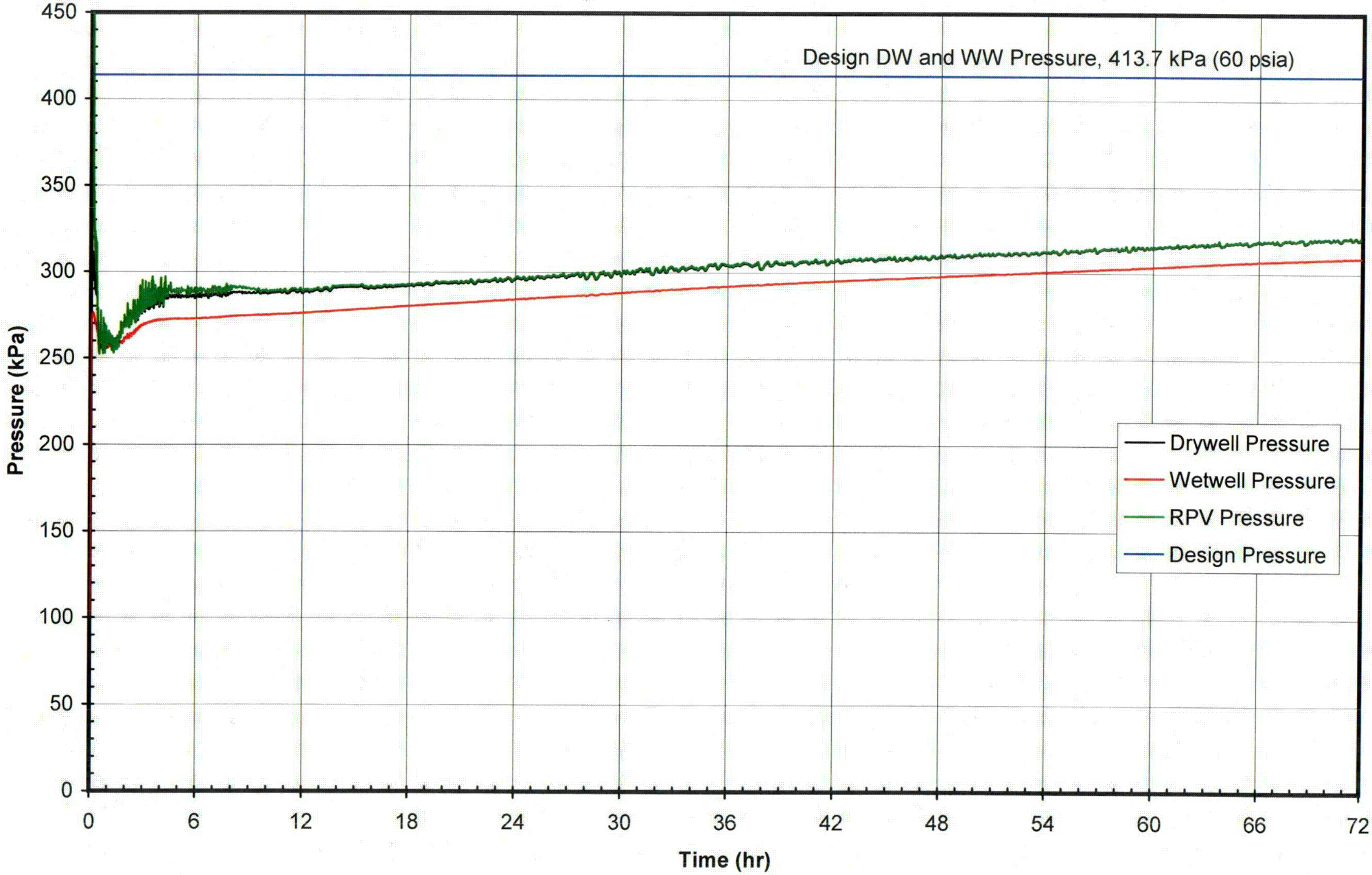

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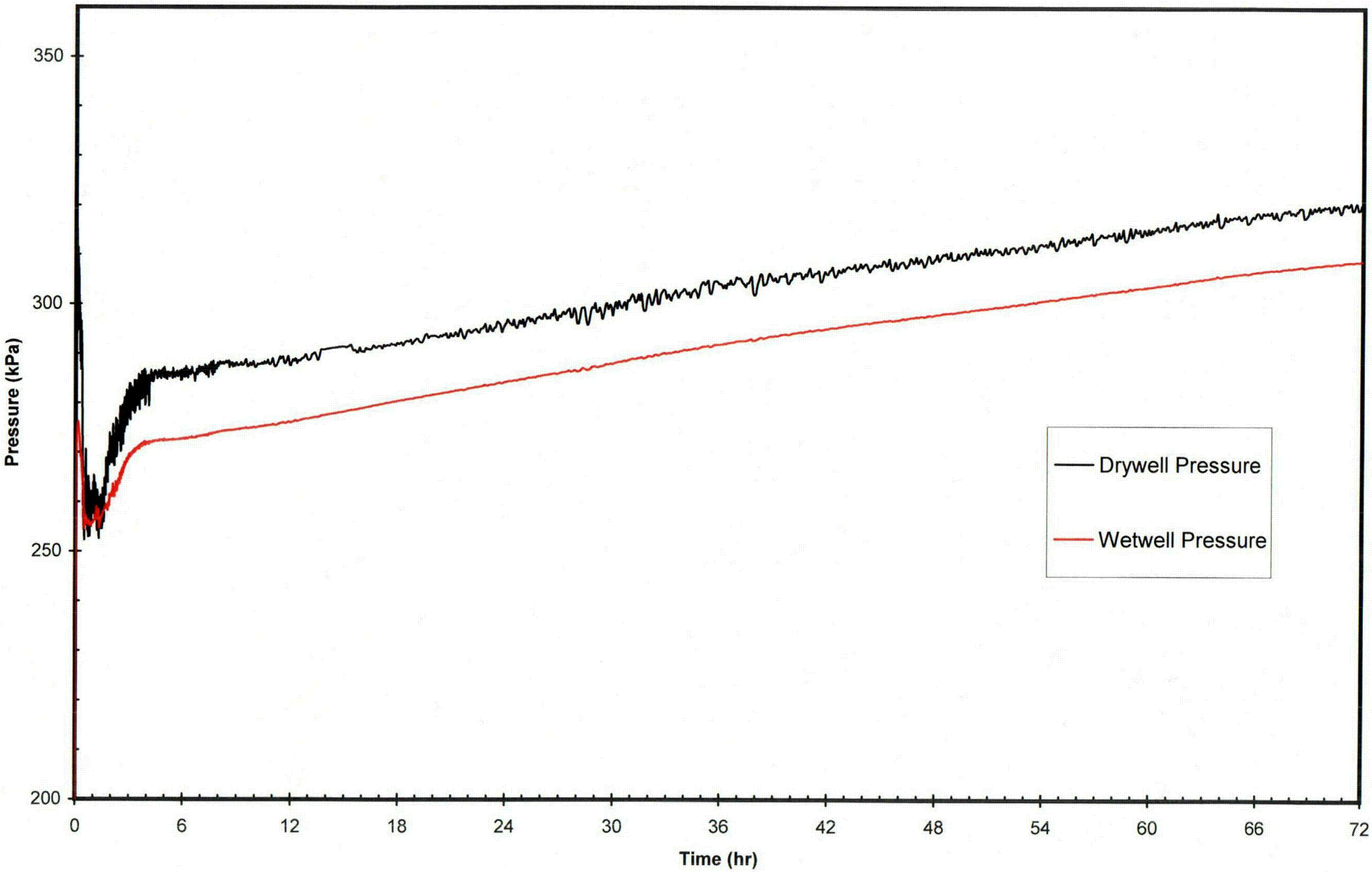

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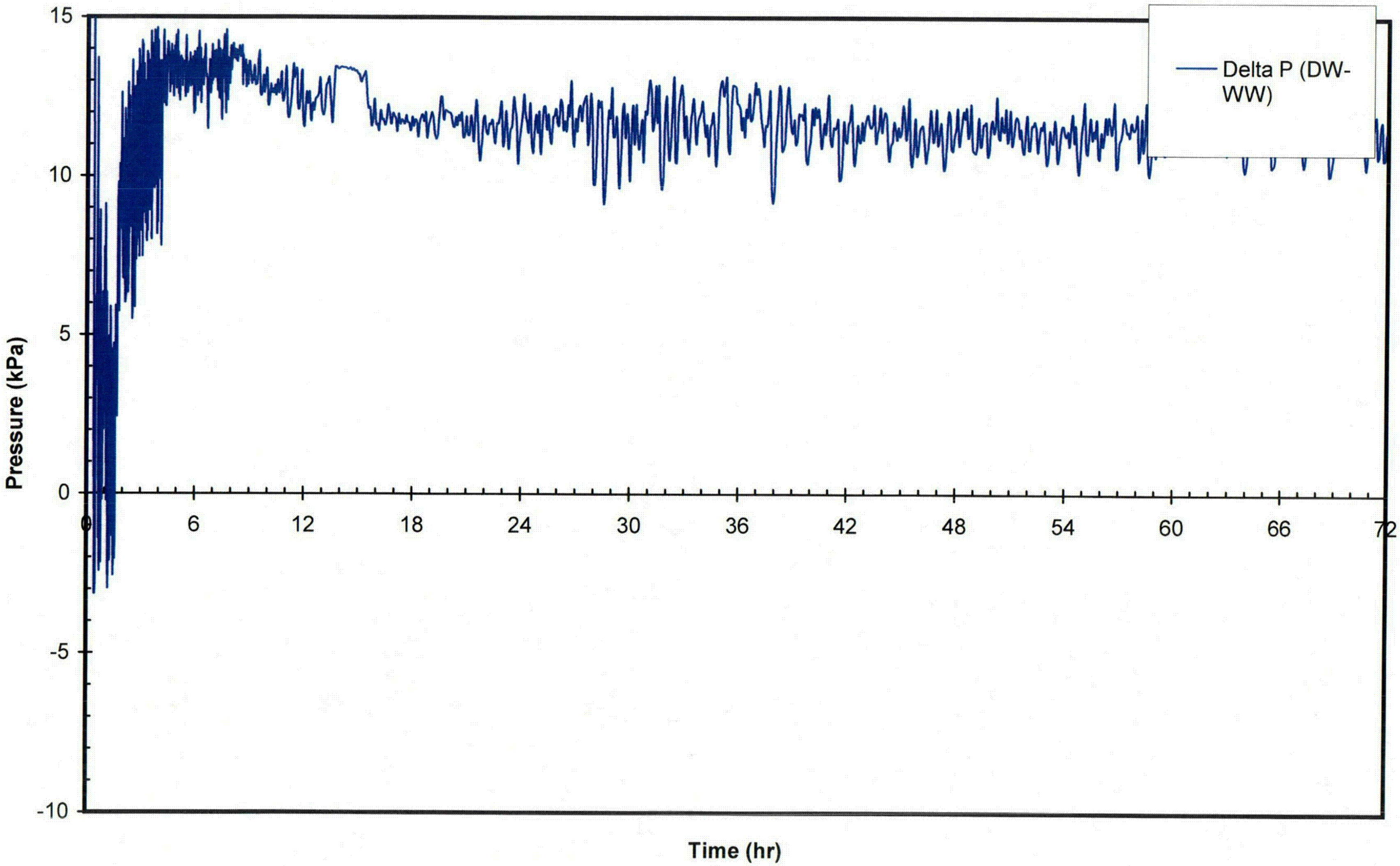

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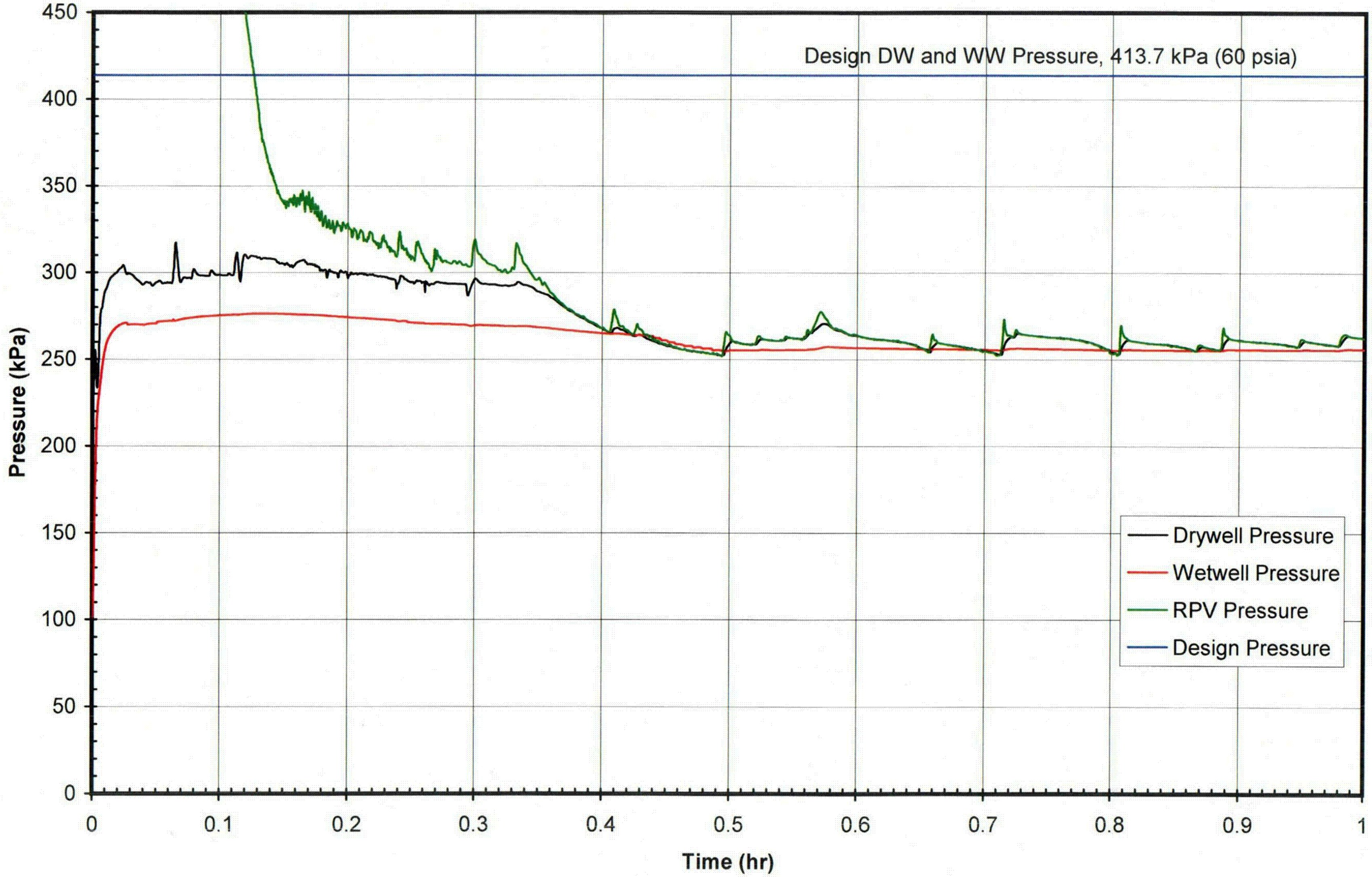

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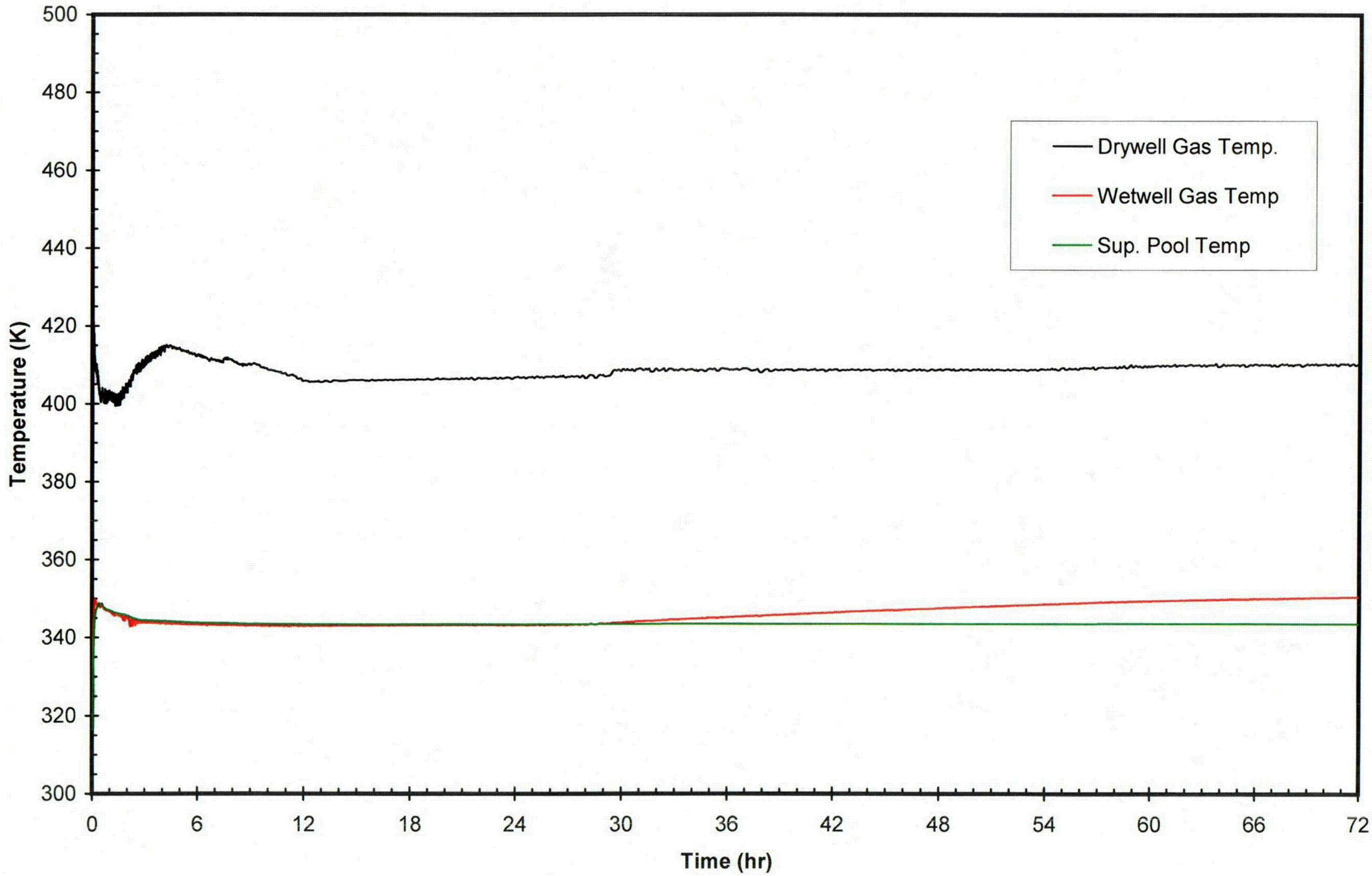

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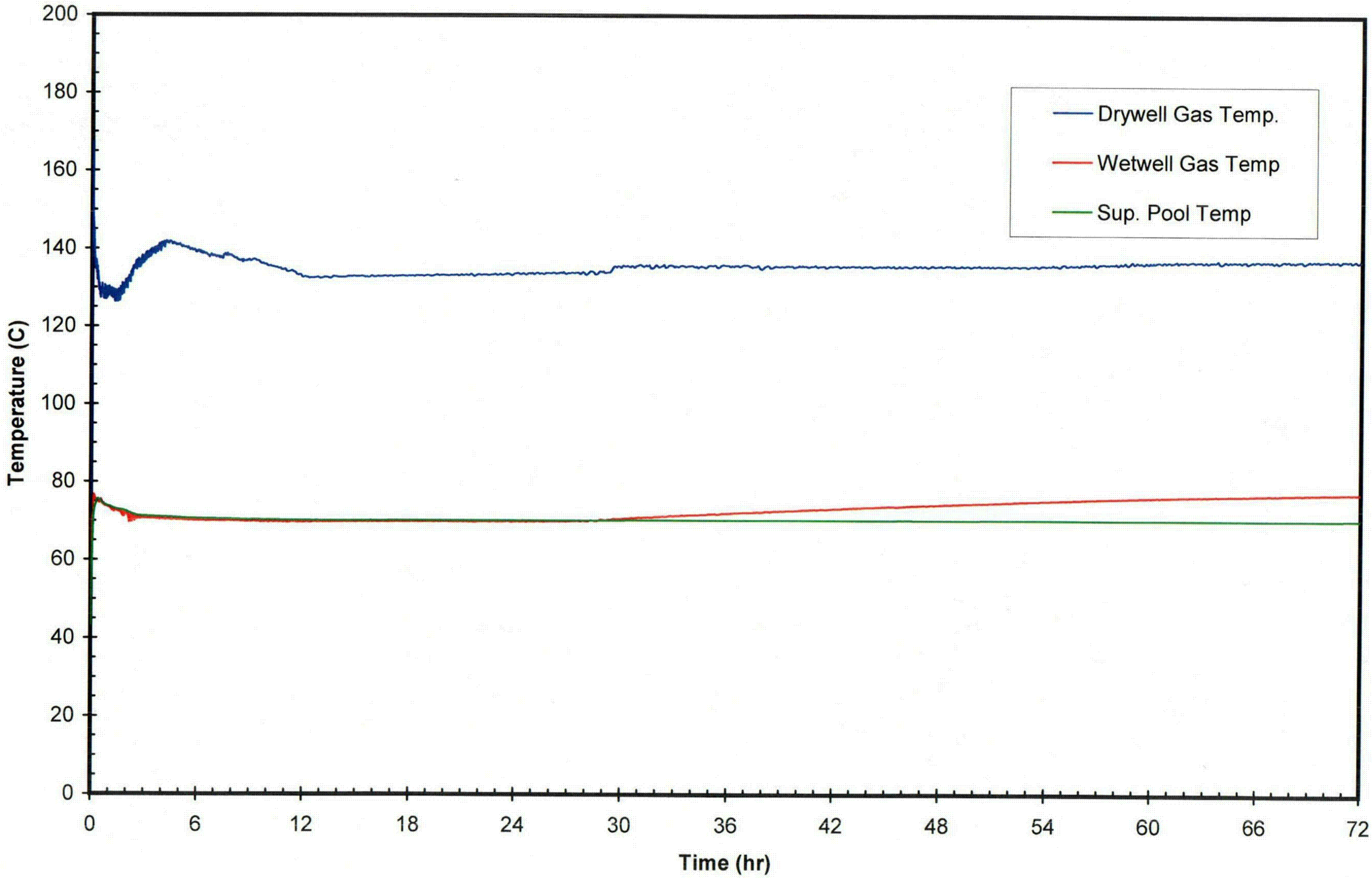

ENCLOSURE 3

MFN 06-350

AFFIDAVIT

Affidavit

I, Jens G. M. Andersen, state as follows:

(1) I am Consulting Engineer, Thermal Hydraulic Methods, Global Nuclear Fuel – Americas, L.L.C. ("GNF-A") and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.

(2) The information sought to be withheld is contained in Enclosure 1 of GE letter MFN 06-350, David H. Hinds to U. S. Nuclear Regulatory Commission, *Response to Portion of NRC Request for Additional Information Letter No. 53 Related to ESBWR Design Certification Application – DCD Chapter 4 and GNF Topical Reports – RAI Number 4.3-2, 4.3-5, 4.4-25, 4.4-30, 4.4-35, 4.4-39, 4.4-51* dated September 29, 2006. The proprietary information in Enclosure 1, *Response to Portion of NRC Request for Additional Information Letter No. 53 Related to ESBWR Design Certification Application – DCD Chapter 4 and GNF Topical Reports – RAI Number 4.3-2, 4.3-5, 4.4-25, 4.4-26, 4.4-28, 4.4-29, 4.4-30, 4.4-35, 4.4-39, 4.4-51 – GNF Proprietary Information,* is delineated by double underlined dark red font text and is enclosed inside double square brackets. Figures and large equation objects are identified with double square brackets before and after the object. The superscript notation{3} refers to Paragraph (3) of this affidavit, which provides the basis for the proprietary determination.

(3) In making this application for withholding of proprietary information of which it is the owner or licensee, GNF-A relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4) and 2.390(a)(4) for "trade secrets " (Exemption 4). The material for which exemption from disclosure is here sought also qualify under the narrower definition of "trade secret," within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).

(4) Some examples of categories of information which fit into the definition of proprietary information are:

a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by GNF-A's competitors without license from GNF-A constitutes a competitive economic advantage over other companies;

b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;

c. Information which reveals aspects of past, present, or future GNF-A customer–funded development plans and programs, of potential commercial value to GNF-A;

d. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs (4)a. and (4)b., above.

(5) To address the 10 CFR 2.390 (b) (4), the information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GNF-A, and is in fact so held. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in (6) and (7) following. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GNF-A, no public disclosure has been made, and it is not available in public sources. All disclosures to third parties including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence.

(6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge, or subject to the terms under which it was licensed to GNF-A. Access to such documents within GNF-A is limited on a "need to know" basis.

(7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his delegate), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GNF-A are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.

(8) The information identified in paragraph (2) is classified as proprietary because it contains details of GNF-A's fuel design and licensing methodology.

The development of the methods used in these analyses, along with the testing, development and approval of the supporting methodology was achieved at a significant cost, on the order of several million dollars, to GNF-A or its licensor.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GNF-A's competitive position and foreclose or reduce the availability of profit–making opportunities. The fuel design and licensing methodology is part of GNF-A's

comprehensive BWR safety and technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC–approved methods.

The research, development, engineering, analytical, and NRC review costs comprise a substantial investment of time and money by GNF-A or its licensor.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GNF-A's competitive advantage will be lost if its competitors are able to use the results of the GNF-A experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GNF-A would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GNF-A of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing and obtaining these very valuable analytical tools.

I declare under penalty of perjury that the foregoing affidavit and the matters stated therein are true and correct to the best of my knowledge, information, and belief.

Executed at Wilmington, North Carolina this 29th day of September 2006.

Jens G M Andersen

Jens G. M. Andersen
Global Nuclear Fuels – Americas, LLC