

Analysis of Requirements Applicable to Issuance of the ESBWR Design Certification Final Rule

GE-Hitachi Nuclear Energy

Docket No. 52-010

May 2013

TABLE OF CONTENTS

	Page
I. INTRODUCTION AND SUMMARY	1
II. BACKGROUND	2
A. ESBWR Design Certification Review (Before Proposed Rule)	2
B. ESBWR Steam Dryer	2
C. ESBWR Rulemaking and Comments	3
D. ESBWR Design Certification Review (Following Proposed Rule)	5
III. LEGAL STANDARDS FOR RENOTICING PROPOSED RULES	7
A. Administrative Procedures Act	7
B. Federal Case Law	8
IV. THE NRC NEED NOT RENOTICE THE ESBWR PROPOSED RULE	9
A. Changes to the ESBWR DCR Would Not Require Renoticing	10
B. Changes to the ESBWR DCD Would Not Require Renoticing	11
C. DCD Changes Improve the ESBWR Steam Dryer Analysis Methodologies	13
D. Not Renoticing Is Consistent with AP1000 Rulemaking Precedent	13
1. Original AP1000 Rulemaking	13
2. AP1000 Amendment Rulemaking	14
V. CONCLUSIONS	16

I. INTRODUCTION AND SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) published the proposed rule for the GE-Hitachi Nuclear Energy (GEH) Economic Simplified Boiling Water Reactor (ESBWR) design certification in March 2011. Following publication of the proposed rule, the NRC staff and GEH have undertaken additional interactions related to the ESBWR steam dryer analysis methodologies, which resulted in changes to the ESBWR design control document (DCD). Also, the NRC staff plans to issue a Supplemental Safety Evaluation Report (SER) in the upcoming months. The NRC staff is considering whether the NRC must renote the ESBWR proposed rule given these developments. GEH provides this paper describing the basis for its conclusion that the original proposed rule provided adequate notice for public comment on the ESBWR steam dryer methodologies and that the NRC need not renote the proposed rule.

As discussed in this paper, renoting of a proposed rule is not necessary for changes that are a “logical outgrowth” of the proposed rule. The additional interactions on the ESBWR steam dryer analysis methodologies do not relate to a new issue or component that was not already discussed in the proposed rule. The proposed rule specifically described the steam dryer design methodology for acoustic load definition, in combination with the American Society of Mechanical Engineering Code and startup testing, as an acceptable process for assuring structural integrity of the ESBWR steam dryer. Information that the NRC has subsequently reviewed for issuing a Supplemental SER re-validates the basic process with a demonstration of its implementation in a replacement steam dryer project. The basic methodology remains essentially the same and the process consists of the same three steps described in the proposed rule.

The additional interactions on the ESBWR steam dryer analysis methodologies also did not result in fundamental changes to design certification information, and did not result in a fundamentally new approach for these methodologies. Therefore, any changes are a logical outgrowth of the proposed design certification rule for the ESBWR. More specifically, the NRC does not need to renote the ESBWR proposed rule for a number of reasons, including:

- (1) there will be only minor changes to the ESBWR Design Certification Rule (DCR) as proposed by the NRC in 2011 (*e.g.*, changes to the revision numbers of documents referenced in the DCR);
- (2) the changes to the DCD following issuance of the proposed DCR will be relatively minor; the changes are focused on a single issue (the ESBWR steam dryer analysis methodologies) and do not affect the design itself or modify the basic underlying methodology processes from previous revisions;
- (3) the proposed DCR recognized that the DCD could change during rulemaking, and potential commenters have had notice of the DCD changes and have had opportunities to comment through public meetings;
- (4) the DCD changes will improve the ESBWR steam dryer analysis methodologies; and

(5) not renoticing is consistent with both the original and the amendment AP1000 design certification rulemaking precedent. Specifically, the NRC did not renotify the original AP1000 proposed rule even though the applicant made numerous changes to the DCD and the staff issued a Final SER (FSER) supplement following the proposed rule. Those changes to the AP1000 DCD were more numerous than those anticipated for the ESBWR DCD in terms of number of changes and sections affected. Similarly, the NRC did not renotify the AP1000 amendment proposed rule even though the applicant made changes to the DCD to correct errors, resolve technical issues, revise analyses, and designate information as Tier 2*, and the staff prepared a supplement to the FSER following the proposed rule. Although some of these changes appear to be of the same nature as those for the ESBWR DCD related to the steam dryer issues, they were much more extensive. This AP1000 rulemaking precedent directly supports not renoticing the ESBWR proposed rule.

This paper is organized into the following sections: Section II provides a brief background regarding the ESBWR design certification; Section III provides the legal standards for renoticing proposed rules, including discussion of the Administrative Procedures Act and federal case law; Section IV explains GEH's position that the ESBWR proposed rule need not be renoticed due to the steam dryer issues; and, finally, Section V presents the conclusions of this analysis.

II. BACKGROUND

A. ESBWR Design Certification Review (Before Proposed Rule)

GEH submitted its application for certification of the ESBWR under 10 C.F.R. Part 52, Subpart B, to the NRC on August 24, 2005.¹ The ESBWR is a 4,500 MWt boiling water reactor design that includes passive safety features. Following GEH's subsequent supplements to the application, the NRC accepted the application for docketing on December 1, 2005.²

In the years following docketing of the application, the NRC staff and GEH have participated in an extensive evaluation of the safety of the ESBWR design. The staff has issued many Requests for Additional Information (RAIs) regarding the design, and GEH has responded to those RAIs. GEH also has submitted multiple revisions of the ESBWR DCD, the most recent of which is Revision 9 submitted by GEH on December 2, 2010.³ On March 9, 2011, the NRC issued its FSER for the ESBWR design certification (based on DCD Revision 9).⁴

B. ESBWR Steam Dryer

As discussed in DCD Tier 2, Section 1.2.2.1, the steam dryer is part of the Reactor Pressure Vessel (RPV) internals in the ESBWR design. Energy produced in the reactor core

¹ ESBWR Design Certification, 76 Fed. Reg. 16,549, 16,550 (Mar. 24, 2011) ("ESBWR Proposed Rule").

² *Id.*

³ ESBWR Design Control Document, Rev. 9 (Dec. 2010) ("DCD"). DCD Revision 9 is available at ADAMS Package No. ML103440266.

⁴ ESBWR Final Safety Evaluation Report, at 1-1 (Mar. 2011) ("ESBWR FSER"). The ESBWR FSER is available at ADAMS Package No. ML103470210.

heats water entering the bottom of the core and converts it to a steam/water mixture. This steam/water mixture travels upward through the “chimney” to the steam separators, where centrifugal force separates the steam from the water. The slightly “wet” steam then travels upwards to the steam dryer, which removes additional water content. Finally, the dry steam travels to the turbine for electricity generation. The steam dryer and the separator assembly are designed to provide outlet dry steam with a moisture content $\leq 0.1\%$. A typical steam dryer is shown in DCD Tier 2, Figure 3L-2.

Although the steam dryer is not safety-related, it is a reactor-internal component and is designed to accommodate steady-state and transient vibratory loads, while maintaining its structural integrity, as described in NRC Regulatory Guide 1.20, “Comprehensive Vibration Assessment Program for Reactor Internals During Preoperational and Initial Startup Testing.” The steam dryer is important for power production, but is not needed to satisfy specific regulatory requirements.⁵

Two sections of the DCD are particularly relevant to the steam dryer and developments following publication of the proposed rule for the ESBWR design certification. The first is DCD Tier 2, Section 3.9, which addresses the design of mechanical systems and components. In particular, Subsection 3.9.2.3 addresses the dynamic response of reactor internals, including the steam dryer, under operational flow transients and steady-state conditions; Subsection 3.9.2.4 addresses the initial startup flow induced vibration testing of reactor internals; and Subsection 3.9.5.3 addresses loading conditions for RPV internals. The second is DCD Tier 2, Section 3L, which provides the reactor internals flow induced vibration (FIV) program. In particular, Subsection 3L.4 provides the Steam Dryer Evaluation Program. This subsection refers to three related GEH licensing topical reports (LTRs): (1) NEDE-33312P/NEDO-33312 – steam dryer acoustic load definition; (2) NEDE-33313P/NEDO-33313 – steam dryer structural evaluation; and (3) NEDC-33408P/NEDO-33408 – steam dryer load evaluation methodology.

C. ESBWR Rulemaking and Comments

On March 24, 2011, the NRC published a proposed rule in the *Federal Register* for the ESBWR design certification, with a comment period of 75 days.⁶ The proposed rule would add a new Appendix E to 10 C.F.R. Part 52 that would provide the ESBWR DCR, which then could be referenced by applicants or licensees intending to construct and operate a reactor utilizing the ESBWR design.⁷

The proposed rule identified the steam dryer methodology as one of a number of technical issues that were resolved during the ESBWR design review.⁸ The Statements of Consideration (SOC) for the proposed rule stated the following on this topic:

As a result of reactor pressure vessel (RPV) steam dryer issues at operating BWRs, the NRC issued revised guidance concerning the

⁵ See, e.g., DCD § 3.9.2.3; ESBWR FSER § 3.9.5.3.3.6.

⁶ ESBWR Proposed Rule, 76 Fed. Reg. at 16,549.

⁷ *Id.* at 16,549, 16,567.

⁸ *Id.* at 16,550.

evaluation of steam dryers. The guidance requested analysis to show that the dryer will maintain its structural integrity during plant operation in spite of or in the face of acoustic and hydrodynamic fluctuating pressure loads. This demonstration of RPV steam dryer structural integrity consists of three steps:

- (1) Predict the fluctuating pressure loads on the dryer,
- (2) Use these fluctuating pressure loads in a structural analysis to qualify the steam dryer design, and
- (3) Implement a startup test program for confirming the steam dryer design analysis results during the initial plant power ascension testing.

The Plant Based Load Evaluation (PBLE) methodology is an analytical tool developed by GEH to predict fluctuating pressure loads on the steam dryer. Section 3.9.5 of the DCD references the GEH LTR NEDE-33313P, “ESBWR Steam Dryer Structural Evaluation,” which references LTR NEDE-33312P, “ESBWR Steam Dryer Acoustic Load Definition,” which references the PBLE load definition method. The PBLE method is described in LTR NEDC-33408P, “ESBWR Steam Dryer-Plant Base Load Evaluation Methodology.” This LTR provides the theoretical basis for determining the fluctuating loads on the ESBWR steam dryer, describes the PBLE analytical model, determines the biases and uncertainties of the PBLE formulation, and describes the application of the PBLE method to the evaluation of the ESBWR steam dryer.

The NRC’s review of the PBLE methodology concludes that it is technically sound and provides a conservative analytical approach for definition of flow-induced acoustic pressure loading on the ESBWR steam dryer. The application of the PBLE load definition process together with the design criteria from the American Society of Mechanical Engineers (ASME) Code, Section III, Article NG-3000 in combination with the proposed start up test program provide assurance of the structural integrity of the steam dryer. Implementation of the analytical, design, and testing methodology for the ESBWR steam dryer demonstrate conformance with the general design criteria of 10 CFR part 50, Appendix A, GDCs 1, 2, and 4.⁹

The proposed rule also provided an opportunity for members of the public or others to submit comments on the DCR, DCD, and/or the environmental assessment.¹⁰ Comments submitted in response to this opportunity are posted on the Federal rulemaking website.¹¹ According to that website, the NRC received a total of six comments in response to the ESBWR design certification proposed rule. GEH submitted one of these comments in response to a generic petition submitted by a group of petitioners to suspend many different licensing and rulemaking activities in response to the March 2011 Fukushima accident. The remaining comments were submitted by individuals or organizations, and raise issues regarding electrical design, public health from radiation, beyond design basis accidents, and the Fukushima accident.

⁹ *Id.* at 16,551-552.

¹⁰ *Id.* at 16,549.

¹¹ See ESBWR Design Certification, <http://www.regulations.gov/#!docketDetail;D=NRC-2010-0135>.

None of the public comments discusses the ESBWR steam dryer or associated methodologies in any manner, nor do the comments raise any policy issues related to these topics.

D. ESBWR Design Certification Review (Following Proposed Rule)

Following issuance of the ESBWR proposed rule, the NRC staff and GEH have had further detailed interactions regarding steam dryer analysis methodologies, including modifications to the supporting LTRs. On January 19, 2012, the staff commenced these activities by notifying GEH of postulated steam dryer issues.¹² The staff explained:

Through the NRC's review of the Grand Gulf Extended Power Uprate (EPU), issues have been identified that are relevant to the conclusions in the staff's March 9, 2011, Final Safety Evaluation Report (FSER) issued in support of the ESBWR DC rulemaking. Specifically, errors have been identified in the benchmarking GE Hitachi (GEH) used as a basis for determining fluctuating pressure loading on the steam dryer, and errors have been identified in a number of GEH's modeling parameters. These errors may affect the conclusions in the staff's FSER and need to be addressed before we complete the ESBWR DC. This information has resulted in the need to revisit the previously communicated rulemaking schedule.¹³

The staff conducted an audit of the steam dryer design methodologies, and has issued a number of additional RAIs on this topic. The staff also has held a series of public meetings and teleconferences during this review period focusing on the steam dryer analysis methodologies, and there was an opportunity for the public to ask questions and make comments during these meetings.¹⁴ In addition, GEH discussed resolution of the steam dryer issues in these public meetings, except where the information was proprietary.

As part of the staff's RAIs related to the steam dryer, the staff issued RAI 3.9-292, which questioned what changes GEH plans to make to the ESBWR licensing basis documents. On February 19, 2013, GEH submitted a draft response to RAI 3.9-292.¹⁵ That response summarizes the licensing basis changes expected to be made as part of the additional review of the steam dryer analysis methodologies, including a roadmap between the NRC RAIs and licensing basis changes, and marked-up DCD pages. The specific changes to the DCD include:¹⁶

¹² Letter from M. Mayfield, NRC, to J. Head, GEH, Economic Simplified Boiling Water Reactor Design Certification Rulemaking Schedule (Jan. 19, 2012).

¹³ *Id.* at 1.

¹⁴ The NRC held public meetings or teleconferences on the following dates: 01/31/2012, 04/18/2012, 04/25/2012, 05/02/2012, 05/09/2012, 05/16/2012, 05/23/2012, 05/30/2012, 06/06/2012, 06/13/2012, 06/20/2012, 06/27/2012, 07/03/2012, 07/11/2012, 07/18/2012, 07/25/2012, 08/01/2012, 08/08/2012, 08/15/2012, 08/22/2012, 08/29/2012, 09/12/2012, 09/29/2012, 10/31/2012, 11/07/2012, 11/14/2012, 11/28/2012, 02/20/2013, 02/27/2013, 03/06/2013, 03/13/2013, 03/19/2013, and 4/10/2013.

¹⁵ Letter from J. Head, GEH, to NRC, NRC Requests for Additional Information Related to the Audit of the Economic Simplified Boiling Water Reactor (ESBWR) Steam Dryer Design Methodology Supporting Chapter 3 of the ESBWR Design Control Document – GEH Draft Response to RAI 3.9-292 (Feb. 19, 2013) (“RAI 3.9-292 Draft Response”).

¹⁶ *See id.*, Enclosures 1, 2, 3, 6.

1. Addition of one new design commitment and one new Inspection, Test, Analysis and Acceptance Criterion (ITAAC) in DCD Tier 1 related to verification that the as-built steam dryer predicted peak stress is below the fatigue limit.
2. A few editorial changes in DCD Tier 2.
3. Changes to some references related to GEH LTRs in DCD Tier 2.
4. Update of the applicable revision of Regulatory Guide 1.20, "Comprehensive Vibration Assessment Program for Reactor Internals During Preoperational and Initial Startup Testing."
5. Modification of a few sentences in DCD Tier 2, Section 3.9.2.3, "Dynamic Response of Reactor Internals Under Operational Flow Transients and Steady-State Conditions," including additional conservatism in the predictive analyses.
6. Changes of "peak stress" to "highest stress" in a few places in DCD Tier 2.
7. Addition of a few sentences in DCD Tier 2, Section 3.9.2.4, "Initial Startup Flow Induced Vibration Testing of Reactor Internals," regarding the initial implementation of the vibration assessment program and Regulatory Guide 1.20 requirements.
8. Addition of a few paragraphs in DCD Tier 2, Section 3.9.5.3, "Loading Conditions," related to steam dryer acoustic loading effects from safety-relief valve standpipes and main steam piping.
9. Removal of a paragraph in DCD Tier 2, Section 3L.4.4, "Fluid Loads on the Steam Dryer," related to a deleted reference.
10. Revisions to DCD Tier 2, Section 3L.4.6, "Instrumentation and Startup Testing," including further discussion of instrumentation, a COL Information Item, and Regulatory Guide 1.20.
11. Addition of a sentence to DCD Tier 2, Section 3L.5.5.1.3, "Steam Dryer," regarding the final as-built structural predictive vibration analysis.
12. Revision to one note for Table 3L-5, "Applicable Data Reduction Method for Comparison to Criteria," describing the information provided in a cross-referenced section.

The draft response to RAI 3.9-292 also explains that GEH has revised the underlying LTRs/Engineering Reports that support the steam dryer analysis: NEDE-33312P/NEDO-33312, NEDE-33313P/NEDO-33313, and NEDC-33408P/NEDO-33408.¹⁷ Changes to these reports consist of removing information not pertinent to the ESBWR steam dryer analysis, supplementing/updating/replacing the methodology benchmark, providing a demonstration of the

¹⁷ *Id.*, Enclosure 1, at 1-2.

methodology, and rearranging content for clarity (methodology theory and description, benchmarking, and demonstration). GEH informed the NRC in a meeting with the NRC held on March 19, 2013 that the three Engineering Reports will be designated as Tier 2* information, which in effect means that NRC prior approval would be required to change the content of the Engineering Reports. These reports are incorporated by reference into the DCD.

In summary, GEH has made some changes to the DCD and referenced LTRs, which are now Engineering Reports (see GEH response to RAI 3.9-292). Although the staff raised issues with certain information regarding ESBWR steam dryer analysis methodologies, resolution of these issues did not require fundamental changes to the design certification information. The basic analysis methodologies were adjusted to address the issues (including a new benchmark with its associated biases and uncertainties), but the underlying methodologies for calculating loads and stresses were not changed in a significant manner from what was included in the SOC for the proposed rule or what was in the design certification record for the proposed rule. That is, there is no fundamentally new approach as a result of the changes.

Following a meeting on March 19, 2013, the NRC issued additional RAIs. GEH is now finalizing the RAI responses for these and for RAI 3.9-292. This should be completed in the upcoming weeks. GEH understands that the staff then will issue a Supplemental SER for the steam dryer assessment methodology issues that have been part of this subsequent review, and will proceed with ESBWR design certification rulemaking. Because the final rule would be reflective of the process described in the proposed rule and, therefore, is a logical outgrowth of the proposed rule, the NRC may proceed with issuing the final rule.

III. LEGAL STANDARDS FOR RENOTICING PROPOSED RULES

A. Administrative Procedures Act

Under the Administrative Procedures Act (APA), a “[g]eneral notice of proposed rule making shall be published in the Federal Register” unless persons subject thereto are named and personally served or otherwise have “actual notice.”¹⁸ The notice shall include “either the terms or substance of the proposed rule or a description of the subjects and issues involved.”¹⁹ The agency then allows “interested persons” the opportunity to submit comments in order to assist the agency in the development of the final rule.²⁰ The agency then publishes a final rule based on the input from the interested persons.

Because the comments are intended to inform the agency’s decision-making process, they often result in differences between the proposed rule and the final rule. In fact, Courts have held that such differences are *required* if the record demands such a change.²¹ The APA does not expressly address any requirement to renotice a proposed rule, even if the final rule differs significantly. However, as explained below, Courts have found that differences between the proposed and final rule cannot be so large so as to defeat the notice provision of APA § 553(b).

¹⁸ 5 U.S.C. § 553(b).

¹⁹ *Id.* § 553(b)(3).

²⁰ *Id.* § 553(c).

²¹ *Kooritzky v. Reich*, 17 F.3d 1509, 1513 (D.C. Cir. 1994).

This doctrine requires that the final rule be the “logical outgrowth” of the proposed rule to ensure adequate notice of the changes.²² This interpretation of the APA was stated explicitly in the legislative history of the Act.²³

B. Federal Case Law

The “logical outgrowth” rule states that renote is required when the differences between the proposed and final rules “are so major that the original notice did not adequately frame the subjects for discussion.”²⁴ Conversely, no renote is required if the changes “follow logically from or [] reasonably develop the rules [that were] proposed originally.”²⁵ This rule is to avoid the comment period becoming “a perpetual exercise rather than a genuine interchange resulting in improved rules.”²⁶ This doctrine was confirmed by the Supreme Court as the appropriate method of determining the necessity of renoticing a proposed rule.²⁷ Specifically, the Supreme Court clarified that “[t]he object . . . is one of fair notice.”

The term “logical outgrowth” is a bit of a misnomer, as it does not require that “the final rule be deducible by merely applying the principles of logic to the proposed version.”²⁸ The public need only be able to anticipate that such a change is possible.²⁹

The purpose of the notice-and-comment rulemaking procedure is to provide “fair notice” to all affected parties.³⁰ This purpose is the underpinning of the logical outgrowth rule. Without sufficient notice, the affected parties will not have the opportunity to fairly comment. Therefore, the key to determining whether notice was sufficient for the final rule is to determine if an affected party could be considered on notice of the potential for their interests to be affected.

The magnitude of the change is relevant to the analysis of whether sufficient notice has been given.³¹ If the changes that occur between the proposed rule and the final rule are not material, then, by definition, the notice of proposed rulemaking sufficiently described the issues and subjects of the rulemaking.³² Even where there is a substantial change, however, there is not necessarily a requirement that the proposed rule be renoticed. For example, the Seventh Circuit explicitly recognized the following types of changes as being substantial yet containing adequate notice in the proposal:

²² See Phillip M. Kannan, *The Logical Outgrowth Doctrine in Rulemaking*, 48 ADMIN. L. REV. 213, 215-16 (1996).

²³ See S. Rep. No. 752 at 200 (1945) (“Agency notice must be sufficient to fairly apprise interested parties of the issues involved.”).

²⁴ *Conn. Light & Power Co. v. NRC*, 673 F.2d 525, 533 (D.C. Cir. 1982).

²⁵ *Id.*

²⁶ *Id.*

²⁷ *Long Island Care at Home, Ltd. v. Coke*, 551 U.S. 158, 174 (2007).

²⁸ Kannan, *supra*, at 216; see also *Small Refiner Lead Phase-Down Task Force v. EPA*, 705 F.2d 506, 548-49 (D.C. Cir. 1983) (describing the phrase “logical outgrowth” as “imperfectly captur[ing]” the test).

²⁹ *CSX Transp., Inc. v. Surface Transp. Bd.*, 584 F.3d 1076, 1079-80 (D.C. Cir. 2009); see also *Long Island Care at Home*, 551 U.S. at 160 (stating that the change between the proposed rule and final rule was acceptable because it was “reasonably foreseeable”).

³⁰ *Leyse v. Clear Channel Broadcasting Inc.*, 697 F.3d 360, 371 (6th Cir. 2012).

³¹ See, e.g., *Transmission Access Policy Study Grp. v. FERC*, 225 F.3d 667, 729 (D.C. Cir. 2000).

³² *Id.*

outright reversal of the agency's initial position; elimination of compliance options contained in [a Notice of Proposed Rulemaking]; collapsing, or further subdividing, distinct categories of regulated entities established in a proposed rule; exempting certain entities from the coverage of final rules; or altering the method of calculating or measuring a quantity relevant to a party's obligations under the rule.³³

Courts also have considered, as fulfilling the requirement of sufficient notice, actual notice to the affected parties, even when failing to use the statutorily prescribed fashion.³⁴ Courts, however, require evidence that actual notice was received.³⁵

In *Connecticut Light & Power Co. v. NRC*, the D.C. Circuit examined the need to renotice a proposed rule that was part of an NRC rulemaking regarding fire protection requirements.³⁶ This issue arose in response to arguments by a licensee affected by the regulation that the adopted rules differed in major respects from the proposed rule.³⁷ The Court identified three substantial changes between the proposed and final rule and found all of them acceptable as "logical outgrowths" of the proposed rule.³⁸ These changes were: (1) the NRC proposed two potential methods for protecting coolant pump lubrication oil and decided on only one in the final rule; (2) the proposed rule had allowed fire retardant coatings to be credited, but the final rule did not because of reliability concerns; and (3) the proposed rule used a postulated hazards approach for protecting shutdown capabilities but the final rule used three stipulated alternatives.³⁹ For the first two changes, the Court concluded that they were acceptable because "[t]he final rules were simply more stringent versions of the proposed rules."⁴⁰ On the last change, the Court concluded that this substantial change was very close to requiring renoticing but found that the NRC's added exemption procedure would allow licensees to be treated under the rule as if the proposed rule were implemented.⁴¹

IV. THE NRC NEED NOT RENOTICE THE ESBWR PROPOSED RULE

For the multiple reasons discussed below, there is no need to renotice the ESBWR proposed rule.

³³ *Am. Medical Ass'n v. United States*, 887 F.2d 760, 768 (7th Cir. 1989).

³⁴ *Small Refiner*, 705 F.2d at 549 ("Our cases recognize that even if the agency has not given notice in the statutorily prescribed fashion, actual notice will render the error harmless.").

³⁵ *Id.*

³⁶ *Conn. Light & Power Co.*, 673 F.2d at 532-34.

³⁷ *Id.*

³⁸ *Id.*

³⁹ *Id.* at 533.

⁴⁰ *Id.*

⁴¹ *Id.*

A. Changes to the ESBWR DCR Would Not Require Renoticing

One of the areas that Courts and the NRC have considered in determining whether a proposed rule should be renoticed is whether the rule language itself is changed and the extent of such a change. The D.C. Circuit has explained:

when a final rule bears little resemblance to the one proposed, the parties are deprived of their APA rights to notice and comment. When a final rule is a logical outgrowth of the proposal, on the other hand, the APA's notice-and-comment provisions are satisfied, and procedural challenges based thereon must fail. "[T]he test, imperfectly captured in the phrase 'logical outgrowth,'" is whether parties "should have anticipated" [the final requirements].⁴²

GEH is not aware of any significant changes that need to be made to the actual ESBWR DCR in response to further interactions regarding the steam dryer analysis methodologies following the proposed rule.

It is likely that the NRC will decide to make minor revisions to the proposed language of the DCR. For example, the NRC may add a reference to the Supplemental SER on steam dryer issues to the parts of the DCR that already reference the FSER and add the steam dryer design process to the listing of Tier 2* matters in Section VIII.B.6.b. In this regard, the NRC could revise Subsections III.D, V.A, and VI.B.1 of the DCR to reference the Supplemental SER. The DCR likely also will be revised to refer to DCD Revision 10, instead of Revision 9. These changes would be minor and would not result in a "final rule [that] bears little resemblance to the one proposed."⁴³ These changes would be more administrative in nature.

These minor changes to the ESBWR DCR itself are similar to, or in some cases less significant than, changes to proposed rules during earlier design certifications that did not result in renoticing. For example:

- The NRC amended the ABWR proposed rule with respect to issue resolution for Tier 2 changes; more detailed statements regarding the scope of issues resolved, change process, and rulemaking findings; and incorporating substantive procedural and administrative requirements from the DCD Introduction into the design certification rule.⁴⁴
- The NRC amended the System 80+ proposed rule with respect to issues similar to those identified for the ABWR above.⁴⁵

⁴² *Shell Oil Co. v. EPA*, 950 F.2d 741, 759 (D.C. Cir. 1991) (quoting *Small Refiner*, 705 F.2d at 548-49) (citations omitted).

⁴³ *Shell Oil*, 950 F.2d at 759.

⁴⁴ See Standard Design Certification for the U.S. Advanced Boiling Water Reactor Design, 62 Fed. Reg. 25,800, 25,801, 25,803-804, 25,813 (May 12, 1997).

⁴⁵ See Standard Design Certification for the System 80+ Design, 62 Fed. Reg. 27,840, 27,840, 27,842, 27,843, 27,853 (May 21, 1997).

- The NRC stated that it amended the AP600 proposed rule to make “editorial revisions and updates to the supplementary information on applicable regulations.”⁴⁶
- The NRC amended the AP1000 proposed rule to exclude the design-specific Probabilistic Risk Assessment and the evaluation of Severe Accident Mitigation Design Alternatives from the definition of Tier 2.⁴⁷

Consistent with this past precedent, no renoticing is required for the likely minor changes to the ESBWR DCR during rulemaking.

GEH recognizes that the DCR incorporates by reference the DCD, including both Tier 1 and Tier 2 information. The changes to the DCD are discussed in the next section, which explains that the DCD changes are relatively minor and also do not require renoticing the ESBWR proposed rule.

B. Changes to the ESBWR DCD Would Not Require Renoticing

For the following reasons, the changes to the ESBWR DCD do not require the NRC to renotify the proposed ESBWR rule.

First, the changes to the DCD affect a relatively minor portion of the overall DCD. The DCD markup that GEH submitted with its draft response to RAI 3.9-292 regarding licensing basis changes identifies changes on only 35 pages of the DCD.⁴⁸ Many of these pages have no changes except to the header, and are included only to provide the entire subsection that is being modified. In fact, only about 15 pages have any substantive changes, and most of these pages only change a few sentences. These 15 pages are a very small portion of the approximately 7,000 pages⁴⁹ of the entire DCD (~0.2%). A change that only affects approximately 0.2% of the DCD is not a significant change that needs to be renoticed.⁵⁰

Second, aside from the quantity of changes, the changes to the DCD are focused on a single issue related to the ESBWR steam dryer analysis methodologies. The changes do not affect widespread components or design issues. Indeed, the changes do not change the physical design of the steam dryer itself. Instead, as discussed above, the basic steam dryer analysis methodologies were adjusted to address the issues that arose during rulemaking, but the underlying methodologies were not changed in a significant manner from what was in the design certification record for the proposed rule. Moreover, the steam dryer and the methodologies are not safety-related, and the analyses are only a part of the overall design process and verification of structural integrity.

⁴⁶ AP600 Design Certification, 64 Fed. Reg. 72,002, 72,003 (Dec. 23, 1999).

⁴⁷ AP1000 Design Certification, 71 Fed. Reg. 4464, 4466 (Jan. 27, 2006).

⁴⁸ RAI 3.9-292 Draft Response, Enclosure 6.

⁴⁹ See GE-Hitachi ESBWR Design Control Document, Rev. 9, <http://pbadupws.nrc.gov/docs/ML1034/ML103440266.html>.

⁵⁰ See *Transmission Access*, 225 F.3d at 729 (holding that the magnitude of a change is relevant in the determination of whether the final rule is a logical outgrowth of the proposed rule).

Third, the proposed rule recognized that the DCD could change during the rulemaking process, including information regarding the steam dryer. The proposed rule stated: “The public is invited to submit comments on this proposed DCR, the generic [DCD] that would be incorporated by reference into the DCR, and the environmental assessment (EA) for the ESBWR design.”⁵¹ Because the steam dryer information is located in the DCD, members of the public had an opportunity to comment on it. Indeed, the proposed rule SOC included a specific section discussing the steam dryer design methodology.⁵² As discussed above, the NRC received no comments on the steam dryer whatsoever. Finally, the discussion of the DCD itself explained that the final version of the DCD could be changed “as a result of public comments.”⁵³ For these reasons, the proposed rule made it clear that the DCD could change. Renoticing is thus not required, because the public could have anticipated that a change to the DCD information regarding steam dryers was possible.⁵⁴

Fourth, any members of the public who would potentially comment on the DCD changes themselves if the proposed rule were to be renoticed have already had access to the changes and had an opportunity to participate in public meetings on this topic. Except for proprietary information, the RAIs and RAI responses related to the steam dryer are publicly available. For example, the draft response to RAI 3.9-292 regarding planned licensing basis changes regarding the steam dryer is publicly available at ADAMS Accession No. ML13053A303. The NRC also has held numerous public meetings to discuss the ESBWR steam dryer issues. For example, the NRC’s public meeting database identifies about 30 public meetings or teleconferences related to the ESBWR during 2012 and 2013.⁵⁵ These efforts certainly provided fair notice of DCD changes, and support not needing to renotece the proposed rule.⁵⁶

For the above reasons, there is no need to renotece the ESBWR proposed rule. The relatively minimal changes to the DCD satisfy the “logical outgrowth” principle because differences between the proposed and final rule are not “so major that the original notice did not adequately frame the subjects for discussion,”⁵⁷ and the changes “follow logically from or [] reasonably develop the rules [that were] proposed originally.”⁵⁸ Given the nature of the changes, sufficient notice to the public has been provided.

⁵¹ ESBWR Proposed Rule, 76 Fed. Reg. at 16,549.

⁵² *Id.* at 16,551-552.

⁵³ *Id.* at 16,553.

⁵⁴ See *CSX Transp.*, 584 F.3d at 1079-80; see also *Long Island Care at Home*, 551 U.S. at 160 (stating that the change between the proposed rule and final rule was acceptable because it was “reasonably foreseeable”).

⁵⁵ See Public Meeting Schedule: Search, <http://www.nrc.gov/public-involve/public-meetings/index.cfm?action=search.form> (searching for meetings in 2012 or 2013 with Docket Number: “05200010: ESBWR”).

⁵⁶ *Long Island Care at Home*, 551 U.S. at 174; *Int’l Union, United Mine Workers of Am. v. Mine Safety and Health Admin.*, 407 F.3d 1250, 1259 (D.C. Cir. 2005) (“Notice requirements are designed (1) to ensure that agency regulations are tested via exposure to diverse public comment, (2) to ensure fairness to affected parties, and (3) to give affected parties an opportunity to develop evidence in the record to support their objections to the rule and thereby enhance the quality of judicial review.”); *Small Refiner*, 705 F.2d at 548 (holding that where a potential party challenging the rule should have been aware that potential changes would affect it, it was “obliged to take reasonable steps,” such as a letter to the regulator, to keep informed of the agency’s “thinking on this matter” and that the party challenging the rule was “*in fact*” aware of the specific potential change through attendance at public meetings discussing it).

⁵⁷ *Conn. Light & Power Co.*, 673 F.2d at 533.

⁵⁸ *Id.*

C. DCD Changes to the ESBWR Control Document (DCD)

The lack of a need to renote the ESBWR proposed rule is particularly appropriate here because the changes to the DCD for the steam dryer analysis methodologies are to reflect an actual demonstration of the methodologies in a replacement steam dryer design, installation, and testing process. In addition, the changes include a new inspection of the as-built ESBWR steam dryer (ITAAC), impose a safety factor in the predictive acoustic loading, and designate the steam dryer methodology information as Tier 2*. To the extent the DCD changes impose more requirements, the changes could be characterized as “more stringent” for the purposes of this analysis. This is similar to the circumstances in *Connecticut Light & Power Co. v. NRC* in which the D.C. Circuit rejected arguments that certain changes to a proposed rule required renoticing.⁵⁹ In particular, the Court rejected this argument for two changes to the proposed rule because “[t]he final rules were simply more stringent versions of the proposed rules.”⁶⁰ Similarly, here the changes to the ESBWR DCD do not fundamentally change the steam dryer design or the analysis methodologies, and include additional requirements, which could be said to result in a “more stringent” version of the proposed rule. For this reason, the proposed rule need not be renoticed.

D. Not Renoticing Is Consistent with AP1000 Rulemaking Precedent

The conclusion to not renote the ESBWR proposed rule due to the steam dryer developments is consistent with both the original AP1000 design certification rulemaking and the more recent rulemaking for the amendment to the AP1000 design certification.

1. Original AP1000 Rulemaking

Westinghouse submitted the original application for certification of the AP1000 design on March 28, 2002.⁶¹ The NRC staff issued an FSER for the AP1000 design in September 2004 and published the proposed rule for the AP1000 design certification on April 18, 2005.⁶² As explained in the final rule SOC:

Subsequently, Westinghouse submitted editorial and minor technical changes and clarifications to the inspections, tests, analyses, and acceptance criteria (ITAAC) in revision 15 to the design control document (DCD). The NRC staff evaluated these changes in a supplement to the FSER (NUREG-1793, Supplement No. 1). Supplement No. 1 is being made available to the public as part of this rulemaking.⁶³

⁵⁹ *Id.* at 532-34.

⁶⁰ *Id.* at 533.

⁶¹ AP1000 Design Certification, 71 Fed. Reg. at 4464.

⁶² *Id.*

⁶³ *Id.*

The AP1000 DCD changes are identified in Table 1.5-1 of the Supplement to the AP1000 FSER.⁶⁴ Although some of the changes are minor, others include substantive changes and corrections related to ITAAC.⁶⁵ The changes affect numerous subsections, tables, and figures. These circumstances are similar to those faced with the ESBWR rulemaking, in which there are revisions to the DCD and the NRC staff is preparing a supplement to the FSER following publication of the proposed rule. In fact, the changes to the AP1000 DCD were much more numerous than those anticipated for the ESBWR DCD in terms of number of changes and sections affected. The NRC did not renote the AP1000 proposed rule, and a similar outcome is appropriate for the ESBWR proposed rule.

2. AP1000 Amendment Rulemaking

On May 26, 2007, Westinghouse submitted an application to amend the AP1000 DCR.⁶⁶ The NRC published the proposed rule for the AP1000 amendment on February 24, 2011.⁶⁷ This proposed rule was based on Revision 18 of the AP1000 DCD, submitted on December 1, 2010.⁶⁸ Following publication of the proposed rule and after the public comment period expired, Westinghouse submitted Revision 19 of the DCD on June 13, 2011.⁶⁹ The NRC then issued Supplement 2 to the AP1000 FSER in September 2011, based on DCD Revision 19, which was the basis for the final rule.⁷⁰

In the AP1000 amendment final rule, the NRC addressed the AP1000 DCD changes between Revision 18 and Revision 19.⁷¹ These included the following changes:

- The NRC staff's review of DCD Revision 18 identified "a few areas where the DCD wording should be revised for clarity, to resolve internal inconsistencies, or to provide updated versions of referenced technical reports."⁷²
- "In addition, three technical issues were noted: a load combination for the shield building, the method used to evaluate tank sloshing, and containment peak pressure analysis error correction."⁷³
- The NRC organized the DCD changes into five subject areas: DCD Structural Design Information and Shield Building Tier 2* Information; Load Combinations for Shield

⁶⁴ NUREG-1793, Supplement 1, Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design, at 1-3 to 1-7 (Dec. 2005).

⁶⁵ *See id.*

⁶⁶ AP1000 Design Certification Amendment, 76 Fed. Reg. 82,079, 82,080 (Dec. 30, 2011) ("AP1000 Amendment Final Rule").

⁶⁷ AP1000 Design Certification Amendment, 76 Fed. Reg. 10,269 (Feb. 24, 2011).

⁶⁸ *Id.* at 10,271.

⁶⁹ AP1000 Amendment Final Rule, 76 Fed. Reg. at 82,085.

⁷⁰ NUREG-1793, Supplement 2, Final Safety Evaluation Report Related to the Certification of the AP1000 Standard Plant Design, at 1-1 (Sept. 2011).

⁷¹ AP1000 Amendment Final Rule, 76 Fed. Reg. at 82,085-087.

⁷² *Id.* at 82,085.

⁷³ *Id.*

Building; Passive Containment Cooling Water Storage Tank; Debris Limits; and Heat Sinks and Containment Pressure Analysis.⁷⁴

- The NRC also determined that three of these five areas must be designated as Tier 2*.⁷⁵

The NRC analyzed all of these changes and determined that none of them required an additional opportunity for public comment (*i.e.*, the AP1000 amendment proposed rule did not need to be renoticed).⁷⁶

As one example, the final rule for the AP1000 amendment explained that Westinghouse identified additional errors in the AP1000 containment cooling analysis after the proposed rule had been published.⁷⁷ Westinghouse made changes to the AP1000 DCD to account for the identified errors in this safety-related analysis, which (without correction) would have resulted in an increase in calculated peak containment pressure from 57.8 psig to 59.2 psig, thus exceeding the acceptance criterion of 59 psig.⁷⁸ Westinghouse completed a revised analysis to correct the errors and documented the results in the DCD and the NRC addressed the changes in Supplement 2 to the FSER.⁷⁹ The NRC indicated that it did not believe that revisions to the AP1000 DCD on this topic required renoticing for several reasons: (1) the actual DCD did not involve adding any new design elements; (2) crediting grating for heat sinks in the analysis was already described in the DCD; (3) the criterion for evaluating the acceptability of the change continued to be the calculated post-accident peak containment pressure of 59 psig; (4) the revised analysis did not involve the use of any previously unapproved design methodologies or acceptance criteria; and (5) crediting gratings as heat sinks in the revised analysis did not introduce any new safety issues not previously addressed.⁸⁰ In addition, the change in designation of the heat sink as Tier 2* was a direct result of the revised analysis and represented a new limitation/restriction.⁸¹

The NRC evaluated the other DCD changes identified above and concluded that those changes similarly did not require renoticing the AP1000 amendment proposed rule.⁸² The NRC considered various factors, such as whether information was publicly available, whether there had been comments on a particular topic during the proposed rule comment period, whether there was a change to the actual design, whether there is any change to the DCR language, and whether the change represents a limitation.⁸³

The changes to the ESBWR DCD related to steam dryer issues are similar to the above changes to the AP1000 DCD, and similarly should not need to be renoticed. Similar to the AP1000 precedent, the revisions to the ESBWR DCD and supporting documents that describe

⁷⁴ *Id.* at 82,085-087.

⁷⁵ *Id.* at 82,085.

⁷⁶ *Id.*

⁷⁷ *Id.* at 82,087.

⁷⁸ *Id.*

⁷⁹ *Id.*

⁸⁰ *Id.*

⁸¹ *Id.*

⁸² *Id.* at 82,085-087.

⁸³ *Id.* at 82,086-087.

the steam dryer analysis methodologies do not involve adding any new design elements; involve no changes to components described in the DCD; represent additional limitations or restrictions, such as imposing a minimum alternating stress ratio of 2.0 for additional margin and adding a new ITAAC to the certified design material (Tier 1); do not introduce any new safety issues not previously addressed; do not fundamentally change the underlying methodology process that was already described in the DCD and supporting design certification documents; were publicly available at meetings and in RAI responses; relate to issues not commented upon during the original comment period; and do not result in any technical changes to the DCR language.

Additionally, the changes to the AP1000 DCD during the rulemaking appear to be much more extensive than those expected for the ESBWR DCD. For example, the “change roadmap” for AP1000 DCD Revision 19 identifies changes to hundreds of pages.⁸⁴ While some of these changes are classified as “Editorial,” many others are classified as “Technical.” This is much more than the approximately 35 pages of changes that GEH identified in its draft response to RAI 3.9-292.

In summary, the ESBWR DCD changes should not require renoticing for the same reasons that the NRC did not renote either the original or the amendment AP1000 proposed rules following changes to the AP1000 DCD.

V. CONCLUSIONS

As explained above, GEH has revised some of the information in the DCD and in underlying Engineering Reports regarding the ESBWR steam dryer analysis methodologies in response to further interactions with the NRC staff following publication of the ESBWR proposed rule. These changes, however, do not modify the basic underlying methodologies and are based on a demonstration of the methodologies in a replacement steam dryer project. These DCD changes have been discussed at numerous public meetings, the changes improve the ESBWR steam dryer analysis methodologies, and the proposed rule indicated that the DCD could change. Additionally, these changes are similar to changes made in other design certifications in which the NRC did not renote a proposed rule. For example, the changes are similar in nature, but much less extensive, than changes made to the AP1000 DCD following publication of the proposed rule for both the original and the amendment AP1000 design certification rulemakings.

For these reasons, the proposed rule provided adequate notice under the APA, because it included “either the terms or substance of the proposed rule or a description of the subjects and issues involved” related to the steam dryer analysis methodologies. The changes are a “logical outgrowth” of the proposed rule because the differences between the proposed and final rule “are [not] so major that the original notice did not adequately frame the subjects for discussion.”⁸⁵ Therefore, the NRC need not renote the ESBWR proposed rule and may proceed with final rulemaking following issuance of the Supplemental SER for the ESBWR design certification.

⁸⁴ AP1000 DCD Revision 19 is provided at ADAMS Package No. ML11171A500.

⁸⁵ *Conn. Light & Power Co.*, 673 F.2d at 533.