

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

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In re: Docket Nos. 50-247LR and 50-286LR

License Renewal Application Submitted By ASLB No. 07-858-03-LR-BD01

Entergy Indian Point 2, LLC, DPR-26, DPR-64
Entergy Indian Point 3, LLC, and
Entergy Nuclear Operations, Inc. September 30, 2011
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DECLARATION OF DR. RICHARD T. LAHEY, JR.

I, Richard T. Lahey, Jr., declare under penalty of perjury that the following is true and correct:

1. I am the *Edward E. Hood Professor Emeritus of Engineering* at Rensselaer Polytechnic Institute (RPI) in Troy, New York, a member of the National Academy of Engineering (NAE), a Fellow of the American Nuclear Society (ANS) and the American Society of Mechanical Engineers (ASME), and an expert in matters relating to the operations, safety, and the aging of nuclear power plants. I have previously submitted a declaration in support of the Notice of Intention to Participate and Petition to Intervene filed by the State of New York in this proceeding on November 30, 2007, which sets forth my qualifications in detail. By way of summary, I have held various positions in the nuclear industry and academia, and served on numerous panels and committees for the U.S. Nuclear Regulatory Commission (USNRC), Idaho National Engineering Laboratory (INEL), Oak Ridge National Laboratory (ORNL), Electric Power Research Institute (EPRI),

National Aeronautics & Space Administration (NASA), and the National Research Council (NRC). I have also held various positions in the nuclear industry and academia, including Dean of Engineering and Chair of the Department of Nuclear Engineering & Science at RPI. I have also been the lead engineer and manager of various departments responsible for safety analyses, Heat Transfer Mechanisms and Core & Safety Development for the General Electric Company (GE), including both military (*i.e.*, Naval) and commercial nuclear reactors. Over the last 40 years, I have also published numerous books, monographs, chapters, articles, studies, reports, and journal papers on nuclear engineering and nuclear reactor safety technology, and most of these publications have been peer reviewed. My *curricula vitae*, which more fully describes my educational and professional background and qualifications, is attached to this declaration and is available at:

<http://www.rpi.edu/~lahey/laheyvita.html>.

2. The factual statements and the expression of opinion in this declaration are based on, among other things, my best professional knowledge, my extensive professional experience in nuclear reactor technology, and my participation in this matter.

Review of SER for IP-2&3 (NUREG-1930, Supplement 1)

3. I have reviewed USNRC Staff's Supplemental Safety Evaluation Report (SSER) for Indian Point Unit 2 and Unit 3 [NUREG-1930, Supp. 1 (ML11243A109)]. The SSER makes it clear that a number of important details and questions remain unresolved concerning the aging-induced degradation of various

*September 30, 2011
Lahey Declaration*

safety-related systems and components and the management of that process. Unfortunately, there are virtually no details given on the future analyses and/or inspections that Entergy will apparently do. In any event, the dates given for the USNRC's anticipated resolution of many of these issues appear to be beyond the time frame for the hearings in this ASLB proceeding and thus will not allow for a testing of the adequacy of the proposed resolution of these issues in this proceeding. That timeline will also prevent the State of New York from playing any meaningful role in their development or resolution. Indeed, many dates are during the proposed period of extended operations of the Indian Point nuclear reactors, and none are sooner than 9/28/11 (*e.g.*, the AMP for RPV internals will not be available for us to review until after 9/28/11, limiting our time for a meaningful review and response). Thus, NYS is basically being asked to trust that the USNRC and Entergy will “do the right thing.”

4. Two issues in the SSER of concern are associated with the Indian Point steam generators and the TLAA fatigue evaluations. These two issues will be discussed next.

STEAM GENERATORS

5. The details of the inspections for primary water stress corrosion cracking (PWSCC) in the steam generator's divider plates will apparently not be available until well after extended operations are expected to begin.

6. Inspections of the steam generator's tube-to-tubesheet welds in IP-2 for PWSCC will not be made until sometime between March 2020 and March 2024 (*i.e.*,

*September 30, 2011
Lahey Declaration*

well after the proposed extended operation period has begun). This is particularly troubling since these welds form part of the primary system's pressure boundary, and if they fail radiation may be released to the secondary side and also to the environment.

FATIGUE EVALUATIONS

7. For CUF_{en} calculations it is important to fully understand the assumptions that will be made and the criteria that will be used in determining which locations will produce the most limiting conditions. The USNRC Staff has raised concerns that Entergy may not have chosen the sites of the most limiting fatigue conditions and Entergy has agreed to reanalyze the locations it has previously identified and to determine if more limiting conditions exist at other sites. If so, detailed further analysis will be required. Unfortunately, the exact time for reporting the results of this future review/analysis was not specified, but it will apparently be just before extended operations are expected to begin. Postponing the disclosure of the details of that review/analysis until Indian Point-2 is on the cusp of extended operation will prevent those matters from being tested and resolved in these ASLB hearings and greatly handicaps, if not precludes, the State of New York from any meaningful role in their development and resolution. Moreover, the assumptions to be used and the criteria to be applied for these future reviews, and whether they were properly designed to identify limiting locations and the conditions of such locations, are left for consideration at a later day by the USNRC and Entergy. Moreover, it also appears that, as before, this review will focus on

*September 30, 2011
Lahey Declaration*

structures, components and fittings outside the RPV and will thus not include a comprehensive consideration of the fatigue of important RPV internal structures, components and fittings.

8. Entergy relies on WESTEMS, a proprietary computer program developed by Westinghouse, as an essential part of Entergy's CUF_{en} analysis. Entergy agreed with the USNRC that the piping system stress model (NB-3600) in WESTEMS will not be used until the USNRC staff resolves some issues concerning its validity. Rather, a finite element method (FEM) "design by analysis" approach (NB-3200) will be used instead (*see* the Conference paper by Nitzel et al. - INEL for a comparison of the NB-3600 and NB-3200 approaches).¹ Unfortunately, this FEM-based computational approach requires numerous assumptions concerning the stress-inducing thermal transients and the loads/moments from the piping system; such assumptions must be developed and applied by the WESTEMS code user to the component being analyzed. These assumptions could materially affect the results raising questions concerning their reliability and validity. Thus, it is necessary to have disclosed in advance the assumptions to be used in the analysis and the basis for using those assumptions in order to ascertain whether the approach being proposed will meet the required safety standards for an adequate AMP. Given the role that such user-developed assumptions play in the process, and the fact that Entergy has apparently not done an error analysis of the WESTEMS

¹ CONF-960706-11, M. E. Nitzel, A. G. Ware, and D. K. Morton, Comparison of ASME Code NB-3200 and NB-3600 Results for Fatigue Analysis of B31.1 Branch Nozzles , Idaho National Engineering Laboratory (1996).

*September 30, 2011
Lahey Declaration*

results, there remain important questions concerning the reliability and validity of these results.

9. USNRC Staff has recently required Entergy to create records that document and justify any assumptions and engineering judgments developed and used in the CUF_{en} calculations [SSER at 4-2]. Such assumptions and engineering judgments will affect the WESTEMS results. A systematic and methodical explanation of these assumptions and engineering judgments is essential in evaluating the adequacy of the CUF_{en} calculations using WESTEMS, but they are not yet available. Indeed, the anticipated schedule of the availability of this information will likely not allow them to be considered in these ASLB proceedings.

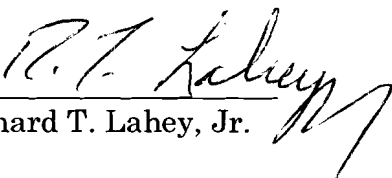
10. Entergy has agreed that any user intervention in future WESTEMS evaluations will be explained and justified. Unfortunately nothing was said about the previous WESTEMS evaluations that were done for IP-2 & IP-3 and the affect that user interventions had on those CUF_{en} results (for which no error analysis has been given). Moreover, the documentation of any new user intervention will not be disclosed or implemented until close to the end of the current licensing terms (*i.e.*, September, 2013 and December, 2015) [SSER 4-2]. In addition, Entergy has not disclosed the specific criteria it will use in deciding whether to make a user intervention and what standards will control the extent of the intervention. Thus, the State of New York is being effectively excluded from reviewing this important process.

*September 30, 2011
Lahey Declaration*

11. There is a difference between stating that one will develop a program that will comply with the parameters in GALL and actually disclosing the details, judgments, assumptions, and user interventions that underlay the program and the analyses (including computer codes such as WESTEMS) that are critical to the program. Only through the latter can one test an applicant's claim that its proposed program is consistent with GALL. In fact, it is not possible to demonstrate that an AMP is consistent with GALL unless the details, judgments, assumptions, and user interventions have been disclosed. This is particularly important since neither Westinghouse nor Entergy appear willing to perform an error analysis of WESTEMS results to justify any claims of compliance.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct.

September 30, 2011
Clifton Park, New York


Dr. Richard T. Lahey, Jr.

*September 30, 2011
Lahey Declaration*