UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	Docket Nos. 50-361-CAL
	)	& 50-362-CAL
SOUTHERN CALIFORNIA EDISON CO.	)	
	)	ASLBP No. 13-924-01-CAL-BD01
(San Onofre Nuclear Generating Station,	)	
Units 2 and 3)	)	January 11, 2012
	)	

OPENING BRIEF OF PETITIONER FRIENDS OF THE EARTH

Petitioner Friends of the Earth files this opening brief under the Atomic Safety and Licensing Board's Orders of December 7, 2012 and December 21, 2012. This matter arises from a June 18, 2012 petition filed by Friends of the Earth with the Nuclear Regulatory Commission (Commission) and subsequently referred by the Commission, in part, to the Atomic Safety and Licensing Board for disposition.

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I. INTRODUCTION

The Commission has charged the Atomic Safety and Licensing Board (Board) with making a decision on whether the Confirmatory Action Letter (CAL) process amounts to a licensing proceeding for an amendment to the operating license for Unit 2 of the San Onofre Nuclear Generating Station (San Onofre), operated by Southern California Edison (SCE). The underlying issue is whether the affected public will have an opportunity to participate in any decision to restart the degraded units. SCE's proposal to restart Unit 2 involves safety issues that differ significantly from those that were previously analyzed and approved during San Onofre's licensing.

SCE replaced the original steam generators at Units 2 and 3 with ones by a different manufacturer, Mitsubishi Heavy Industries (MHI), whose design differed significantly from the original ones. Soon after they were put in service, the replacement steam generators (RSG) exhibited unprecedented degradation of the tubes and components and assemblies that serve to restrain damaging tube motion.

In response to the design defects, SCE has proposed an experiment to allow Unit 2, despite the damage to its steam generators, to operate at reduced power, initially for 150 days, to be followed by further, as yet undetermined operation, in the hope that this will reduce the excessive vibration causing the degradation of the RSG's tubes. But SCE's restart plan raises significant new issues not covered by San Onofre's current license. Distilled down, the basic issue is that the integrity of the steam generator tubing in the reactor units is vital to safe operation, and nothing remotely related to operating Unit 2 with steam generators so degraded was ever considered in the original licensing review. To restart the unit therefore requires a

license amendment process in which the public can be heard regarding the issues associated with running a unit with such prematurely worn steam generator tubing.

The Board has requested our views on a number of detailed questions, which are designed to shed light on whether the CAL process is *de facto* a license amendment proceeding. The CAL process, including the restart plan,[1] is a license amendment proceeding because—as we shall demonstrate—it proposes a restart despite safety concerns not covered by the Unit's existing license.

We respectfully protest being denied access to the additional documents relevant to these issues that Petitioner requested in Petitioner's December 11, 2012 Motion to Amend the Proposed Scheduling Order and Clarify Scope of Disclosure. Petitioner notes that the denial of the requested documents has hampered our ability to respond fully to the Board's questions, though we have made every effort to provide as complete responses as possible.

II. STATEMENT OF THE FACTS

A. Events Preceding the Shut Down of Units 2 and 3

On January 31, 2012, San Onofre experienced a steam generator tube rupture in Unit 3 that resulted in the release of radioactive material into the environment. Prior to the leak in Unit 3, SCE had discovered excessive wear in Unit 2, which was offline for a refueling outage. Subsequently, untimely degradation of the walls of many tubes was discovered in the replacement steam generators, which had been in operation for eleven months in Unit 3 and less than two years in Unit 2.

On March 23, 2012, SCE submitted a description of the steam generator problems and its commitments to address the issues at Units 2 and 3, which were formalized in the NRC's CAL

[1] In its Order of December 7, 2012, the Board referred to its need to understand "the CAL *and its effect*," referring to "any new or temporary operational limits for Units 2 and 3." Order at 3. In this brief, we use the terms "CAL" to mean the CAL process, including SCE's proposed restart plan and any other such "effects" of the CAL.

on March 27, 2012. The CAL prohibits SCE from placing Unit 2 into Mode 2 and placing Unit 3 into Mode 4 until SCE, among other things, determines the causes of the tube-to-tube and other tube wear modes in Unit 3, and takes action to prevent the loss of tube integrity in both units. The CAL further requires SCE to submit its basis for concluding there is reasonable assurance that the unit will operate safely. Prior to approving restart, the CAL requires NRC Staff to determine that Units 2 and 3 can be "operated without undue risk to public health and safety, and the environment." Also in March of 2012, an Augmented Inspection Team (AIT) was dispatched to San Onofre to independently investigate the failures at San Onofre Units 2 and 3.

None of the investigations conducted to date have determined the root cause of the premature and extensive tube degradation in the replacement steam generators. Lacking such understanding, SCE has not proposed any action to permanently fix the problems of either Unit 2 or 3.

On June 18, 2012, FoE filed with the Commission a Petition to Intervene in these proceedings. On November 8, 2012, the Commission referred the question of whether the CAL process is a *de facto* license amendment to the Board.

B. Southern California Edison's Replacement of the Steam Generators at San Onofre Units 2 and 3

In 2010 and 2011 SCE replaced the original steam generators in Unit 2 and Unit 3, which had operated safely for 28 years, with ones constructed by a different manufacturer, Mitsubishi Heavy Industries (MHI). The new design differed from the original one in significant detail. SCE requested that MHI, for example, change the design by adding 377 more tubes, removing the stay cylinder supporting the tube sheet, and replacing the "egg crate" tube support with a broached tube design, among other alterations. SCE did not seek a license amendment for these changes.

C. Extent of Tube Degradation in the Steam Generators in Units 2 and 3

Both units show indications of extensive tube wear after just a short period of operation. The tube degradation in each unit is unlike tube wear in other replacement steam generators in U.S. plants at the same stage of their useful lives. San Onofre Unit 2 has 1595 degraded tubes; Unit 3 has 1806. Unit 2 has 4721 tubal wear indications; Unit 3 has 10,284. Unit 2 has 510 tubes plugged after one cycle of operation of the replacement steam generators; Unit 3 has 807. More than 90% of the wear indications in Unit 3 were caused not by tube-to-tube wear, but rather by tubes rubbing against the anti-vibration bar or the tube support plate. SCE and NRC have reported that 9% of the tubes in Unit 3 steam generators have greater than 10% through-wall wear indications. In Unit 2, 12% of the tubes show such wear.

Tube wear of this magnitude after such an abbreviated period of operation is unprecedented, as described in greater detail in Section IV.D.ii., below.

D. SCE's Response to the Confirmatory Action Letter

On October 3, 2012, SCE submitted its response to the CAL and restart plan to NRC Staff. While agreeing that the proximate cause of wear of the SG tubes was excessive vibration, SCE and its consultants have not identified a root cause of the excessive vibration causing the premature and extensive tube wear, as described in Table 6-1 of SCE's Unit 2 Return to Service Report. SCE's response to the CAL includes an analysis of tube-to-tube wear and argues that the cause of such wear is fluid elastic instability (FEI). However, this response does not isolate the root cause that produced the FEI. Whether the root cause is inherent in the changes in the design of the replacement SGs, as Petitioner's consulting nuclear engineer Arnold Gundersen believes, has obvious implications for whether the SGs can be safely operated in their current condition.

SCE's response includes a proposal to restart Unit 2 at no more than 70% power for 150 days, at which time SCE promises to shut down the reactor and inspect the tube wear. SCE hired AREVA NP, Westinghouse Electric Company LLC, and Intertek/APTECH to provide operational assessments (OAs) of this proposal. MHI examined the unprecedented tube wear and present condition of the tubes as well.

These assessments, which are included in SCE's response to the CAL, suffer from important omissions. They focus on tube-to-tube wear to tube rupture, incorrectly assuming that this mode of wear will outpace all other wear modes. Thus, they do not analyze the potential safety effects of further degradation of the tubes that are vibrating against the retainer bars and tube restraint structures. (AREVA identified these types of tube wear, among others, on Unit 3 as failing the accident leakage performance criteria and these criteria apply equally to Unit 2.) The OAs point to different mechanical interactions resulting from FEI and random fluid excitation sources as the causes of the tube degradation, but none determined the root cause of the in-plane FEI.

SCE received assessments on the issue of various tube wear modes by AREVA, the other consultants, and MHI, but SCE did not include important aspects of these assessments in its response to the CAL. For example, SCE did not include an analysis by MHI, which found that anti-vibration bar-to-tube wear in Unit 2's steam generators arose in areas of the tube bundle where FEI was inactive, suggesting that the wear was caused by turbulent flow forces that may persist even at the proposed power level of 70% intended to suppress the FEI. SCE has publicly stated that it conducted an analysis of its proposed restart plan under 10 C.F.R. § 50.59 but no license amendment application has been submitted.

III. SUMMARY OF THE ARGUMENT

At the outset we emphasize that FoE is not asking this Board to rule on the merits of whether SCE is entitled to a license amendment or to determine whether SCE's restart plan should be approved. Our point is that the proceeding underway is a license amendment and should be subject to the requirements that apply to a licensing proceeding.

SCE's restart plan for Unit 2 triggers the criteria for a license amendment under NRC's regulations, as described in detail in Section IV of this brief. Equally compelling is the ultimate effect: were SCE to restart under its proposed plan without a license amendment, SCE would be granted authority not permitted in its current license, a result not allowed under NRC and federal court precedent.

Specifically, the CAL process,[2] including the restart plan and approval process, constitutes a *de facto* license amendment proceeding—the primary threshold question before the Board—for the following four reasons:

- SCE's restart plan triggers the criteria in 10 C.F.R. § 50.59 requiring a license amendment, as described in Part A, below;
- Unit 2 cannot meet the binding performance requirements of the current operating license at 70% power, as described in Part B;
- SCE's request to restart Unit 2 under its current plan seeks authority not provided in its current license, as described in Part C; and,
- Restarting a damaged unit with design defects requires a license amendment, as discussed in Part D.

[2] *See* Letter from Elmo E. Collins, Regional Administrator, Region IV, Nuclear Regulatory Commission, to Peter T. Dietrich, Senior Vice President & Chief Nuclear Officer, Southern California Edison, Confirmatory Action Letter – San Onofre Nuclear Generating Station, Units 2 and 3, Commitments to Address Steam Generator Tube Degradation, CAL 4-12-
001, at 3 (Mar. 27, 2012) ("CAL"), available at ADAMS Accession No. ML12087A323.

Petitioner demonstrates in Section IV, Part A that the restart plan is a "change, test, or experiment" (CTE) necessitating a license amendment because it meets criteria enumerated in § 50.59(c)(2) for when a license amendment is required. SCE's restart proposal constitutes a CTE because under its existing license SCE is authorized to operate Unit 2 at up to full power, including Design Basis Accidents and conditions at full power. In contrast, under the CAL response SCE proposes to limit Unit 2's operation to 70% power—undeniably a "change" to the terms of the Unit's operation. This change is also properly considered a "test" or "experiment" as defined in § 50.59 because SCE's proposal to operate at 70% power with degraded steam generator tubes is both outside the reference bounds of the design bases and inconsistent with the analyses in the FSAR, as updated.

The proposed CTE would trigger multiple criteria under § 50.59(c)(2), any one of which requires a license amendment. First, compared to operating with undamaged steam generators as permitted under the current operating license, the proposed change to operate with degraded steam generator tubes would result in more than a minimal increase in the frequency of occurrence and the consequences of an accident (§ 50.59(c)(2)(i) and (c)(2)(iii), respectively). SCE has thus far failed to demonstrate an understanding of the root cause of the FEI and other fluid excitation forces causing mechanical vibration damaging the steam generators' tubes and, therefore, cannot demonstrate that running Unit 2 at reduced power will prevent or reduce tube failure to the low levels contemplated in the existing operating license. Moreover, because SCE was selective in its use of information from its consultants and MHI, the calculations supporting its restart plan are not robust.

Second, the unprecedented incidence and uniqueness of the tube degradation at both units indicates a new potential for multiple tube failures at Unit 2, a different type of accident than was

likely considered under the FSAR previously, thereby requiring a license amendment under § 50.59(c)(2)(v).

Third, the anomalously high tube wear incidences in Unit 2, combined with SCE's failure to address many of the sources of vibrations resulting in degradation of the SG tubes in the restart plan, indicates that restarting Unit 2 without repair creates a substantial increase in the likelihood of a malfunction in the steam generators beyond that contemplated in the FSAR which is important to safety, triggering the need for a license amendment under criteria § 50.59(c)(2)(ii) and (c)(2)(vi), respectively.

Fourth, SCE has not demonstrated that the degraded steam generator tubes in Unit 2 would be able to meet the accident leakage performance criteria in the event of a design basis accident, triggering criterion § 50.59(c)(2)(vii), which requires a license amendment when the CTE results in a design basis limit being exceeded or altered.

Moreover, SCE cannot demonstrate that it meets the tube integrity performance criteria in its current license, which requires that steam generator tubes shall retain structural integrity over the full range of normal operating conditions. As described in Part B of Section IV, SCE's proposal to restart Unit 2 at 70% power cannot meet this requirement without amending its current operating license.

As detailed in Part C of Section IV, if SCE were granted approval to restart under its current proposal without an amendment to its license, the effect would be to grant SCE greater operating authority than that permitted by its license. Actions that are not specifically authorized under the license require a license amendment under NRC and federal appellate court precedent. SCE's response to the CAL seeks to change the terms of its license to allow operation with damaged steam generators. Thus, this proposal differs from a situation in which the NRC allows

resumption of full power operation after using its enforcement authority to temporarily limit operation while the licensee conforms its operation to the terms of the existing license.

Last, Unit 2, which shares the same design as Unit 3, is required to seek a license amendment prior to restarting because it presents similar safety risks to that of Unit 3—which has demonstrated failure mechanisms with safety implications and is being kept offline for this reason. This argument is discussed at Section IV, Part D of the brief.

To the extent not answered in the context of the argument that the CAL represents a licensing amendment proceeding, questions posed by the Board in its December 7, 2012 Order are answered in Section V. The Board's questions regarding Petitioner's standing and the admissibility of its contention are answered in Sections VI and VII, respectively.

IV. THE CAL PROCESS CONSTITUTES A DE FACTO LICENSE AMENDMENT

The CAL process is a license amendment proceeding by another name. As courts have long recognized, the label given to a proceeding is not dispositive. *See, e.g., Commonwealth of Mass. v. United States Nuclear Regulatory Comm'n*, 878 F.2d 1516, 1521 (1st Cir.1989) (stating that the "fact that the NRC did not call its decision to restart a 'reinstatement' of the license is not controlling"); *and Columbia Broadcasting Syst. Inc. v. United States*, 316 U.S. 407, 416 (1942) (stating that "[t]he particular label placed upon it by the Commission is not necessarily conclusive, for it is the substance of what the Commission has purported to do and has done which is decisive").

A. Operating San Onofre Unit 2 at 70% Power Requires a License Amendment Under 10 C.F.R. § 50.59

The Board is charged with determining whether the CAL process for San Onofre constitutes a license amendment process. Question (iii) of the Board's Order asks: "To what

extent do the standards of 10 C.F.R. § 50.59(c)(1) and (c)(2) apply in determining whether the CAL constitutes a de facto licensing amendment?"[3] In this case, § 50.59 applies because SCE proposes a change, test, or experiment that triggers the amendment process under § 50.59(c)(2). SCE apparently agrees that section 50.59 applies since they publicly admitted to performing such an analysis.

To determine whether the CAL process is a license amendment, the Board must examine whether the restart plan proposed by SCE in response to the CAL is within the envelope of the applicable FSAR, as updated (UFSAR), since this is the metric by which the need for a license amendment is measured in 10 C.F.R. § 50.59. Put another way, the question is whether the conditions created by operating Unit 2's damaged steam generators at the 70% thermal power level, as proposed by SCE, are contemplated and analyzed by the existing UFSAR; or, whether operating Unit 2 at 70% power in its current condition, as proposed by the licensee, would so change operations as to require a license amendment.

To answer to this question, it is necessary to be precise about what SCE is proposing in its restart plan. The company requests the NRC to allow it to run a unit with damaged steam generators at 70% power without an understanding of the *root* cause of the excessive early wear that caused Unit 2 to remain shut down, and without any long term plan for repairing or replacing the ailing steam generators. SCE says what it is proposing is a temporary "compensatory action" while it prepares a "long-term plan" for repair.[4] Thus, the company

[3] Order (Conference Call Summary and Directives Relating to Briefing) (Dec. 7, 2012) (hereinafter "December 7 Order") (unpublished) at 6.
[4] Letter from Peter T. Dietrich, Senior Vice President & Chief Nuclear Officer, Southern California Edison, to Elmo E. Collins, Regional Administrator, Region IV, Nuclear Regulatory Commission, Docket No. 50-361, Confirmatory Action Letter – Actions to Address Steam Generator Tube Degradation, San Onofre Nuclear Generating Station, Unit 2 (Oct. 3, 2012) (Cover letter to SCE Restart Plan), at 4.

proposes to restart Unit 2 without a repair plan, without a revision to its license, and without public input on its decision.

Moreover, since the current license for Unit 2 allows for operation at up to 100% of power, it is unclear whether, under SCE's proposal, the Commission would have any means of enforcing the 70% limit, should SCE decide of its own volition that Unit 2 was safe to operate at more than 70% power.

SCE's proposal for restarting San Onofre Unit 2 is subject to the standards of 10 C.F.R. § 50.59, which determines when a license amendment is required. The key portions of this regulation state that a licensee shall obtain a license amendment under § 50.59 before implementing "a proposed change, test, or experiment" (CTE) if the CTE would meet any one of eight conditions spelled out in § 50.59(c)(2)(i)–(viii).

These conditions require a license amendment if the CTE would more than minimally increase the *frequency of occurrence* or *consequences* of an accident evaluated in the FSAR; or the *likelihood* of occurrence or *consequences* of a malfunction of a "structure, system or component" important to safety. In addition, an amendment is necessary if the CTE would create a possibility for an accident of a *different type* than previously evaluated, or a malfunction of a structure, system or component important to safety with a *different result* than evaluated in the UFSAR. Finally, a license amendment is required if the proposed CTE would result in *exceeding or altering the design basis limit* described in the UFSAR for a fission product barrier, or a departure from a *method of evaluation* described in the UFSAR that is used in establishing the design bases or safety analysis. We stress that an affirmative answer to any one of these criteria triggers a license amendment.

SCE admitted at a December 7, 2012 public meeting that the company did a § 50.59 analysis on its response to the CAL.[5] FoE has been denied access to this analysis under the Board's Order of December 20, 2012, but SCE has not explained why it did not come to the obvious conclusion that its proposal to run Unit 2 at 70% of power without repairing or replacing the damaged steam generators requires an amendment to its license. The facts nevertheless make clear that SCE's response to the CAL stumbles over not just one, but at least six of the trip wires in § 50.59 that require a license amendment.

i. SCE Proposes a "Change, Test, or Experiment"

To begin with, there can be no dispute that SCE's proposal constitutes a CTE under § 50.59(a)(1) and (6). Operating a plant with a 70% power limit because of badly damaged steam generators is a dramatic change from the full power operation with trouble-free steam generators, the mode of operation under the existing license.

In question (viii), the Board asks: "How is the term 'operational assessment' different than or the same as the terms 'test' and 'experiment' used in 10 C.F.R. § 50.59?" Throughout SCE's Steam Generator Operational Assessment, SCE refers to the Songs Steam Generator Program, which has been withheld from FoE and its experts. John Large,[6] a nuclear engineering expert, points to the Nuclear Energy Institute (NEI) "Steam Generator Program Guidelines," which describe an Operational Assessment as a "forward-looking assessment which *demonstrates* that the tube integrity performance criteria *will be met* throughout the next inspection interval." Large Affidavit at ¶ 11.2–11.3.[7] Thus, the OA is an exercise aimed at

[5] NRC Public Meeting (Nov. 30, 2012), video *available at* http://www.youtube.com/watch?v=VPxDYWa0b8o and http://www.youtube.com/watch?v=8tCQWeEauHo.
[6] As detailed in the attached affidavit, Mr. Large is a Consulting Engineer, Chartered Engineer, Fellow of the Institution of Mechanical Engineers, Graduate Member of the Institution of Civil Engineers, Learned Member of the Nuclear Institute, and a Fellow of the Royal Society of the Arts. He is based in London, United Kingdom.
[7] Mr. Large's Affidavit is appended to this brief as Attachment 1.

predicting whether a plant will perform within the technical specifications required by the license.

By contrast, the contemplated "change" is also properly described as a "test" or "experiment," which are defined in 10 C.F.R. § 50.59 as "any activity where any structure, system, or component is utilized or controlled in a manner which is either:"

(i) Outside the reference bounds of the design bases as described in the final safety analysis report . . .; or,

(ii) Inconsistent with the analyses or descriptions in the final safety analysis report . . .[8]

The NRC-endorsed industry guidance explains further:

> The intent of the definition is to ensure that tests or experiments that put the facility in a situation that has not previously been evaluated (e.g. unanalyzed system alignments) or that could affect the capability of SSCs to perform their intended design functions (e.g. high flow rates, high temperatures) are evaluated before they are conducted to determine if prior NRC approval is required.[9]

FoE has not been permitted to see all relevant portions of the UFSAR but we are confident that the design bases of the FSAR did not contemplate operating the steam generators with thousands of indications of premature wear, including the risks accompanying a reactor limited to no more than 70% of power because of destructive vibration of the virtually new steam generators. FoE feels confident that operating Unit 2 in these conditions is "inconsistent with the analyses or descriptions" in the existing FSAR.

The root cause that explains how the Mitsubishi design permitted such vigorous levels of fluid elastic instability (FEI) activity "has not been determined, even by MHI itself which continues to be at a loss to explain which feature(s) of its analytical and/design process was at

[8] 10 C.F.R. § 50.59(a)(6).
[9] "Guidelines for 10 C.F.R. § 50.59 Implementation," NEI 96–07, Revision 1 (Nov. 2000) at 22 (endorsed by the NRC in Regulatory Guide 1.187).

fault." Large Affidavit at ¶ 5.5.5. According to Arnold Gundersen,[10] one of FoE's expert nuclear engineers:

> Operating the damaged San Onofre Unit 2 at reduced power is an experiment by Edison on steam generators that are unlike any other steam generators that have been designed and fabricated anywhere in the world.

Gundersen Affidavit at ¶ 79.[11] Using the term "operational assessment" does not change the experimental character of what is proposed: to operate at reduced power for 150 days, then look inside and see what effect the change has had. In fact, Edison has used the word "research" to describe its examination of the vibrations expected during the 150 days of operation. Gundersen Affidavit at ¶ 81. In classically experimental mode, SCE plans to repeat this process in the hope of identifying the highest power that can be achieved without further degradation to the steam generator tubes.[12]

These units have been kept shut for one year because there was clearly much more than "a minimal increase in risk" to operate them. Without finding the cause of the problem or a solution there is clearly more than a minimal increase in risk inherent in SCE's restart plan.

ii. *Facts Relevant to § 50.59(c)(2) Analysis*

The changed, damaged condition of the steam generators clearly creates more than a "minimal increase" in the risk to the public. First, the degradation of the steam generators' tubes in both Units 2 and 3 is far more extensive than at any other U.S. nuclear power plant that has replaced steam generators. A study by Daniel Hirsch and Dorah Shuey, called, "*Far Outside the Norm: The San Onofre Nuclear Plant's Steam Generator Problems in the Context of the National Experience with Replacement Steam Generators*" (September 12, 2012) (hereinafter

[10] As detailed in the attached affidavit, Mr. Gundersen is Chief Engineer at Fairewinds Associates, Inc. and has forty years of nuclear industry experience and oversight. He holds bachelor of science and master's degrees in nuclear engineering.
[11] Mr. Gundersen's Affidavit is appended to this brief as Attachment 2.
[12] *See* Letter from Peter T. Dietrich, *supra* note 4.

"Hirsch Report") (Attachment 3), using data submitted to the NRC by utilities operating nuclear reactors with replacement steam generators, compares Units 2 and 3 with the other U.S. nuclear plants that have replaced steam generators. The Report finds that the experience at both San Onofre reactors is "far, far outside the norm of national experience,"[13] as shown in the following table.[14]

Table 1. Comparison of San Onofre RSG Tube Wear with National Experience

	National Median	San Onofre Unit 2	San Onofre Unit 3
Median Tubes Showing Wear After 1 Cycle	4	1,595	1,806
Median Indications of Wear After 1 Cycle	4	4,721	10,284
Median Tubes Plugged After 1 Cycle	0	510	807

To be sure, indications of wear and tube thinning are not the same as a tube rupture, but they do represent an increased risk, and the issue here is whether there is an increased risk that needs the rigorous evaluation of a license amendment process.

Second, it is incorrect to assert that Unit 2 is different from Unit 3 in terms of the deterioration of the steam generators. The attached Affidavit of John Large explains the tube degradation process and concludes that "U[nit] 2 is following the same AVB deterioration process as A[Unit] 3." Large Affidavit at ¶ 5.7.27.

Third, it is equally incorrect to conclude that reducing FEI vibration by limiting Unit 2 to 70% power will prevent further deterioration of the steam generators. In the first instance,

[13] DANIEL HIRSCH & DORAH SHUEY, FAR OUTSIDE THE NORM: THE SAN ONOFRE NUCLEAR PLANT'S STEAM GENERATOR PROBLEMS IN THE CONTEXT OF THE NATIONAL EXPERIENCE WITH REPLACEMENT STEAM GENERATORS i (Sept. 12, 2012) (hereinafter "HIRSCH REPORT"). The data for this study were from the first In-Service Inspection report submitted to the NRC after installation of the replacement steam generators and numerous related documents available through the NRC ADAMS database. *Id.* at 11. The report is appended to this brief as Attachment 3.
[14] Table compiled from figures in HIRSCH REPORT.

whether limiting the unit to 70% power will reduce or eliminate FEI vibration is simply not known ("the root cause of how [the Mitsubishi] design permitted such vigorous levels of FEI activity has not been determined, even by MHI itself which continues to be at a loss to explain which features of its analytical and/or design process[] was at fault," Large Affidavit at ¶ 5.5.5). As noted earlier, SCE is proposing to run an experiment hoping to learn whether FEI vibration can be controlled at 70% power.

Moreover, Unit 2 is subject to excitation forces inducing tube and component vibration other than FEI. In its CAL response, SCE fails to note the findings in MHI Appendix 10,which conclude that:

> AVB-to-tube wear in U2 arose in FEI inactive areas of the RSG tube bundle, is being excited by turbulent flow forces (vortex shedding, turbulent wake, etc.) which may persist even when FEI is suppressed by the proposed reduction to 70% thermal power [p. 369, Appendix 10].

Large Affidavit at ¶ 5.5.8. [redacted]

[redacted][15]

[redacted] (Also, see generally discussion of this point in Large Affidavit at ¶¶ 5.5.7–5.5.8, and 5.5.19–5.5.23.) For this reason, further degradation of the tubes progressing towards accelerated tube-to-tube wear can be expected even if SCE limits Unit 2 to 70% power.

Fourth, plugging at-risk tubes is "not a satisfactory solution" (Large Affidavit at ¶ 5.6.10) because the retainer bars will continue to vibrate via random fluid flow processes at sub-FEI

[15] [redacted]

levels. Indeed, operating at 70% power is likely to exacerbate this process, leading to further tube wear by "foreign objects." *Id*.

Fifth, projections of the structural integrity and accident-induced leakage of individual tubes for Unit 2 at a pre-specified level of thermal power (70%) cannot reasonably be relied upon to determine whether the unit can be expected to operate without running a greater risk, or incurring tube failure for reasons identified in the Large Affidavit at ¶¶ 5.8.15–5.8.25.

Sixth, SCE has not demonstrated that the damaged steam generators in Unit 2 would be able to meet accident leakage performance criteria in the event of a design basis accident such as a major steam line break. SCE's response to the CAL ignores the findings of its consultant AREVA, which identified a number of tube wear modes (not just tube-to-tube wear (TTW)) on Unit 3 that failed the accident leakage performance criteria that apply equally with respect to Unit 2. *Id*. at ¶¶ 5.9.3–5.9.4.

iii. Under the Criteria of 10 C.F.R. § 50.59(c)(2) SCE is Required to Obtain a License Amendment to Operate Unit 2 at 70% of Power In Its Current Condition

The Commission's referral to this tribunal asks the question of whether this CAL proceeding constitutes a license amendment even though SCE has failed to apply for one. The beginning point in answering that question is § 50.59. SCE publicly claimed it examined these criteria but refused to reveal the results.

The NRC may not avoid the obligation to conduct a license amendment proceeding by characterizing the proceeding as an enforcement matter. *See, e.g., Commonwealth of Mass. v. United States Nuclear Regulatory Comm'n*, 878 F.2d 1516, 1521 (1st Cir.1989) (stating that the "fact that the NRC did not call its decision to restart a 'reinstatement' of the license is not controlling"); and *Columbia Broadcasting Syst. Inc. v. United States*, 316 U.S. 407, 416 (1942) (stating that "[t]he particular label placed upon it by the Commission is not necessarily

conclusive, for it is the substance of what the Commission has purported to do and has done which is decisive").

The purpose of § 50.59, as stated by the NRC in the most recent rule amending the language, "is to identify possible changes that might affect the basis for licensing the facility so that any changes that might pose a safety concern are reviewed by NRC to confirm their safety before implementation."[16]

Section 50.59 (c)(1) requires the licensee to perform a "screening" analysis to determine whether a 50.59 analysis of the proposed change, test, or experiment is necessary. It states:

> (c)(1) A licensee may make changes in the facility as described in the final safety analysis report (as updated), make changes in the procedures as described in the final safety analysis report (as updated), and conduct tests or experiments not described in the final safety analysis report (as updated) without obtaining a license amendment pursuant to § 50.90 only if:
>
> (i) A change to the technical specifications incorporated in the license is not required, and
>
> (ii) The change, test, or experiment does not meet any of the criteria [i-viii] in paragraph (c)(2) of this section.

Condition (i) is an automatic trigger. If the technical specifications must be modified to implement the proposed change, test, or experiment, then a license amendment is required. Condition (ii) takes further evaluation. The licensee must apply paragraph (c)(2) to the proposed change, test, or experiment and determine whether it would meet *any one* of criteria (i) through (viii). If so, the licensee must apply for a license amendment.

In other words, as the NRC-endorsed Revision 1 to NEI 96-07 Guidelines for 10 CFR 50.59 Implementation states, if an activity is either "(1) a change to the facility or procedures as

[16] "Changes, Tests, and Experiments," 1999 WL 958452, 5 (N.R.C.) (Sept. 20, 1999).

described in the UFSAR or (2) a test or experiment not described in the UFSAR," then the activity requires NRC approval in the form of a license amendment.[17]

SCE's proposed experiment triggers six of the eight criteria that require a license amendment under § 50.59(c)(2). If a licensee finds that any one of these criteria is satisfied it is required by § 50.59 to seek a license amendment from the NRC. Since the restart plan trips the criteria six times, SCE cannot legally operate Unit 2 without seeking a license amendment.

The following details the aspects of the SCE response to the CAL that trip provisions of § 50.59(c)(2).

1. Section 50.59 (c)(2)(i): Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the final safety analysis report (as updated); and § 50.59(c)(2)(iii): Result in more than a minimal increase in the consequences of an accident previously evaluated in the final safety analysis report (as updated)

As the proponent of the request to operate damaged and unrepaired steam generators at 70% of power, the licensee bears the burden of demonstrating that what it seeks will not result in a more than minimal increase in the frequency of occurrence or consequences of an accident. To make such a demonstration it would be necessary for SCE to demonstrate convincingly an understanding of the root cause of the FEI that, amongst other sources of fluid excitation, induces the mechanical vibration that is wearing the steam generator tubes and to explain how that root cause has been eliminated. But SCE has failed to demonstrate such an understanding:

> The individual Operational Assessments presented by SCE have individually failed to demonstrate a clear and proven relationship between reactor operational power level, the rate(s) of TTW and TSP- and AVB-to-tube wear.

Large Affidavit at ¶ 11.19.

[17] Revision 1 to NEI 96–07 Guidelines for 10 C.F.R. § 50.59 Implementation, Nov. 2000, ADAMS Accession Number ML003771157 at 29 (endorsed by the NRC in Regulatory Guide 1.187).

Because SCE has not determined what is causing the variety of tube wear that has occurred, it has not been able to demonstrate that operation at 70% power will reduce tube failure: "[I]t remains doubtful that there is not an increased frequency of accident involving a single or multiple tube failure in normal operations and during and/or following design basis fault events." Large Affidavit at ¶ 11.19.1.

> In the event of a steam line break accident in the San Onofre Replacement Steam Generators with the degraded condition of the tubes, an accident would have occurred that is more severe than any design basis accident previously analyzed by Edison in the FSAR.

Gundersen Affidavit at ¶ 38.

2. Section 50.59(c)(2)(v): Create a possibility for an accident of a different type than any previously evaluated in the final safety analysis report (as updated)

The NRC-approved Guidelines for the implementation of § 50.59 describe an example of a change that may create the possibility of an accident of a different type than that which is analyzed in the FSAR. One of the examples is particularly pertinent to the change in the steam generators at San Onofre Unit 2:

> For example, there are a number of scenarios, such as multiple steam generator tube ruptures, that have been analyzed extensively. However, these scenarios are of such low probability that they may not have been considered to be part of the design basis. However, if a change is made such that a scenario such as a multiple steam generator tube rupture becomes credible, the change would be considered to create the possibility of an accident of a different type.[18]

The multiple tube ruptures during pressure testing in Unit 3, coupled with the unprecedented wear in the steam generators at Unit 2 that indicates the potential for multiple tube failures, is now sufficient to make a scenario of multiple tube rupture at Unit 2 credible, though it may not have been considered credible enough to include in the UFSAR previously.

[18] *Id.* at 54.

As a result, "the potential effects of failure of the RSGs to perform adequately in the event of a LOCA have not been demonstrated." Large Affidavit at ¶ 11.31.1.

3. Section 50.59(c)(2)(ii): Result in more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system, or component (SSC) important to safety

As demonstrated above in Table 1, San Onofre Unit 2 has suffered thousands of times[19] more indications of wear than any unit with a replacement steam generator over one operation cycle (other than San Onofre Unit 3). SCE's request to restart Unit 2 without repair or replacement of the degraded tubes creates a substantial increase in the likelihood of a malfunction in the steam generators, components critical to safety.

SCE has plugged 510 tubes in Unit 2: by contrast, the median number of plugged tubes in all other units after one cycle of operation with replacement steam generators is zero.[20] SCE offers tube plugging as its solution to the continuing tube wear and loss of tube integrity. However, since the retainer bars are vibrating, then tube wear "will continue with the possibility that free-debris will be generated and swept into . . . the RSG bundle." Large Affidavit at ¶ 11.21. SCE has not presented an analysis of how the company plans to stop further degradation of the tubes adjacent to the retainer bars. Thus, SCE has failed to analyze the potential safety effects of an increased failure of a "component important to safety," i.e., the steam generators for Unit 2.

SCE's consultant AREVA articulates its theory of how long Unit 2 could be expected to operate without incurring a tube failure or running a greater risk of a tube failure occurring. But without an understanding of exactly what has caused the tube thinning to date, it is pure

[19] HIRSCH REPORT, *supra* note 13, at i.
[20] *Id.*

speculation. John Large provides multiple reasons why these projections should not be considered predictive. *See* Large Affidavit ¶ ¶ 5.8.15–5.8.25.

4. Section 50.59(c)(2)(vi): Create a possibility for a malfunction of an SSC important to safety with a different result than any previously evaluated in the final safety analysis report (as updated)

SCE has not demonstrated that operating Unit 2 at 70% of power will not increase the risk of a malfunction of the steam generators causing a result different from those evaluated in the UFSAR. In other words, SCE has failed to demonstrate why reducing the operation to 70% power would reduce the risk to the UFSAR level. In its response to the CAL and restart plan, SCE has chosen to focus entirely on the potential for limiting FEI stresses on the steam generator tube bundles. But the company fails to address other sources of vibration that may not be reduced by limiting operation to 70% of power. One of these sources is the set of fundamental changes made to the design of the replacement steam generators:

> These three changes (additional tubes, removal of stay cylinder and egg crate removal) caused a unique and unanalyzed heat load to the interior of the Replacement Steam Generators that will continue to cause the tubes to vibrate and fail even after some have been plugged.

Gundersen Affidavit at ¶ 55. In addition, other sources of vibration that are affecting the vibration of the tube bundles are left unanalyzed in SCE's CAL response and restart plan:

> Vortex Induced Vibrations (VIV) and Turbulence Induced Vibration (TIV) might be created if San Onofre Unite 2 were allowed to operate at reduced power, and once again, the NRC and Edison have neglected to review and acknowledge these scenarios.

Gundersen Affidavit at ¶ 71.

5. Section 50.59(c)(2)(vii): Result in a design basis limit for a fission product barrier as described in the FSAR (as updated) being exceeded or altered

SCE has not demonstrated that the degraded steam generator tubes in Unit 2 would be able to meet accident leakage performance criteria in the event of a design basis accident such as

a major steam line break. SCE's response to the CAL ignores the findings of AREVA, which identified a number of tube wear modes (not just TTW) on Unit 3 that failed the accident leakage performance criteria. That finding applies equally with respect to Unit 2. Large Affidavit at ¶ 5.9; *see also* ¶¶ 7.11–7.15.

SCE claims that it has demonstrated that tube integrity will be maintained, but that is not correct:

> [T]he OAs state but do not demonstrate by analysis open to inspection, that SIPC has been satisfied to 95% probability at 50% confidence for a) full (100%) power operation, see ¶ 7.7.7 and b) at the proposed 70% power operation.

Large Affidavit at ¶ 11.31.1.

The consequence of such a failure has been described ably by Mr. Gundersen as follows:

> In the event of a steam line break accident in the San Onofre Replacement Steam Generators with the degraded condition of the tubes, an accident would have occurred that is more severe than any design basis accident scenario previously analyzed by Edison in the FSAR.

Gundersen Affidavit at ¶ 38.

B. SCE Must Obtain a License Amendment Because Unit 2 Cannot Meet the Requirements of the Current License Under the Proposed Restart Plan

Under NRC regulations, the license awarded to San Onofre requires the steam generator tubes to meet certain tube integrity criteria. These performance criteria include three separate requirements: (1) tube structural integrity (SIPC); (2) accident-induced leakage; and (3) operational leakage. These requirements are incorporated in San Onofre's operating license:

> [S]team generator tubes shall retain structural integrity over the *full range of normal operating conditions* . . . and *design basis accidents, or combination of accidents.* This includes retaining a *safety factor of 3.0* against burst under normal steady state *full power operation* primary-to-secondary pressure differentials.[21]

[21] San Onofre Operating License for Unit 2, p. 5.0–14, ¶ 5.5.2.11, *available at* http://pbadupws.nrc.gov/docs/ML0531/ML053130316.pdf (emphasis supplied).

Unless the license is amended, these requirements will continue to apply to Unit 2. Unit 2, which SCE proposed to operate at 70% *precisely because of* concerns about tube integrity at higher power levels, cannot meet the performance criteria in the license, which require that the steam generator tubes retain structural integrity over the *full range* of normal operating conditions of up to 100%.

Since such a demonstration cannot be made if the unit is limited to operating at no greater than 70% power, SCE's restart plan, with its proposed limitation to operate Unit 2 at no more than 70% of power, can only be understood as a request for a license amendment.

C. SCE Must Seek A License Amendment Because Its Restart Plan, If Approved, Would Grant the Company Greater Operating Authority than Permitted under Its Existing License

SCE's proposal to operate Unit 2 at 70% of power with damaged steam generators seeks new and greater operating authority than permitted under the current license and therefore requires a license amendment. By operating with damaged steam generators, Unit 2 would create new risks exceeding those permitted under its current license. Additional operating authority, beyond the current license, would be necessary to allow SCE to run these additional risks. Thus, SCE's restart plan necessarily requires a license amendment.

Both the NRC and reviewing courts have stated that, in determining whether a license amendment is necessary, the "key consideration should be: did the agency action 'supplement' the existing operating authority prescribed in the license?" *In the Matter of Cleveland Electric Illuminating Company*, U.S. NRC CLI-96-13, 19, 26 (1995) (internal citations omitted). Where the actions of the NRC, such as through an order, would result in the licensee being awarded greater operating authority than its license permits, a license amendment is required. *See, e.g.*, *Com. of Mass. v. U.S. Nuclear Regulatory Comm'n*, 878 F.2d 1516, 1520–21 (1st Cir. 1989)

(internal citations omitted) (requiring a license amendment for the licensee "to operate in accordance with the restrictions which have been imposed" when the restrictions are found to supplement the existing authority in the license). *See also In re Three Mile Island Alert, Inc.,* 771 F.2d 720, 729 (3d Cir. 1985) *and Kelley v. Selin*, 42 F.3d 1501, 1515 (6th Cir. 1995).

The Commission has taken the position that licenses authorize only what is explicitly allowed, and no other actions. The courts agree: "Regulated conduct which is neither delineated, nor reasonably encompassed within delineated categories of authorized conduct, presumptively remains unlicensed." *Citizens Awareness Network, Inc. v. U.S. Nuclear Regulatory Comm'n*, 59 F.3d 284, 294 (1st Cir. 1995) (holding if the licensee "wishes to modify the facility or to take actions that are not specifically authorized under the license," it must request a license amendment). Thus, when it became apparent that the existing license for Niagara Mohawk's Nine Mile Point plant permitted concentrations of certain salts in cooling water that were abetting the growth of cracks in the vertical welds in the core shroud, the NRC required an amendment to the license to reduce the limits on these salts in the Technical Specifications, even though the operator had voluntarily made the necessary reduction.[22]

Undoubtedly, one reason to consider the CAL process a license amendment request has to do with the enforceability of the requirement. At Nine Mile Point, as in the case of San Onofre, a voluntary commitment by the licensee to limit activities permitted by the original license would not be enforceable, should the licensee change its mind.

San Onofre Unit 2 differs from other cases where restarting the reactor did not require a license amendment after a period of shut down because in each other case the licensee was allowed to resume operating under the terms of its pre-existing license. In the case of San Onofre, however, the licensee seeks authority to operate on different terms than those in its

[22] License Amendment issued by the NRC on September 19, 1998.

license: SCE asks for permission to change its operating limit to operate with damaged steam generators at 70% power for a period of 150 days in an attempt to understand the cause of the rapid deterioration of the steam generators and perform "research" on the expected vibrations. Gundersen Affidavit at ¶ 81. Such an alteration of the terms of operation is different in kind from a request for permission to operate a plant within the established safety limits with non-degraded, properly operating steam generators at up to full power, which is what San Onofre's existing license permits.

SCE will no doubt argue that operation at 70% of thermal power is within the envelope of the FSAR because the FSAR authorizes operation at up to 100% of thermal power. Such simplistic reasoning is in error. SCE is asking to be allowed to operate at 70% of power because Unit 2 is considered to no longer be capable of operating within the safety limits of the FSAR at higher power levels. Were this not true, there would be no need for the company to adopt a restart plan limited to 70% of power. Operating Unit 2 with its damaged steam generators requires authority not granted in the existing San Onfore license.

D. The Extensive Degradation in Unit 2's Steam Generator Tubes Shares the Same Failure Mechanisms and Risks As Those of Idled Unit 3 and Therefore Requires a License Amendment Prior to Restart

In the December 3, 2012 Scheduling Call between the Board and the parties, Judge Arnold posed the following question:

> Unit 2 has the same design steam generators as Unit 3. Unit 3 steam generators have demonstrated a failure mechanism with safety implications. So the question I [Judge Arnold] have is does Unit 2 require a license amendment in order to restart with steam generators that are currently installed that could potentially demonstrate the same failure mechanism as seen in Unit 3.[23]

[23] Transcript of Scheduling Call with Board at p. 35, 10–17 (Dec. 3, 2012).

As explained in detail below, Unit 2 requires a license amendment prior to being approved for restart because it has the same fundamental design defects and presents a similar safety risk as that of Unit 3, which is being kept offline *owing to this risk*.

Since both reactors were taken offline in January 2012, however, SCE has maintained that the problems in Unit 2 and Unit 3 are different.[24] Further, SCE has insisted that the extent of the wear in the replacement steam generators in Unit 2 is within the normal experience of similar new replacement steam generators.[25] Both sets of claims, which SCE relies on to support its proposal to restart Unit 2 *even while it tacitly concedes that Unit 3 is too damaged to be restarted*, are factually incorrect, as demonstrated below.

i. Units 2 and Unit 3 Have The Same Fundamental Design Errors and Failure Risks

When SCE replaced the original steam generators it requested that MHI make numerous changes to the design of the replacement steam generators compared to those originally installed at San Onofre, including adding 377 more tubes, removing or drastically altering critical support structures, and using a different tube alloy, among other alterations.[26] SCE did not seek a license amendment for these changes, which resulted in a less stringent review process by NRC Staff than would have been the case under the procedures involved in a license amendment application.

The design changes made to the replacement steam generators resulted in their rapid degradation. Importantly, in both reactors tube wear is occurring at four different locations: 1)

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[24] *See, e.g.*, Press Release, Edison International, "Southern California Edison Announces Intent to Downsize Staffing at San Onofre Nuclear Generating Station" (Aug. 20, 2012), *available at* http://www.edison.com/pressroom/pr.asp?id=7986 (last accessed Dec. 18, 2012) (stating that "[t]he reality is that the Unit 3 reactor will not be operating for some time").

[25] *See* NRC Public Meeting, *supra* note 5 (stating that the wear in Unit 2 was "normal wear" not out of line with similar levels of wear at other plants).

[26] *See, e.g.,* FoE's June 18, 2012 Petition to Intervene at 17–18, ¶ 6–7. FoE's Petition is appended to this brief as Attachment 4, along with supporting declarations.

tube-to-tube wear (TTW); and at various components that serve to restrain and/or provide points of fixity to the individual tubes, including 2) the retainer bars; 3) the anti-vibration bars; and 4) the tube support plates.

Regarding tube-to-tube wear, SCE and the consultants it engaged to undertake the Operational Assessments generally agree that it was the presence of a thermal-hydraulic phenomenon, in-plane FEI activity, in the hot-leg to U-bend region of the steam generator tube bundles that triggered the tube motion and resulting tube-to-tube wear. SCE described the mechanistic cause of the tube-to-tube wear in Unit 3 as:

> [C]aused by a combination of localized high steam velocity (tube vibration excitation forces), high steam void fraction (loss of ability to dampen vibration), and insufficient tube to anti-vibration bar (AVB) contact to overcome the excitation forces. The FEI resulted in a vibration mode of the SG tubes in which the tubes moved in the in-plane direction parallel to the AVBs in the U-bend region. This resulted in TTW in a localized region of the Unit 3 SGs.[27]

The root cause of how MHI's design permitted this amount of in-plane fluid elastic instability has not been determined, with MHI continuing to be unable to explain which analytic or design features resulted in the FEI.

The mechanism causing the three other types of wear, i.e., the non-tube-to-tube wear, is distinct from the fluid elastic instability activity. MHI's analysis of the mechanistic causes of the non-tube-to-tube wear is as follows:

> The concluded mechanistic cause of the Type 1 wear {TTW} is tube FEI in the tube bundle U-bend region, which is caused by a combination of the SG secondary side thermal-hydraulic conditions (high fluid velocity and high void fraction) and **inactive AVB support conditions** in the in-plane direction.
>
> The concluded mechanistic cause of the Type 2 {AVB} and 3 {TSP} wear is random vibration of the tubes. The Type 2 {AVB} wear is caused by the tube motion due to high void fractions and high flow velocities. The Type 3 {TSP} wear is caused by high velocity flow across the straight leg sections of the tubes.

[27] SCE, Enclosure 2, Songs Return to Service Report (Oct. 3, 2012).

> The concluded mechanistic cause of the Type 4 {RB} wear type is vibration of the retainer bar, which is the same as in the Unit-2 SGs.

Large Affidavit at ¶ 5.5.20 (emphasis {and explanation} supplied) (citing Attachment 4 to SCE's Restart Plan: MHI Document L5-04GA564–Tube Wear of Unit-3 RSG Technical Evaluation Report, Mitsubishi Heavy Industries SO23-617-1-M1538 Rev 0).

MHI's analysis is significant because it indicates that non-tube-to-tube wear is being caused independently and by forces other than FEI. MHI concluded, for example, that AVB-to-tube wear in Unit 2's steam generators arose in areas of the tube bundle where FEI was inactive: areas that were instead excited by turbulent flow forces that may persist even at the proposed power level of 70% intended to suppress the FEI. Large Affidavit at ¶ 5.5.8.

This point is important because it suggests that a restart plan that would reduce FEI will not necessarily address the other, independent causes of *non*-tube-to-tube wear—all of which ultimately render the free span sections more susceptible to tube-to-tube wear. In other words, because TTW accounts for only a portion of the total number of degraded tubes in the steam generators, a restart plan that reduces in-plane and out-of-plane FEI does not guarantee the structural integrity of all tubes because other failure modes and sources of fluid excitation have not been fully accounted for by SCE.

It is critical to recognize that these fundamental design errors are common to and affect both Unit 2 and Unit 3. While MHI concludes that there may be manufacturing dimensional tolerance variations between Unit 2 and 3,[28] the fundamental design defects are identical. Further, these particular design errors are significant because they undermine the structural

[28] MHI concluded that the tube-to-AVB contact forces of Unit 3 were "more likely to be insufficient" to prevent the in-plane motion of tubes and the Unit 3 SGs were more susceptible to in-plane tube vibration than Unit 2 SGs because the average contact force in Unit 3's SGs was smaller. According to MHI, this difference was caused by the manufacturing dimensional tolerance variations. Large Affidavit at ¶ 5.5.20.

integrity of the steam generator tubes, which are critical because they serve as the primary coolant and fission product boundary for the reactor plant. The NRC describes the importance of the tube integrity of the steam generators as follows:

> The steam generator (SG) tubes in pressurized water reactors have a number of important safety functions. These tubes are an integral part of the reactor coolant pressure boundary (RCPB) and, as such, are relied upon to maintain the primary system's pressure and inventory. As part of the RCPB, the SG tubes are unique in that they are also relied upon as a heat transfer surface between the primary and secondary systems such that residual heat can be removed from the primary system; the SG tubes are also relied upon to isolate the radioactive fission products in the primary coolant from the secondary system. In addition, the SG tubes are relied upon to maintain their integrity, as necessary, to be consistent with the containment objectives of preventing uncontrolled fission product release under conditions resulting from core damage severe accidents.[29]

In other words, ruptured tubes, which in this case result from tube degradation from all types of wear, could create a breach in the steam generators' containment. Pervasive tube degradation thus potentially presents a serious safety risk, which is the case at San Onofre upon examining the extent of the degradation in *both* Unit 2 and 3.

ii. Unit 2 Has Extensive Tube Degradation Similar to that In Unit 3

SCE seeks to defuse the concern over the safety risk posed by restarting Unit 2 by arguing that Unit 2's problems are different and, by implication, less serious, than those experienced by Unit 3. SCE attempts to support this distinction by citing the fact that Unit 2 currently has only two tubes that are rubbing against each other in the TTW mode, whereas Unit 3 has hundreds of indications from TTW.[30] This argument neglects the critical point, however, that tube-to-tube wear is only one of the four types of wear experienced by the replacement steam generators in *both* units, as described above. SCE asserts that only TTW is of concern, and

[29] NRC Draft Regulatory Guide DG-1074, Steam Generator Tube Integrity, Dec. 1998, ML003739223, cited in HIRSCH REPORT at 2.
[30] NRC Public Meeting, *supra* note 5 (asserting that the problems in Unit 3 are far worse than in Unit 2 because of the discrepancy in the numbers of tubes showing tube-to-tube wear between the two units).

that the extent of the other types of wear is generally comparable to that experienced nationally in other replacement steam generators, but this claim is not factually supportable.[31]

The statistics on total tube wear demonstrate that there is a serious problem with tube integrity in both Units. Although SCE has provided conflicting data sets at various points, even the most conservative numbers made available by the NRC show extensive tube degradation in both Units:

- Unit 2 had 1595 degraded tubes; Unit 3 had 1806.
- Unit 2 had 4721 tubal wear indications; Unit 3 had 10,284.
- Unit 2 had 510 tubes plugged after one cycle of operation; Unit 3 had 807.

Thus, according to data tables supplied by the NRC, there are similar numbers of degraded tubes in both Units (1595 in Unit 2 versus 1806 in Unit 3). Unit 3 has a greater number of wear indications than Unit 2, and more tubes in the higher ranges of through-wall wear. Unit 3 also has hundreds of indications of through-wall wear due to tube-to-tube rubbing, whereas Unit 2 has two.

The fact that San Onofre's Unit 2 currently has few wear indications caused by tube-to-tube wear, as compared to Unit 3, does not lessen the safety risk posed at Unit 2. As the Hirsch Report states:

> [T]ube-to-tube wear represents less than 10% of the wear indications in Unit 3. The great majority of tubes that are in trouble in either unit are experiencing tube-to-AVB [anti-vibration bar] wear or tube-to-tube-support-plate wear. And both reactors are faced with thousands of such wear indications.
>
> The focus by SCE and NRC on tube-to-tube wear and the effort to thus distinguish Unit 2 from Unit 3 is misplaced. By far, the majority of tubes showing wear are evidencing it from other kinds of wear and exist in large numbers in both units.[32]

[31] *See* HIRSCH REPORT at 7–8.
[32] *Id.* at 9.

Thus, SCE and the Staff's focus to date on tube-to-tube wear ignores both the vast amount of degradation in all four SGs from non-tube-to-tube wear, as well as the fact that these non-tube-to-tube wear indications are being caused by different fluid excitation mechanisms—one that is not addressed by SCE's restart plan. Because both reactors share the same fundamental design defects and have high incidences of non-tube-to-tube wear, this presents serious safety implications for the integrity of the steam generators at both Unit 2 and 3 that warrant a license amendment review process.

iii. The Degradation in Unit 2 Is Far Beyond the National Experience For Other Replacement Steam Generators

SCE and NRC Staff maintain that the amount of non-tube-to-tube wear in Unit 2's steam generators is generally comparable to the national experience for other replacement steam generators.[33] Thus, for example, the NRC's AIT Report dismissed all but the tube-to-tube wear and four wear indications at retainer bars in Unit 2 as common in new steam generators, stating that with those four exceptions, "the wear indications found are similar to those found at other replacement steam generators after one cycle of operation."[34]

NRC has not, to Petitioner's knowledge, provided support for this statement in the AIT Report. In an attempt to respond to this information gap, the Hirsch Report, referenced above, assembled and evaluated the available data on replacement steam generator tube wear in order to describe where San Onofre falls within the national experience. In attempting to understand the Staff's justification for asserting that San Onofre's experience is within the national norm for replacement steam generators, the Report's authors describe the following interaction with the NRC:

[33] NRC Public Meeting, *supra* note 5.
[34] NRC AIT REPORT at 10.

> Efforts to get NRC to provide data supporting the claim in its AIT report have not been successful. NRC staff in Region IV responsible for the San Onofre steam generator investigation stated that they believed the number of wear indications in Unit 2 was comparable to other similar steam generators. When asked for the basis for that belief, they said they had no data but had heard it anecdotally. Obviously, a matter important for determining whether San Onofre Unit 2 should be permitted to restart should be based on more than an anecdote.
>
> NRC regional staff indicated they would attempt to get supporting data on the national experience from NRC headquarters. NRC headquarters staff reported NRC had not compiled any such data.[35]

Based on data compiled in the Hirsch Report, it is abundantly clear that Unit 2's problems are not merely "settling in" wear normal for new replacement steam generators, as SCE and Staff suggest,[36] but rather evidence that *both* Units have experienced wear far in excess of the norm for typical replacement steam generators.[37] *See* Table 1 (comparing the median number of steam generator tubes showing wear, the number of wear indications, and the number of tubes plugged at San Onofre as against the national nuclear fleet). By any measure, the amount of tube degradation in Unit 2 in less than two years of operation *far* exceeds the national norm.

iv. San Onofre's Steam Generators Are Not Structurally Comparable to Other Replacement Steam Generators

In question (v) of its December 7, 2012 Order, the Board asked the parties to compare the design and fabrication of San Onofre's steam generators with other replacement steam generators:

> Figure 4-3 in the report entitled "Operational Envelop for Large U-bend Steam Generators, SONGS U2C17 Steam Generator Operational Assessment for Tube-to-Tube

[35] HIRSCH REPORT, *supra* note 13, at 10.
[36] At times the NRC has contradicted this position and indicated that it regarded the steam generators' wear as highly unusual. *See, e.g.*, North County Times, "SAN ONOFRE: Rate of tube wear at nuke plant 'unprecedented,' NRC says" (Apr. 4, 2012) (quoting an NRC spokesperson as saying: "[i]t is accurate to say San Onofre's demonstrated wear is *unprecedented* for the length of time the steam generators were used") (emphasis added).
[37] *See, e.g.*, Press Release, Southern California Edison, "Southern California Edison Releases Steam Generator Tube Wear Data" (July 13, 2012) (stating that "[t]he nature of the support structure wear is not unusual in new steam generators and is part of the equipment settling in").

> Wear" [hereinafter Tube-to-Tube Report] compares the bulk velocity ratio and void fraction ratio to several successfully operating large S/Gs, and it notes that "[a]t 100% power, the thermal-hydraulic conditions in the u-bend region of the SONGS replacement [S/Gs] exceed the past successful operational envelope for U-bend nuclear [S/Gs] based on presently available data." Tube-to-tube Report at 17. How similar to the SONGS S/Gs are these other S/Gs? Do the other steam generators, for example, use alloy 690 tubes and have similar spacing, similar support structures, etc.?[38]

Petitioner's experts have found that San Onofre's replacement steam generators are substantially different in design than any other steam generators in the country. While Inconel *Alloy 690* is now favored by steam generator manufacturers for its improved corrosion resistance (Large Affidavit at 8.18.), the other alterations made to San Onofre are different from the design of other steam generators: no other steam generator in the nation is as large as those at San Onofre with broached tube supports, a tight Combustion Engineering tube pitch, and no stay cylinder. Gundersen Affidavit at ¶ 49–51. These features are the result of the design changes made by SCE and MHI to the original Combustion Engineering steam generators in the course of their replacement. No other steam generators have been modified in this fashion, meaning that the replacement steam generators at San Onofre are unlike any other design in the country.

As previously described, among the design changes SCE made were: 1) adding 377 tubes to the center of the generator; 2) removing the stay cylinder to make room for the extra tubes, which subsequently increased the heat load at the location where it was already the highest; and 3) replacing the egg crate tube supports with broached tube supports, which resulted in less cooling flow. These changes caused a unique and unanalyzed heat load in the center part of the new steam generators; in the original steam generators, there were no tubes, and therefore no heat input, in this central area. This change redistributed approximately 4% of the reactor's heat to the inside of the tube bundle, a new heat load that was then exacerbated by the replacement of

[38] December 7 Order at 7.

the egg crate tube supports with the broached plate design, which further reduced cooling flow to the center of the steam generator. Gundersen Affidavit at ¶¶ 50–56.

As the AIT Report confirmed, the cumulative effect of these changes was to create FEI, or a large steam void, in the center of the tube bundle, which created various vibration modes causing the tube degradation. Gundersen Affidavit at ¶¶ 57, 62–63. No other steam generators have been designed or modified in a similar fashion, making structural comparisons and industry operating experience largely inapplicable.

With regard to AREVA's analysis comparing San Onofre to other steam generators (labeled as case references A-F), Petitioner's experts dispute that any meaningful comparison can be drawn from the information that currently exists. For example, in AREVA's Tube-to-Tube report, Figure 4-3 purports to plot "many factors" defining the "operational parameters" for a particular plant and, more specifically, the energy balance that determines the onset of FEI. Large Affidavit at ¶ 8.2–8.3. AREVA concludes that "[a]t 100% power, the thermal-hydraulic conditions in the u-bend region of the SONGS replacement steam generators exceed the past successful operational envelope for U-bend nuclear steam generators based on presently available data." Large Affidavit at ¶ 8.11.

AREVA's analysis, however, implies that Figure 4-3 is comparing like with like; to do so, however, would require AREVA to have done a full ATHOS or similar flow analysis for each of the comparative steam generators. Unless AREVA actually performed this computer simulation for each of the five (labeled A through F) comparative nuclear plants, Figure 4-3, any conclusions flowing from AREVA's analysis, are unlikely to be directly comparing the fluid flow velocity distribution in the critical FEI regions of San Onofre's RSGs with the other comparative steam generator tube bundles. Large Affidavit at ¶ 8.12–13.

Because the Board denied Petitioner's request that SCE disclose the identity of the comparative plants, Petitioner's expert can only surmise that the comparison AREVA makes in Figure 4-3 is between the mean or average velocity within the overall tube bundle for San Onofre and the comparative plants. Even as an average this comparison is not reliable, however, as velocity distributions within each plant are very unlikely to be identical owing to different design geometries, flow areas, etc. As a result, it is very unlikely that the Bulk Velocity, as well as the Mean Void comparison, in AREVA's analysis can reliably serve as even a crude basis of comparison of the FEI potential at San Onofre. Large Affidavit at ¶ 8.14.

With regard to whether operating Unit 2 at 70% power operation can be considered conservative given the differences between the steam generators at San Onofre and other steam generators, the Board in question (vi) asked:

> Figure 5-1 in the Tube-to-Tube Report compares the same parameters as in Figure 4-3, but for operation at 70% power. It appears from Figure 5-1 that the bulk fluid velocity for SONGS is at the high end of the experimental range. Given the likely differences between the SONGS generators and those cited in the discussion, can one conclude that operation at 70% power is conservative?[39]

According to AREVA, Figure 5-1 demonstrates that "[a] decrease to 70% power places the SONGS steam generators back inside the operational envelope of demonstrated successful performance relative to in-plane fluid-elastic stability of nuclear steam generators with large U-bends."[40] As discussed above in conjunction with Figure 4-3, however, AREVA is not comparing like with like, as we shall explain.

FEI can be in-plane or out-of-plane, or both. For FEI to result in tube motion, the tubes must be sufficiently unrestrained. AREVA discusses this in-plane stability, stating that "prior to the observations at SONGS Unit 3, no in-plane instability had been observed in any U-bend

[39] *Id.* at 6–7.
[40] SONGS Steam Generator Program, SO23-SG-1, at 43, ¶ 4.

nuclear steam generator."[41] If, as AREVA asserts, none of the five comparative steam generators had previously experienced in-plane FEI, then there is no meaningful deduction to draw from Figure 5-1—contrary to AREVA's statement that operating Unit 2 at 70% power places the steam generators back within the operational envelop of successful performance for this type of steam generator.

Instead, as the Large Affidavit points out, the unique nature of the in-plane FEI affecting San Onofre's steam generators "could only have arisen from a difference or differences between the generally consistent designs of steam generators of other manufacturers and that of the SONGS RSGs." Large Affidavit at ¶ 9.10. Large goes on to say:

> Whereas I can confidently opine that the lack of any formalized AVB *in-plane* restraint effectiveness, i.e. '*left to chance'*, has played a major role, there may be other secondary influences and factors that have rendered the SONGS RSG uniquely vulnerable to *in-plane* FEI. A complete understanding of the causation of the *in-plane* FEI is essential to ensure that the SONGS Unit 2 plant is acceptably safe to restart and, once restarted, predictably safe to continue in operation over the proposed 150 day inspection interval—the understanding presented by SCE is neither comprehensive or convincing.

Large Affidavit at ¶¶ 9.11–12. Accordingly, SCE has not shown any direct connection between the 70% power level and reduced risk of tube failure. It therefore cannot be concluded that this level of power operation is conservative.

In sum, the absence of similar steam generator designs nationally, as well as reliable comparisons based on truly comparable parameters, renders drawing meaningful comparisons between the steam generators at other reactors and those at San Onofre uncertain, if not impossible, with the information presently available.

[41] *Id*. at 16, ¶ 4.

V. ADDITIONAL RESPONSES TO QUESTIONS SUPPLIED BY THE BOARD

Petitioner has answered a number of the Board's questions in the foregoing text, where relevant to the argument. Thus, the answer to question (iii) can be found at page 10–23; the answer to question (v) can be found at page 33–36; the answer to question (vi) can be found at page 36–37; and the answer to question (viii) can be found at page 12–14. In this section, we address those questions that are not addressed elsewhere in the brief.

A. Answer to Board Question (i)

> *In resolving the first issue referred to this Board by the Commission, which party has the burden of persuasion?*[42]

The general rule in NRC practice requires the licensee to bear the ultimate burden of proof. 10 C.F.R. § 2.325 ("the applicant or the proponent of an order has the burden of proof"); *see also, e.g.*, *Metro. Edison Co.* (Three Mile Island Nuclear Station, Unit 1), ALAB-697, 16 NRC 1265, 1271 (1982) (the "licensee generally bears the ultimate burden of proof"). The ultimate burden is on the utility to show that it is operating within its operating license—which SCE has not done here.

Prospective intervenors typically bear the burden of going forward with the evidence—i.e., introducing enough evidence on an issue to have the issue decided by the fact finder rather than against the party in a peremptory ruling—either by direct evidence or cross-examination. *See, e.g.*, *Northeast Nuclear Energy Company*, 53 N.R.C. 22, 27 (2001) (stating that the "proponent of the contention has the initial burden of coming forward with factual issues, not merely conclusory statements and vague allegations," "[a]lthough the ultimate burden of persuasion is on the license applicant"). This "threshold burden," the NRC has said, requires a

[42] December 7 Order at 6.

proponent to "raise any specific, germane, substantial, and material factual issues that are relevant to the…request for a license amendment and that create a basis for calling on the applicant to satisfy the ultimate burden of proof." *Id.*

Courts have found, however, that this burden may not be appropriate where, as here, the information was in the hands of the licensee or NRC Staff and was not made available to petitioner. *See, e.g.*, *York Comm. for a Safe Env't v. NRC*, 527 F.2d 812, 815 n.12 (D.C. Cir. 1975) (where the information necessary to make the relevant assessment is "readily accessible and comprehensible to the license applicant and the Commission staff but not to petitioners, placing the burden of going forward on petitioners appears inappropriate").

The scope of the burden of going forward has also been questioned. In *Vermont Yankee Nuclear Power Corp. v. NRDC*, the United States Supreme Court affirmed the Nuclear Regulatory Commission in finding that the proper standard to apply required intervenors to make a "showing sufficient to require reasonable minds to inquire further," a burden the NRC found to be significantly less than that of making a *prima facie* case. 435 U.S. 519, 554 (1978).

In this case, Petitioner is not able to use cross-examination as a means of introducing evidence, nor does it have access to all of the documents possessed by SCE and the NRC Staff. Nevertheless, Petitioner contends that it has met the burden of going forward with the evidence as articulated in *Vermont Yankee*—a showing sufficient to require reasonable minds to inquire further. This is evident even in the actions of the Commission in convening an ASLB on the basis of FoE's initial petition. And as further demonstrated in this brief, Petitioner has satisfied the initial burden of coming forward with factual issues, not "merely conclusory statements and vague allegations," by supplying rigorous technical analyses from two nuclear engineering experts on the specific issues before the Board, a far cry from vague allegations.

In sum, to the extent that the Board finds it appropriate to assign the typical intervenor's burden of going forward with the evidence—and there is reason to question the appropriateness of even this standard in this instance, for the reasons mentioned above—Petitioner nevertheless contends that it has satisfied this burden, shifting the burden of proof to SCE. The burden is now on SCE to prove that its restart proposal is within the scope of its current operating license.

B. Answer to Board Question (ii)

> *What impact, if any, will the decision of the NRC's Executive Director of Operations, under 10 C.F.R. § 2.206, as to Friends of the Earth's petition, have on the first issue referred to this Board by the Commission?*[43]

Question (ii) of the Board's December 7, 2012 Order asked the parties to brief the impact, if any, of a decision on Petitioner's converted 2.206 petition by the NRC's Executive Director of Operations under 10 C.F.R. § 2.206 on the issue of whether the CAL constitutes a *de facto* license amendment subject to a hearing under Section 189a of the Atomic Energy Act.[44] Petitioner asserts that the 2.206 proceeding will have little, if any, impact on the ASLB proceeding for the following reasons.

Assuming that the Petition Review Board finds that SCE erred in its 10 C.F.R. § 50.59 analysis prior to the manufacture of the replacement steam generators and should have sought a license amendment for a much broader group of changes made to the design of the RSGs, this does not moot the issue now before the Board: it is Petitioner's position that, apart from the historical need for a license amendment, a license amendment is now independently required for the reasons explained in length in Section IV, above.

Notably, the current situation is quite different from one in which a party argues that a license amendment was required several years earlier even though a plant is currently operating

[43] *Id.* at 6.
[44] *Id.* at 1, 6.

without problems. Had a review been done as part of the license amendment process, there is a good chance that the steam generators as designed would not have been licensed. In other words, even if the Petition Review Board found that SCE was required to have applied for a license amendment prior to the installation of the RSGs, SCE could not simply go through an identical license amendment process now because the steam generator tubing and its restraint systems (AVB, RB and TSP) have degraded since the time of its original installation, so much so that the degradation will now have to be taken into account.

The issues now before the Board necessarily involve questions of law and fact that were not present in 2006, when Edison first proposed to replace the steam generators. Thus, even if the Executive Director of Operations were to find that under Section 50.59 SCE was not required to seek a license amendment in 2006, this would not have an impact on the issues presently under consideration by the Board. As Section IV of this brief lays out in detail, SCE's restart proposal requires a license amendment regardless of whether a license amendment was sought in 2006 because SCE's restart plan would, if approved, violate NRC's regulations in Section 50.59 and award SCE greater operating authority than its current license allows. Thus, the basis for seeking a license amendment for the issues presently before the Board is unaffected by a decision either way from the Petition Review Board.

C. Answer to Board Question (iv)

> *Does the Final Safety Analysis Report (FSAR) analyze a steam generator (S/G) tube failure event? If it does, how many tubes are assumed in the analysis and what is the primary-to-secondary leak rate? What is a conservative rate?*[45]

Though FoE does not have access to the complete FSAR, John Large, an expert in the subject, believes that the FSAR does analyze a steam generator tube failure event, specifically, the limiting design basis steam generator tube rupture event involving a single tube bursting.

[45] *Id*. at 6.

Large Affidavit at ¶ 7.10. In accordance with the design and licensing basis, Large expects the design basis to consider a coincident event involving either a: Loss of Coolant Accident; Main Steam Line Break, or Feedwater Line Break with a Safe Shutdown Earthquake, during and after which the tubes in the steam generators are required to maintain structural integrity. Large Affidavit at ¶¶ 7.11–15. SCE's restart proposal, does not, however, appear to include a reassessment of the additional loadings and material stresses on the tubes during a coincident design basis event. Therefore, compliance with the tube structural integrity criterion should be reassessed for the wear indications that are projected to develop during the proposed in-service period.

All in-service, pressurized tubes in both replacement steam generators should be considered in the tube failure analysis, taking account of the tube position and the effectiveness of the AVB restraints for the coincident event analysis. Large Affidavit at ¶ 7.18

The permissible leakage rate for a single tube rupture event is not specified in the Operating License; the operational leakage level is 150 gallons per day. Large Affidavit at ¶ 7.20. Leakage for accident induced events is limited to 0.5 gallons per minute (gpm) per steam generator and 1 gpm for both steam generators. Large Affidavit at ¶ 7.21.

Large does not believe that the "methodology and data available for predicting both the conditions conducive to AVB wear, the wear rate and the eventual loss of AVB effectiveness," required by the Operating License to evaluate the structural integrity of the tubes in advance of the next proposed in-service period, is sufficiently robust. Large Affidavit at ¶ 7.26. In conclusion, Large states that he has:

> [V]ery serious doubts about the reliability of determining the TTW rate and, particularly, the period of time projected for individual tubes to reach a condition that would threaten the structural integrity of individual tubes – the basis of the methodology for arriving at

the time-to-burst requires substantiation of the underlying assumption that the wear rate is a linear and not non-linear phenomenon.

Large Affidavit at ¶ 7.27.

D. Answer to Board Question (vii)

Section 8.0 in the Tube-to-Tube report states that "[t]he desired margin is a projected maximum stability ratio of 0.75 with a 0.95 probability at 50% confidence over the next inspection interval of 5 months." Tube-to-Tube Report at 104. Does a confidence level of 50% meet the reasonable assurance requirement in the regulations?[46]

Large interprets the relevant section of the Tube-to-Tube report [p. 104, ¶1] to apply only to FEI stability at the time of start-up of Unit 2. Large Affidavit at ¶ 10.3. However, the Tube-to-Tube Report acknowledges that ABV wear in Unit 2 will continue to advance in the preventatively plugged zones as the in-service period progresses.[47] This phenomenon of continuing wear affects the predicted 2.5-month in-service, pressurized tube-to-burst time—which is shorter than the proposed inspection interval of 5 months. Large Affidavit at ¶¶ 5.8.13–5.8.25. For these and other reasons, Large does not agree that a confidence level of 50% satisfies the regulatory requirement. Large Affidavit at ¶ 10.2.

E. Answer to Board Question (ix)

In light of [Section 3.5] of the Enforcement Manual, please provide your views of the meaning of the CAL as relevant to the issues in this case, citing case law where appropriate.[48]

As the Board points out in question (ix), "a CAL is not a discrete event occurring in a snapshot of time or consisting of a single piece of correspondence. Rather…a CAL is a dynamic, ongoing process consisting of actions taken by a licensee that are, in turn, reviewed by

[46] *Id.* at 7.
[47] Attachment 6, Appendix B SONGS U2C17 Steam Generator Operational Assessment for Tube-to-Tube Wear 104, ¶1 (Oct. 2, 2012) ("Some effective in-plane supports are needed to maintain a stability ratio of 0.75. In the most limiting case, 4 effective supports are required. This requirement applies to approximately 120 U-bends").
[48] Order (Directing Parties to Brief Additional Issue) (Dec. 21, 2012) (hereinafter "December 21 Order") (unpublished).

the NRC staff."[49] CALs are designed to enforce the terms of an existing license. A CAL is issued to "remove significant concerns about health and safety, safeguards, or the environment."[50] In other words, a CAL is an enforcement tool typically used to address NRC's concerns where a licensee is operating outside the licensing basis and voluntarily agrees to bring the plant back into compliance. The enforcement manual states, "the level of significance of the issues addressed in a CAL [are] such that if a licensee did not agree to meet the commitments in the CAL, the staff would likely proceed to issue an [enforcement] order."[51]

In the case of San Onofre, however, SCE proposes a whole new operating regime in its restart plan, one that is outside of the operating basis contemplated by the existing license. With this restart plan, SCE removes San Onofre from the enforcement context and seeks an amendment to its license, requiring a license amendment proceeding. Thus, for the reasons described in Section IV of this brief, SCE's actions in response to the CAL are a license amendment.

VI. STANDING

Petitioner has standing with respect to the first question before the Board—whether the CAL process is a *de facto* license amendment proceeding—by virtue of the Commission's referral of the question to the Board. NRC regulations set forth specific requirements for standing only for petitions to intervene,[52] not for participation in the disposition of a threshold question referred by the Commission to the Board. Assuming the Board decides the initial question in Petitioner's favor, FoE has standing to participate in such a license amendment proceeding.

[49] December 21 Order at 2.
[50] NRC Policy Statement, Revision to General Statement of Policy and Procedure for Enforcement Actions, 1995 WL 509922, 21 (N.R.C.).
[51] NRC Enforcement Manual, Revision 7, 3–30 (Oct. 1, 2010).
[52] 10 C.F.R. § 2.309(d).

As argued in FoE's June 18, 2012 Petition to Intervene, FoE has standing to participate in any proceeding to amend SCE's license to operate San Onofre Units 2 or 3 as a result of the damaged steam generators in those units.[53] In its Petition, FoE demonstrated credentials as a public interest advocacy organization through a declaration from Marcelin Keever. *See* Declaration of Marcelin Keever at ¶ 2, May 30, 2012 ("Keever Decl."), attached to Petition.[54]

FoE has a nationwide membership of over 9,100 (including 1,900 members in California) and over 140,000 activists. *Id*. at ¶ 4. Among its missions, FoE seeks to ensure the public has an opportunity to influence the outcome of government and corporate decisions that affect the lives of many people. *Id*. at ¶ 7. Since its inception in 1969, FoE has sought to improve the environmental, health, and safety conditions at civil nuclear facilities licensed by the NRC and its predecessor agencies. *Id*. at ¶ 3. To that end, Petitioner utilizes its institutional resources, including legislative advocacy, litigation, and public outreach and education, to minimize the risks that nuclear facilities pose to its members and to the general public. *Id.*

Under the Atomic Energy Act (AEA), the Board must grant a hearing on a license amendment application upon "the request of any person whose interest may be affected by the proceeding, and shall admit any such person as a party to such proceeding." 42 U.S.C. § 2239(a)(1)(A). To support the request, a petitioner must provide the Board with information regarding "(1) the nature of the petitioner's right under the governing statutes to be made a party; (2) the nature of the petitioner's property, financial, or other interest in the proceeding; and (3) the possible effect of any decision or order on the petitioner's interest." *Entergy Nuclear Vermont Yankee, L.L.C., and Entergy Nuclear Operations, Inc. (Vermont Yankee Nuclear Power*

[53] FoE June 18, 2012 Petition to Intervene at 5–9.
[54] These arguments largely repeat Section II of FoE's June 18, 2012 Petition to Intervene. In an abundance of caution, they are included here again in response to the Board's December 7 Order, which requested briefing on this issue but required Petitioner not go beyond the scope of the arguments presented to the Commission in FoE's June 18, 2012 Petition. Order at 6, n.10.

Station), 60 N.R.C. 548, 552 (2004) (citing 10 C.F.R. § 2.309(d)(1)). "The NRC generally uses judicial concepts of standing in interpreting this regulation." *Entergy Nuclear Vermont Yankee,* 60 N.R.C. at 552. Thus, a petitioner may intervene if it can specify facts showing "that (1) it has suffered or will suffer a distinct and palpable harm constituting injury-in-fact within the zone of interests arguably protected by the governing statutes, (2) the injury is fairly traceable to the action being challenged, and (3) the injury will likely be redressed by a favorable determination." *Id.* at 552–53. In determining whether a petitioner has met the requirements for establishing standing, the Board must "construe the petition in favor of the petitioner." *Id.* at 553.

Member organizations such as FoE may intervene on behalf of their members if they can "demonstrate that the licensing action will affect at least one of [their] members, . . . identify that member by name and address, and . . . show that [they are] authorized by that member to request a hearing on his or her behalf." *Id.* In its Petition to Intervene, FoE described the concerns of Lyn Harris Hicks, a member of FoE, who resides at 3908 Calle Ariana, San Clemente, California, 92672. Declaration of Lyn Harris Hicks at ¶ 1, May 29, 2012 ("Hicks Decl."), appended to *FoE Petition to Intervene at Attachment 4*.

Ms. Hicks's declaration describes her personal health, safety, economic, aesthetic, and environmental interests in the proper operation of the San Onofre Nuclear Generating Station and the risk of the harms that SCE's defective steam generators, without further analysis and repair, poses to those interests. She also describes her interest in open government and corporate decision making, which is also at stake in the license amendment proceeding. The Declaration of Mr. Gundersen affirms the engineering basis for Ms. Hicks's concerns. *See* Gundersen Expert Decl, appended to FoE Petition to Intervene at Attachment 4. Ms. Hicks supports FoE's Petition,

and has authorized FoE to intervene in this proceeding and request a hearing on her behalf. Hicks Decl. at ¶ 11, 12.

For over thirty years, Ms. Hicks has lived within about three miles from the San Onofre Nuclear Generating Station. *Id*. at ¶ 1, 3. Thus, Ms. Hicks and her family are at increased risk of serious health effects caused by exposure to radioactivity if the defective steam generators are not properly repaired before the Commission allows them to be restarted. *Id*. at ¶ 8.

In addition to risking the health effects of radiation exposure, Ms. Hicks would suffer substantial devaluation of her property and loss of the enjoyment of the beautiful coastal environment, where her family has lived for decades, in the event of an accident caused by restarting the reactors without a thorough analysis and understanding of the root cause of the existing problems in the steam generators. *Id*. at ¶ 10. She and her family have spent many years enjoying the beautiful beaches of San Clemente. *Id*. at ¶ 5. Both her property value and the aesthetic value of the surrounding area will decline if the steam generators are not operated safely. *Id*. at ¶ 10.

Mr. Gundersen describes in his Declaration the scenarios under which Ms. Hicks could suffer the effects of radiation leaks. Mr. Gundersen details the potential for San Onofre to release radioactivity into the atmosphere as a result of the design flaws in the replacement steam generators up to and including a design basis accident. Gundersen Expert Decl. at ¶¶ 15-18.

As Ms. Hicks has explained, she will suffer a concrete and particularized risk of injuries from the operation of San Onofre Units 2 and 3 with defective steam generators.[55] Petitioner's experts confirm the engineering behind Ms. Hicks's assertions as to these risks, which will occur

[55] So long as a petitioner falls within the zone of interests protected by the statute and alleges harm that is "concrete and particularized," rather than "conjectural" or "hypothetical," the "requisite injury may either be actual *or threatened*." *Crow Butte Res., Inc. (License Amendment for the North Trend Expansion)*, 67 N.R.C. 241, 271 (2008) (emphasis added).

if the reactors are restarted with defective steam generators without sufficient understanding of the cause of the defects and adequate repair. The fact that the NRC Staff have ordered the two units shut down during investigation confirms the risks Ms. Hicks is exposed to if the root cause(s) degrading the steam generator are not fully understood and appropriate action is not taken.

Ms. Hicks also suffers concrete and particularized injury to her interests in transparent government and corporate decision making when the NRC allows SCE to avoid the license amendment process required by the NRC's own regulations. The consequence of this is that neither SCE nor the NRC would provide the public with a root cause analysis of what has happened at San Onofre and explain how, and whether, it can be repaired. Ms. Hicks is at risk of further injury if San Onofre Unit 2 is allowed to restart on an experimental basis at reduced power for five months because SCE has not demonstrated that restarting the Unit under these conditions will ameliorate the increased risk of accidental radiological release and radiation exposure arising from the acknowledged restraint component and tube wear in Units 2.

The Board is capable of granting Petitioner redress by convening a public adjudicatory hearing in which Petitioner has the opportunity to participate as a party. Such a hearing will assure that the Board obtains the benefit of the testimony of Petitioner's witnesses regarding the root cause of the premature deterioration of the San Onofre steam generators and the potential safety implications should be the restart plan be approved. It will also assure the public that the San Onofre reactors will not be restarted until the health and safety of the millions of people who live near the San Onofre plant are safeguarded.

Ms. Hicks's concerns plainly fall within the zone of interests protected by the AEA and its implementing regulations. *Sequoyah Fuels Corp. and General Atomics (Gore, Oklahoma*

Site), 39 N.R.C. 54, 75 (1994) (membership organization granted standing by showing that "the health and safety interests of its members are within the AEA-protected zone of interests"); *Babcock and Wilcox (Apollo, Pennsylvania Fuel Fabrication Facility)*, 37 N.R.C. 72, 80 (1993) (holding that specified "health, safety, and environmental concerns . . . clearly come within the zone of interests safeguarded by the AEA and NEPA").

Ms. Hicks therefore has standing to intervene in her own right: she has met the requirements for injury-in-fact, causation, and redressability, and her concerns fall within the zone of interests protected by the AEA and implementing regulations. She will be affected by the failure of SCE's replacement steam generators, has provided her name and address, and has authorized FoE, of which she is a member, to intervene in this proceeding on her behalf. Thus, Petitioner FoE has standing to pursue this action. *Entergy Nuclear Vermont Yankee,* 60 N.R.C. at 553.

VII. ADMISSIBILITY OF CONTENTION

The Board has asked Petitioner to brief the admissibility of its contention, filed on June 18, 2012. FoE's contention, namely whether SCE should be required to amend its license as a result of defects in the replacement steam generators in Units 2 and 3, was aimed squarely at the same question the Board will have had to decide in the affirmative to reach the issue of admissibility.

In addition, should the Board decide the CAL process is a *de facto* license amendment proceeding, the NRC Staff will be required to notice the proceeding in the *Federal Register* and provide an opportunity for all members of the public to request a public adjudicatory hearing.[56] At that point, FoE, and others, could submit petitions under 10 C.F.R. § 2.309 based on SCE's

[56] 10 C.F.R. § 50.91.

restart plan and proposed changes to San Onofre Unit 2. FoE's June 18, 2012 petition simply could not have accounted for these proposed changes because SCE had not yet issued its restart plan and response to the CAL.

The Board's Order directs Petitioner not to go beyond the scope of its previously filed Standing and Contention arguments. In an abundance of caution,[57] FoE offers the arguments made in its June 18, 2012 petition, along with those in section IV of this brief as additional bases and evidence for its contention.

FoE's petition remains timely and meets the requirements of 10 C.F.R. §2.309(f)(1). Thus, the petition is admissible.

A. FoE's Petition Should Be Considered Pursuant to 10 C.F.R. § 2.309(c)(1)

FoE's Petition to Intervene was timely filed pursuant to 10 C.F.R. § 2.309(c)(1).[58] The balance of the criteria under 10 C.F.R. § 2.309(c)(1) weigh heavily in favor of considering the petition. Each criterion is examined below.

i. Good cause.

Petitioner has shown good cause to become a party to the current San Onofre license amendment proceeding. Petitioner FoE represents a substantial number of members who live within fifty miles of the San Onofre plant and who have an interest in the outcome of the proceeding because whether the licensee is required to fully correct the safety risks created by SCE's replacement steam generators could profoundly affect their health, safety, environmental quality, and economic well-being.

[57] December 7 Order at 6, n.10 (stating "[a]rguments advanced by Friends of the Earth on standing and contention admissibility shall not go beyond the scope of the arguments they presented to the Commission"). The arguments in Section IV fall within the scope of FoE's original Petition because they too address whether SCE has shown that the replacement steam generators can be safely operated within the parameters of the existing license.

[58] 10 C.F.R. § 2.309(c)(1) was amended, effective Sept. 4, 2012. However, because FoE's petition was filed prior to that date, the applicable regulatory text remains the version that was in effect July 31, 2008 to September 3, 2012.

Petitioner FoE has obtained the services of consultants Fairewinds Associates and Large Associates with expertise in nuclear engineering and operation of nuclear power plants. These experts can provide important technical assistance to the Board in understanding the steam generator problems at San Onofre.

ii. Nature of Petitioner's rights under the Atomic Energy Act to be made a party to the proceeding.

Under the Atomic Energy Act (AEA), the Commission must grant a hearing in a proceeding upon "the request of any person whose interest may be affected by the proceeding, and shall admit any such person as a party to such proceeding." 42 U.S.C. § 2239(a)(1)(A). As described in section VI, above, and in the attached declaration, Petitioner's members have economic, aesthetic, health, safety, and environmental interests, and interests in open and transparent government and corporate decision making that they wish to safeguard. The operation of SCE's defective steam generators, without undergoing the proper examination through a public license amendment process, poses a grave threat to those interests.

iii. Nature and extent of Petitioner's property, financial or other interest in the proceeding.

Petitioner's interests in the proceeding are fully described in the attached declaration and in Section VI, above.

iv. Possible effect of any order that may be entered in the proceeding on the Petitioner's interests.

Any order issued by the NRC in this proceeding will have potentially fundamental effects on the interests of Petitioner and its members, such as Lyn Hicks, living in Southern California. As detailed in Report 3 of Petitioner's expert, Fairewinds Associates, the experimental operation of Unit 2 with degraded steam generator tubes increases the risk of a beyond design basis accident, which could cause substantial releases of radioactivity into the air of southern

California. Petitioner's interests, described in Section VI, in the health and physical safety of its members, such as Ms. Hicks, and in the economic well-being and environmental quality of the area surrounding San Onofre are all threatened by such increased risk at the plant. Thus, the order(s) resulting from this proceeding could directly and profoundly affect the interests of Petitioner and its members.

Likewise, an order requiring an adjudicatory hearing on the health, safety and environmental issues associated with restarting the replacement steam generators will affect the Petitioner's interests in open and accountable government and corporate decision making.

v. *Availability of other means whereby the Petitioner's interest will be protected*.

Petitioner's interest will not be protected without a license amendment proceeding affording a rigorous technical review and an opportunity for an adjudicatory public hearing in which FoE may participate as an intervenor. As we have argued in detail in this brief and in our Petition to Intervene, the public meetings that have accompanied the CAL process do not afford FoE the adjudicatory process owed to it under the AEA. No other means exist by which Petitioner will have the opportunity to present expert witnesses or engage in cross-examination.

Nor does the ongoing 2.206 process, convened at the Commission's request, protect Petitioner's interest in the issues now before this Board. The scope of the 2.206 proceeding is strictly about whether a license amendment should have been required when the steam generators were replaced, as the Commission made clear in its referral of this issue. Accordingly, the 2.206 proceeding will not address the issues under consideration by the Board and does not serve as an alternative forum for Petitioner's interest in whether the CAL process, including SCE's restart plan, constitutes a *de facto* license amendment proceeding.

vi. Extent to which Petitioner's interests will be represented by existing parties.

Petitioner's interests will not be represented by either the licensee or the NRC Staff. SCE's economic interest lies in restarting San Onofre Units 2 and 3 as soon as possible. For the reasons stated in Petitioner's Contention 1 and above in Section VI, that approach is at odds with Petitioner's interest in adequately addressing safety risks presented by the root cause of the defects in the replacement steam generators. The NRC Staff involved in that decision may have a vested interest in defending the adequacy of its prior review, given the wealth of facts showing that the Staff erred both technically and legally in allowing the installation of steam generator replacements that were not fit for purpose at San Onofre in the first instance. Accordingly, this interest would detract from taking an objective view of the implications of restarting these now degraded replacement steam generators for public health and safety.

vii. Extent to which the Petitioner's participation will broaden the issues or delay the proceeding.

The issues have now been defined by the Commission's referral and the Board's order. FoE has demonstrated that its participation will neither unduly broaden the issues nor delay the proceeding through its responses to the Board's orders and the preparation of this brief. FoE has demonstrated its ability to contribute to an informed decision by the Board.

viii. Extent to which the Petitioner's participation may reasonably be expected to assist in developing a sound record.

If granted, a hearing on Petitioner's contention would provide an opportunity to assure the public that the NRC has conducted an adequate assessment of the safety of the replacement steam generators at San Onofre, including input and review by independent experts. FoE has retained Mr. Gundersen and Mr. Large to assist in developing the record regarding deficiencies in both the replacement steam generators as designed, as well as in SCE's restart plan. Mr.

Gundersen has produced four technical reports providing analysis on the causes and potential remedies for the steam generator failures. Mr. Large has performed a technical analysis of SCE's restart plan and response to the CAL. Theses experts' wealth of experience in nuclear engineering and the nuclear industry will assist the Commission in deliberating and deciding the correct response to the situation at San Onofre.

B. FoE'S Petition Meets the Criteria of 10 C.F.R. §2.309(f)(1)

FoE's June 18, 2012 Petition to Intervene, together with the additional bases discussed in Section IV, above, present an admissible contention. The following describes how FoE's contention meets the standard for admissibility under 10 C.F.R. § 2.309(f)(1).

i. FoE's Contention provides a specific statement of the issue of law or fact to be raised or controverted

FoE stated in its June 18, 2012 Petition to Intervene, "Petitioner contends that San Onofre cannot be allowed to restart without a license amendment and attendant adjudicatory public hearing as required by 10 C.F.R. § 2.309, in which Petitioner and other members of the public may participate."[59]

ii. FoE provides a brief explanation of the basis for the contention

Petitioner FoE provided ten specific bases for its contention in its June 18th Petition to Intervene. These bases are still appropriate to support intervention in the current license amendment proceeding, in addition to the bases discussed in Section IV, above, related to SCE's response to the CAL and restart plan. For the Board's convenience, Petitioner reproduces the bases listed in the petition:

1. The San Onofre Nuclear Generating Station consists of two twin units, Unit 2 and Unit 3, each of which originally had two recirculating steam generators fabricated by

[59] FoE Petition to Intervene at 16.

Combustion Engineering (the "CE generators"), beginning operation in 1983 and 1984, respectively. In 2009, SCE replaced Unit 2's CE generators with new steam generators designed and fabricated by MHI. Unit 3's replacement steam generators were ordered under the same contract and to the same specifications, and were replaced in 2010.

2. SCE extensively modified the original CE generator design without seeking a license amendment pursuant to 10 C.F.R. § 50.90 in clear violation of 10 C.F.R. § 50.59.

3. There is evidence that a deliberate design objective dictated by SCE was to avoid NRC and public review by claiming the new MHI steam generators were replacements that met the section 50.59 safety criteria enabling licensees to make modifications without having to seek a license amendment. According to engineers at SCE and MHI, "the major premise of the steam generator replacement project was that it would be implemented under the 10 C.F.R. § 50.59 rule, that is, without prior approval" by the NRC.[60]

4. To this end, the SCE's Facility Change Report for San Onofre Units 2 and 3 for the period from December 19, 2008 through February 10, 2011 asserts: "Replacement of the steam generators is a replacement in kind in terms of overall fit, form, and function with no, or minimal, permanent modifications to the plant Safety Systems or Components (SSC)."[61]

5. The Facility Change Report also asserts: "The results of the RSG [Replacement Steam Generators] tube wall thinning analysis are conservative or essentially the same as results from the USFAR described tube wall thinning analysis for the OSGs [Original Steam Generators]. […] It was concluded that this change may be made without prior NRC approval."[62]

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[60] Boguslaw Olek & Tomoyuki Inoue, "Improving Like-for-Like RSGs," *Nuclear Engineering International* 36, 37 (Jan. 2012).
[61] Facility Change Report at 4.
[62] *Id.*

6. Contrary to SCE's claim that the new steam generators were like-for-like replacements, the MHI generators differ significantly from the previous CE model. The key fabrication change in the new generators was the decision to add 377 tubes to each steam generator, increasing the total number of tubes by more than 4%. This significant increase in the number of tubes resulted in a series of subsequent design changes necessary to physically accommodate the additional tubes, including: removing the stay cylinder, which functioned as a support pillar to the tubesheet into which the U-tubes are inserted; thickening the tubesheet to compensate structurally for the removal of the stay cylinder; reducing the volume of water in the steam generator; changing the flow pattern; and reducing the inspection access area below the tubesheet. Gundersen Expert Decl. at ¶¶ 20, 23.1-23.2.

7. These design modifications altered the structural loads on the tubesheet, a critical safety consideration as the tubesheet serves as the key barrier keeping radiation inside the containment. Adding tubes also required increasing the nuclear reactor core flow, on which the original design basis safety calculations for cooling the reactor are based. This flow increase necessitated yet more modifications to control the flow distribution to the tubes, including subsequent changes to the tube supports in an attempt to avoid increased vibration in the tubes. Gundersen Expert Decl. at ¶¶ 23.3-23.5. Notably, increased vibration resulting from the cascading design changes is now hypothesized to be the cause of the rapid tube degradation.

8. Replacement of the original steam generators with a substantially modified steam generator design created risks not considered in the safety analysis that require public review.

9. In SCE's Safety Evaluation assessing whether the proposed changes in the replacement steam generators' design would affect the safety analysis on which San Onofre's license is based, SCE took the position that the design changes would not affect the reactors'

reliability or safety. This evaluation was wrong at the time of the generators' replacement because the new design repeatedly triggered the requirement for a license amendment under 10 C.F.R. § 50.59, as Mr. Gundersen's Declaration demonstrates. Gundersen Expert Decl. at ¶¶ 24-32. The failures of the steam generators at the reactors in 2012 demonstrate dramatically why review of the design and amendment of the license is necessary.

10. The NRC failed to follow its own regulations, in particular 10 C.F.R. § 50.59, which require a formal licensing proceeding be convened and a license amendment granted before changes can be made to the facility that affect the final safety analysis. The NRC failed to follow its own regulations by allowing SCE to replace the steam generators without the requisite proceeding to amend the license. Accordingly, before San Onofre may be cleared to restart, the NRC must undertake a license amendment proceeding, including the adjudicatory public hearing required under 10 C.F.R. § 2.309.[63]

SCE's subsequent response to the CAL and restart plan, as discussed in Section IV, above, provide further bases for FoE's contention. According to the NRC Practice and Procedure Digest, if an intervenor becomes aware of information after filing a contention, such information would be relevant if it falls within the "envelope," "reach," or "focus" of the contention when "read with the original bases offered for it." NRC Practice and Procedure Digest, 97 (June 2011).[64] SCE released its response to the CAL and restart plan on October 3, 2012, nearly four months after FoE filed its Petition to Intervene. Those SCE documents provide further justification, as described above, for FoE's contention that the serious safety issues

[63] *See* FoE Petition to Intervene at 16–18.
[64] The Digest cites the following case law to support this point: *Duke Energy Corp. (Catawba Nuclear Station, Units 1 & 2*), LBP-04-12, 59 NRC 388, 391 (2004) (characterizing *Duke Energy Corp. (McGuire Nuclear Station, Units 1 & 2; Catawba Nuclear Station, Units 1 & 2*), CLI-02-28, 56 NRC 373, 379 (2002) *and Pub. Serv. Co. of New Hampshire (Seabrook Station, Units 1 & 2*), ALAB-899, 28 NRC 93, 97 (1988), *aff'd sub nom. Massachusetts v. NRC*, 924 F.2d 311 (D.C. Cir. 1991), *cert. denied*, 502 U.S. 899 (1991)). NRC Practice and Procedure Digest 97 (June 2011).

presented by SCE's restart plan should be rigorously examined by the Board in an adjudicatory public hearing.

iii. FoE demonstrates that the issue raised in the contention is within the scope of the proceeding

FoE's Petition was filed well before the scope of the proceeding was determined by the Commission. Nevertheless, FoE's contention is within the scope of the proceeding. The Board announced in a December 3, 2012 scheduling conference call that, "Our understanding is that the Commission expects us to determine whether or not a license amendment is required."[65] FoE's contention goes to the heart of that question and provides the basis for determining whether a license amendment is necessary prior to restarting Units 2 or 3.

iv. FoE demonstrates 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

The central issue raised by FoE's contention is that SCE must obtain a license amendment prior to restarting either Units 2 or 3. Certainly, SCE's actions related to both the design and installation of the replacement steam generators and the evaluation of the failures of those generators, as analyzed above, are material to the findings the NRC must make to determine how SCE's license should be appropriately amended.

v. FoE provides a concise statement of the alleged facts or expert opinions which support the requestor's/petitioner's position on the issue and on which the petitioner intends to rely at hearing, together with references to the specific sources and documents on which the requestor/petitioner intends to rely to support its position on the issue

This information is provided in FoE's June 18, 2012 Petition to Intervene in paragraphs 11-21 and in Section IV, above.

[65] Transcript of Scheduling Call with Board at p. 11 (Dec. 3, 2012).

vi. FoE provides sufficient information to show that a genuine dispute exists with the applicant/licensee on a material issue of law or fact.

As is apparent from FoE's June 18, 2012 Petition to Intervene and Section IV, above, FoE and SCE disagree on the fundamental question of whether a license amendment is necessary prior to restarting San Onofre Units 2 and 3. FoE and SCE also disagree about the underlying factual questions, such as whether SCE's restart plan and response to the CAL adequately address the root causes of the replacement steam generator failures.

VIII. CONCLUSION AND PRAYER FOR RELIEF

Under NRC regulations and both administrative and federal court precedent, the NRC's CAL process constitutes a *de facto* proceeding to amend the operating license for San Onofre. Upon reaching that conclusion, the Board should direct the NRC Staff to convene a license amendment proceeding, with an adjudicatory public hearing, to consider whether or not San Onofre's license for Unit 2 should be amended to allow operation as proposed by SCE in the restart plan. The Board should also prohibit SCE from restarting Unit 2 or 3 until SCE applies for and receives an amendment to the license.

Petitioner has demonstrated standing to participate in the license amendment proceeding and FoE's petition to intervene in the licensing proceeding should be granted.

Respectfully submitted,
/Signed (electronically) by/
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ATTACHMENT 1: Affidavit of John Large (Redacted)

ATTACHMENT 2: Affidavit of Arnold Gundersen

ATTACHMENT 3: "Hirsch Report"

ATTACHMENT 4: June 18, 2012 Petition to Intervene and Supporting Declarations

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	Docket Nos. 50-361-CAL
	)	& 50-362-CAL
SOUTHERN CALIFORNIA EDISON CO.	)	
	)	ASLBP NO. 13-924-01-CAL-BD01
(San Onofre Nuclear Generating Station,	)	
Units 2 and 3)	)	January 11, 2012
	)	

CERTIFICATE OF SERVICE

I hereby certify that, on this date, the "Opening Brief of Petitioner Friends of the Earth" and accompanying attachments were filed through the E-Filing system.

Signed (electronically) by Richard Ayres

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