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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the matter of	Docket # 50-293
Entergy Corporation	
Pilgrim Nuclear Power Station	
License Renewal Application	May 27, 2008

PILGRIM WATCH REPLY TO ENTERGY'S & NRC'S RESPONSES TO PILGRIM WATCH MOTION TO ADD NEW CONTENTION REGARDING THE CUMULATIVE USAGE FACTOR (CUF)

INTRODUCTION

Pursuant to the Board's Order (Setting Deadlines for Provisional Proposed Findings and Conclusions on Contention 1 and for Pleadings to Pilgrim Watch's Recent Motion Regarding CUFs) ASLBP No. 06-848-02-LR (May 12, 2008) Pilgrim Watch responds to NRC Staff and Entergy's responses regarding the admissibility of Pilgrim Watch's Recent Motion Regarding CUF under 10 CFR 2.309 (f)(1).

> 10 CFR 2.309 (f)(1): A request for hearing or petition for leave to intervene must set forth with particularity the contentions sought to be raised. For each contention, the request or petition must:(i) Provide a specific statement of the issue of law or fact to be raised or controverted, *provided further*, that the issue of law or fact to be raised in a request for hearing under 10 CFR 52.103(b) must be directed at demonstrating that one or more of the acceptance criteria in the combined license have not been, or will not be met,

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and that the specific operational consequences of nonconformance would be contrary to providing reasonable assurance of adequate protection of the public health and safety.

BACKGROUND

Submissions by Pilgrim Watch prior to May 5, 2008 simply addressed a request to keep the record open that turned out not to be necessary because of the Federal First Circuit Court's Order. Therefore those filings are not relevant. What remains relevant is whether or not the contention is admissible under 10 CFR 2.309 (f) (1). A summary of submissions on this issue are as follows.

April 9, Pilgrim Watch filed a motion regarding the Cumulative Usage Factor (hereinafter CUF), asking that the Board keep the record open so that the Board could address the CUF issue being raised based upon new and significant information.[1]

April 21, 2008 both NRC and Entergy filed responses objecting to Pilgrim Watch's Motion.[2]

April 30, 2008 Pilgrim watch replied to Entergy's and NRC's April 21 responses.[3]

May 2, 2008 both Entergy and NRC filed motions to strike Pilgrim Watch's reply on the grounds that they believed Pilgrim Watch had not satisfied regulations restricting replies to situations where leave is granted following the demonstration of "compelling circumstances."[4]

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[1] Pilgrim Watch Motion Requesting the Record be Held Open so that the Board May Address a New and Significant Issue [Method to Calculate Cumulative usage factors (CUF)] Sua Sponte and Provide Pilgrim Watch an Opportunity for Hearing, April 10, 2008

[2] Entergy's Response in Opposition to Pilgrim Watch's Motion Requesting the Record be Held Open for Sua Sponte Consideration of Cumulative Usage factors, April 30, 2008; NRC Staff Response To Pilgrim watch Motion Requesting Record Be Held Open, April 21, 2008.

[3] Pilgrim Watch Replies to Entergy's and NRC's Responses Opposing Pilgrim watch's Motion Requesting that the record be Held Open for Sua Sponte Consideration of Cumulative Usage factors, April 30, 2008.

[4] Entergy's Motion to Strike Pilgrim Watch's reply to Entergy's and NRC's Responses Opposing Pilgrim Watch's Motion Requesting that the Record be Held Open for Sua Sponte Consideration of Cumulative Usage factor, May 1,

May 5, 2008 Pilgrim Watch filed a motion regarding Cumulative Usage Factor.[5]

May 8, 2008 NRC Staff filed a motion to strike Pilgrim Watch's May 5 motion saying that it was an impermissible reply.[6]

May 12, 2008 The Board treating Pilgrim Watch's May 5, 2008 Motion as being a submission of a new contention directed Entergy and NRC to respond regarding the admissibility of the contention under 10 CFR 2.309 (f)(1).[7]

Pilgrim Watch's Reply addresses two issues: First, whether the contention is within scope, is material and has basis; and second, its timeliness.

THE CONTENTION'S ADMISSIBILITY - SUBSTANCE

The contention is within scope of these proceedings; the issue raised is material; and there is substantial basis for the contention.

The Contention

The LRA and accompanying commitments do not include an adequate plan to monitor and manage the effects of aging due to metal fatigue on key reactor components that are subject to an aging management review, pursuant to 10 C.F.R. § 54.21(a), and an evaluation of time limited aging analysis, pursuant to 10 C.F.R. § 54.21(c).

The commitments are vague, incomplete and lack transparency and do not demonstrate that the effects of aging will be adequately managed *before* the close of the hearing. Entergy's commitments do not explain with requisite specificity how the CUFs for plant components will

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2008; NRC Staff Motion to Strike Pilgrim Watch Reply to NRC Staff response to Pilgrim Watch's Motion to Hold the Record Open, May 2, 2008.

[5] Pilgrim Watch Motion Regarding Cumulative Usage Factor, May 5, 2008

[6] NRC Staff Motion to Strike Pilgrim Watch Motion regarding the Cumulative Usage factor, May 8, 2008

[7] May 12, Order at 3

be recalculated to yield acceptable values; do not explain precisely what Entergy must demonstrate in order to apply CUF values from other plants to Pilgrim; do not contain a clearly stated inspection schedule; and do not provide specific information on how Entergy will repair or replace affected components.

In the absence of more specific information and recalculation of CUFs greater than 1.0 *prior* to the close of the hearing, Entergy's Aging Management Plan for metal fatigue is simply a "promise" asking the public and Board for their trust. Trust without verification does not provide reasonable assurance that public health and safety will be protected; nor will it provide public confidence in the licensing review process.

The Contention Is Within the Scope of the Proceedings

10 CFR §2.309(f)(iii) requires that the Petitioner "Demonstrate that the issue raised in the contention is within the scope of the proceeding." In proceedings concerning the renewal of an operating license, the scope is limited to "a review of the plant structures and components that will require an aging management review for the period of extended operation and the plant's systems, structures, and components that are subject to an evaluation of time limited aging analysis." *See Florida Power and Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), CLI-00-23, 52 NRC 327, 329 (2000).

In reactor license renewals, 10 CFR § 54 requires the Applicant to submit as part of its application an Aging Management Program for all passive systems at the facility, which includes the methods they use to monitor the condition of important equipment so that they can make repairs and replacements before safety margins are compromised.

In order to renew its license for another 20 years Pilgrim is required, under 10 CFR § 54.21 to demonstrate that for each structure and component identified in that section the effects of aging will be adequately managed for the period of extended operation.

The Pilgrim Nuclear Power Plant Application for License Renewal includes a list of systems that require aging management. Among them are the components that are listed in Pilgrim's SER that must have an environmentally adjusted CUF less than 1.0; however there are some with CUFs greater than 1.0. [8]

Specifically the applicant's own data demonstrates that (a) the reactor vessel shell and lower head, (b) reactor vessel feedwater nozzles, (c) reactor recirculation system piping (including inlet and outlet nozzles), and (d) feedwater piping have an environmentally adjusted CUF greater than 1.0 [9] and thus are at a higher risk for failure due to metal fatigue. These (4) systems were identified by NUREG/CR-6260 Section 5.7 to be among the nine systems most sensitive to environmental effects for PNPS vintage General Electric plants.[10]

Data in NUREG-1891, referred to above, indicates that the requirements of 10 CFR 54.21(c)(1)(i)(ii) are not satisfied because they exceed the CUF on their face.

Because the issue of metal fatigue of plant systems requires aging management review this issue is within the scope of this license renewal proceeding.

The Issue Raised In the Contention Is Material to te Findings Of These Proceedings

10 CFR §2.309(f)(iv) requires that the Petitioner "Demonstrate that the issue raised in the contention is material to the findings the NRC must make to support the action that is involved in the proceeding."

In discussing the materiality requirement, the Atomic Safety and Licensing Board (ALSB) considering the license renewal for Millstone Nuclear Power Station stated,

> In order to be admissible, the regulations require that all contentions assert an issue of law or fact that is material to the outcome of a licensing proceeding; that is, the subject

[8] NUREG-1891, Safety Evaluation Report Related to the License Renewal of Pilgrim Nuclear Power Station, Docket No. 50-293,section 4.3.3.1, Adams Accession number Ml073241016
[9] Ibid, 4.3.3.1 *Summary of Technical Information in the Application*
[10] Ibid

matter of the contention must impact the grant or denial of a pending license application. Where a contention alleges a deficiency or error in the application, the deficiency or error must have some independent health and safety significance.

In the Matter of Dominion Nuclear Connecticut, Inc. (Millstone Nuclear Power Station, Units 2 and 3) Docket Nos. 50-336-LR, 50-423-LR ASLBP No. 04-824-01-LR July 28, 2004, p. 7. *See Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP- 98-7, 47 NRC 142, 179-80 (1998), aff'd in part, CLI-98-13, 48 NRC 26 (1998).

The sufficiency of the Aging Management Plan for assuring CUFs do not exceed (1.0) is material to the renewal of this license. Component fatigue can lead to ultimate failure. Failure from fatigue can result in dangerous pipe ruptures, component malfunction, or migration of loose pieces of metal through the reactor system which can interfere with safe operation of the plant. These potential consequences could significantly impact health and safety. Therefore the NRC must make certain findings to protect the public health and safety, and the environment, and either deny the license extension, or impose significant modifications to the commitments.

There is a Substantial Basis for This Contention

1. Entergy must comply with the following requirements of 10 C.F.R. § 54.21(c) (1):

   Each application must contain the following information:

   (c) An evaluation of time-limited aging analyses.

   (1) A list of time-limited aging analyses, as defined in § 54.3, must be provided.

   The applicant shall demonstrate that--

   (i) The analyses remain valid for the period of extended operation;

   (ii) The analyses have been projected to the end of the period of extended operation; or

   (iii) The effects of aging on the intended function(s) will be adequately managed for the period of extended operation [10 C.F.R. § 54.21(c)(1)].

Data in the SER indicates that some key reactor components will have a greater potential for cracking due to metal fatigue before the year 2032, during the 20 year period of extended plant operation.

2. Component Plant Environmentally Adjusted CUF (Entergy's data) that exceeds 1.0 CUF criterion includes [NUREG-1891, SER 4.3.3.1 at 4-44]: reactor vessel shell and lower head; reactor vessel feedwater nozzles; reactor recirculation system piping (including inlet and outlet nozzles); and feedwater piping- four out of nine potential components.

3. Component fatigue, which can lead to ultimate failure, is an aging phenomenon that results from cyclic mechanical and thermal stresses. Failure from fatigue can result in dangerous pipe ruptures, component malfunction, or the migration of loose pieces of metal through the reactor system, which can interfere with safe operation of a plant.

3. Data in NUREG-1891, referred to above, indicates that the requirements of 10 C.F.R. §§ 54.21(c)(1)(i) and (ii) are not satisfied because they exceed the CUF limits on their face.

4. **Commitments**: To satisfy section 54.21(c)(i)(iii) – that "the effect of aging on the intended functions(s) will be adequately managed for the period of extended operation" – Entergy agreed to License Renewal Commitments 31 and 35 (NUREG-1891, SER, Appendix A, A-10 thru A-13].

A. Commitment 31 says that: At least *2 years prior to entering the period of extended operation*, for the locations identified in NUREG/CR-6260, for BWRs of the PNPS vintage, PNPS will refine our current fatigue analyses to include the effects of reactor water environment and verify that the cumulative usage factors (CUFs) are less than 1.0. This includes applying the appropriate Fen [sic] factors to valid CUFs determined in accordance with one of the following:

(i) For locations, including NUREG/CR-6260 locations, with existing fatigue analysis valid for the period of extended operation, use the existing CUF to determine the environmentally adjusted CUF.

(ii) More limiting PNPS-specific locations with a valid CUF may be added in addition to the NUREG/CR-6260 locations.

(iii) Representative CUF values from other plants, adjusted to or enveloping the PNPS plant specific external loads may be used if demonstrated applicable to PNPS.

(iv) An analysis using an NRC-approved version of the ASME code or NRC-approved alternative (e.g., NRC-approved code case) may be performed to determine a valid CUF.

(v) During the period of extended operation, PNPS may also use one of the following options for fatigue management if ongoing monitoring indicates a potential for a condition outside the analysis bounds noted above:

- Update and/or refine the affected analyses described above.

- Implement an inspection program that has been reviewed and approved by the NRC (e.g., periodic nondestructive examination of the affected locations at inspection intervals to be determined by a method acceptable to the NRC).

- Repair or replace the affected locations before exceeding a CUF of 1.0.

Enhancement or Implementation Schedule: June 8, 2012; June 8, 2010 for submitting the AMP PNPS selects the option of managing the effects of aging due to environmentally assisted fatigue

B. Commitment 35 says that: At least 2 years prior to entering the period of extended operation, for reactor vessel components, including the feedwater nozzles, PNPS will implement *one or more* of the following [emphasis added]:

(i) Refine the fatigue analyses to determine valid CUFs less than 1.0. Determine valid CUFs based on numbers of transient cycles projected to be valid for the period of extended operation.

Determine CUFs in accordance with an NRC-approved version of the ASME code or NRC-approved alternative (e.g., NRC- approved code case).

(ii) Manage the effects of aging due to fatigue at the affected locations by an inspection program that has been reviewed and approved by the NRC (e.g., periodic non-destructive examination of the affected locations at inspection intervals to be determined by a method acceptable to the NRC).

(iii) Repair or replace the affected locations before exceeding a CUF of 1.0. Should PNPS select the option to manage the aging effects due to fatigue during the period of extended operation, details of the AMP such as scope, qualification, method, and frequency will be submitted to the NRC at least 2 years prior to the period of extended operation.

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Enhancement or Implementation Schedule: June 8, 2012; June 8, 2010 for submitting the AMP if PNPS selects the option of managing the effects of aging due to environmentally assisted fatigue

C. **The Commitments do not provide reasonable assurance; they are vague, incomplete, and lacking in transparency.**

(i) Recalculations: The commitment says they will "refine the current fatigue analyses to include the effects of reactor water environment and verify that the cumulative usage factors (CUFs) are less than 1.0." We note that "verify that the cumulative usage factors (CUFs) are less than 1.0" appears to suggest doing the math to get the "right" answer.

There is no requirement, as there should be, to do the recalculations *prior to* the close of the hearing so that the methodology, assumptions and calculations are available for the Board's and stakeholder's scrutiny. The Intervenor's (NEC's) analysis of Entergy's CUF recalculations at

Vermont Yankee, new and significant information discussed below, point to the importance of having the recalculations done before, not after, the hearing closes.

(ii) The commitments allow for representative CUF values from other plants, adjusted to or enveloping the PNPS plant specific external loads, to be used if demonstrated applicable to PNPS. There is no set standard laid out describing exactly what "demonstrated applicable" must entail.

(iii) The commitments allow Entergy to choose to do more inspections or fix or replace the component. Instead, any component with a CUF value exceeding 1.0 should be required to be fixed or replaced in order to meet the CLB, an obligation of the licensee during license renewal.

In summary there is truth is the saying that, "The Devil is in the details" and the details are absent.

THE CONTENTION'S ADMISSIBILITY - TIMELINESS

Both Entergy and NRC complain that the motion did not properly address the criteria for filing a late-filed contention. Contrary to their assertions, Pilgrim Watch previously explained that new and significant information affecting public health and safety came forward in press reports, April 2008. The news reports resulted from new and significant developments in New England Coalition's (NEC) intervention at Entergy's Vermont Yankee (hereinafter VY) LRA on CUF. We learned, among other things, that NRC had made note that the issues at Vermont Yankee could apply to other reactor sites.

New and Significant Lessons Learned from VY's Intervention: VY, like Pilgrim, had CUFs exceeding 1.0. At VY, Entergy recalculated the CUF twice. NEC's expert demonstrated repeated inadequacies in Entergy's recalculations. NEC filed an amended contention. The VY ASLB will hear arguments from both sides as to the validity of the findings at the July 21-25 evidentiary hearing. VY's latest experience alerted Pilgrim Watch to the serious shortcomings in Pilgrim's

commitments; mainly because, as it stands now, Pilgrim would not recalculate the CUFs prior to the close of the hearing.

The public learned from Vermont Yankee's experience not to blindly trust in Entergy's recalculations as the commitments ask the public to do - "once burned, twice warned."

It appears that Entergy and NRC have taken a different lesson away from VY's experience. Craft commitments that postpone recalculations until after the hearing closes to avoid getting burned again by public scrutiny - an "end-run."

If the commitments are allowed to stand, the Board and public will have no opportunity to verify Entergy's recalculations and check/verify their assumptions.

Therefore, the new and significant information from NEC's experience at Vermont Yankee is that Pilgrim's CUF commitments do not provide reasonable assurance. The essence of Pilgrim Watch's current motion is a challenge to the manner in which Entergy intends to deal with the issue of metal fatigue at Pilgrim. The commitments lack the detail necessary so that the public and ASLB can determine precisely what will be done and how it will be done.

From reading the commitments, all we are told is that Entergy has committed to do recalculations using an ASME-type code methodology or NRC-approved alternative to show that the CUF values fall below 1.0 – that does not tell us enough. They do not disclose the assumptions they will use to do the calculations, describe how they will implement the methodology, nor even hint at what a NRC- approved alternative might be.

The Vermont Yankee CUF Experience

In support of NEC's amended contention, NEC submitted a declaration from their expert Dr. Joram Hopenfeld. According to Dr. Hopenfeld, the environmentally corrected cumulative use factors (CUFens) that Entergy and its consultants calculated as part of their August 3, 2007

reanalysis reports were "unrealistically low."[11] Among Dr. Hopenfeld's specific allegations are that Entergy failed to perform an error analysis to show the error range for each variable in the CUFen analyses, relied on incorrect guidance when calculating environmental fatigue correction factors (FENS), failed to use sufficient care in adapting equations derived from laboratory experiments to actual reactor components, and "did not use the equations properly at low oxygen and low temperatures" [Id. at16-18]. Dr. Hopenfeld also alleges that Entergy's calculation of 60-year CUFs does not provide sufficient information about key assumptions to substantiate the claim that the result is "conservative" or "bounding' [Id. at 20]. Dr. Hopenfeld includes his own proposed recalculation of CUFen values (some exceeding 1.0) based on the CUF values originally presented in the Application and on what Dr. Hopenfeld asserts are appropriate "bounding" values for the Fens [Id. at 28-32 and Table1].

Irrespective of whether or not Entergy plans to use the same or different methodology at Pilgrim is not relevant. What is relevant is that we do not have specific information about what they do intend to use. It is obvious from VY's experience that merely agreeing to vague commitments, and to do recalculations after the hearing is closed, does not allow any party, including the Board, an opportunity make an assessment that the calculations/formula is appropriate, is based on the right assumptions, or that it is applied correctly.

The real issue is not whether there should be commitments but the lack of detail in the commitments so that no one knows whether the CLB, will be met. 10 CFR 54.21(a)(3) requires Entergy,

> for each structure and component identified in paragraph (a)(1) of this section [must] demonstrate that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation.

[11] In the Matter of Entergy Nuclear Vermont Yankee, L.L.C., and Entergy Nuclear Operations, Inc. (Vermont Yankee Nuclear Power Station) LBP-06-20, 64 NRC at 186-87, at 9.

The components that have CUF values > 1.0 require proper management. The commitments do not provide assurance.

The question for the Board to address, based on the new and significant information from NEC's intervention, is whether Entergy's commitments to do a recalculation will meet the requirements of 54.21 and 54.29. We need to know the details about the analytical method and approach that Entergy will use; because depending on the calculation method and assumptions, Entergy can get almost any answer that it wishes. We also need to know how its new calculation method will be bench-marked so that it can be judged by the Board and stakeholders before license approval.

In Entergy's and NRC Staff's May 19th answers, neither offered evidence supporting the claim that by merely saying that they will do calculations approved by ASME and NRC Staff that it has demonstrated that it will have adequately managed aging related to metal fatigue.

As authorized by 10 CFR 2.309(f)(1)(vi) this contention is based on the absence of *specific* information that is required by law to be included in the LRA. Pilgrim Watch cannot identify the flaws in information that Entergy has not provided. We can only identify that the information is not provided and will not be provided unless the Board accepts this contention and requires Entergy to be transparent.

Entergy complained [Entergy's Answer at 6] that "Pilgrim Watch has neither identified a witness on this issue nor summarized their proposed testimony." First we are not required to present a witness at this stage; and second until Entergy is required to produce a recalculation and its methodology, there is nothing for an expert to analyze.

The Dispute

Entergy, NRC Staff and Pilgrim Watch agree that there is more to be done. The dispute is that Entergy and NRC Staff do not want outside involvement. They wish to be secretive and to deprive the Board and public of any role in reviewing how Entergy meets its commitments. They expect us to blindly trust NRC Staff and Entergy. When the public is excluded, nuclear safety suffers and public confidence in the NRC as a fair and responsible regulator erodes.

NEC's analyses of Entergy's recalculations at Vermont Yankee, what we are calling new and significant information, strongly supports the view that only if the Board requires that Pilgrim recalculates the CUF's *prior* to the close of the hearing so that they can be independently analyzed can the adequacy of the aging management plan be evaluated.

In Vermont, after Entergy produced its first set of recalculations and they were examined by NEC and its expert, Entergy found it necessary to produce a *second* set of recalculations to attempt to address the problems identified with the first set of calculations. [12]

This significant development at VY underscores how much more Entergy has to do at Pilgrim before the public and Board have sufficient detail to allow a decision to be reached on whether Entergy has adequately dealt with aging of critical components subject to metal fatigue.

CONCLUSION

In conclusion mere "promises to do the "right thing" without providing sufficient details and the opportunity to verify assumptions and calculations does not meet the safety obligations imposed by the Atomic Energy Act.

Thank you in advance for your consideration.

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[12] In the Matter of Entergy Nuclear Vermont Yankee, L.L.C., and Entergy Nuclear Operations, Inc. (Vermont Yankee Nuclear Power Station) ASLBP No. 06-849-03-LR(April 24, 2008)Order (Granting Motion to Amend NEC Contention 2A) at 1

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NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the matter of — Docket # 50-293-LR

Entergy Corporation

Pilgrim Nuclear Power Station

License Renewal Application — May 27, 2008

CERTIFICATE OF SERVICE

I hereby certify that the following was served May 27, 2008 by electronic mail and by U.S. Mail, First Class to the Service List: Pilgrim Watch Reply to Entergy's and NRC's Responses to Pilgrim Watch's Motion to Add New Contention Regarding the Cumulative Usage factor (CUF)

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