

whether the NRC understands and corrects the root causes of the steam generator failures that have happened at San Onofre.

Pursuant to 10 C.F.R. § 2.309, Petitioner hereby petitions to intervene and requests a hearing in the NRC proceeding to amend the operating license for Southern California Edison's (SCE, or Licensee) San Onofre plant. The outcome of the current proceeding could jeopardize the Petitioner's interests, which are detailed below in Section II. Petitioner sets forth its contentions in Section IV.

Petitioner asserts that under 10 C.F.R. § 50.59 the San Onofre replacement steam generators may not be operated without an amendment to the San Onofre operating license.² It asks that the Commission either recognize that the current Confirmatory Action Letter (CAL) process is in fact a license amendment proceeding under 10 C.F.R. § 2.309 and 42 U.S.C. § 2239, or convene such a license amendment proceeding under these authorities or under the Commission's inherent supervisory authority over the nuclear industry.³ Petitioner further requests that it be given status as a party in such proceeding, and that, pursuant to 10 C.F.R. § 2.309, the Commission provide an adjudicatory public hearing with respect to the causes and potential remedies for the failure of the replacement steam generators at San Onofre.

² SCE's amendments to the licenses for Unit 2 and Unit 3, proposed on June 27, 2008 and approved on June 25, 2009, are insufficient to address all of the changes Edison made in the replacement steam generators. The license amendment application clearly states: "The proposed changes reflect revised [steam generator] inspection and repair criteria and revised peak containment post-accident pressure resulting from installation of the replacement [steam generators]." The application does not include any request to amend the licenses with regard to major design changes such as removal of the stay cylinder, replacement of the egg crate tube support with a broached plate tube support, or the thickening of the tube sheet. Thus, the previous license amendment was incomplete and additional amendments are required before the replacement steam generators can be allowed to restart. Letter from Southern California Edison Company to the Nuclear Regulatory Commission re "Amendment Application Numbers 252 and 283," 2 (June 27, 2008); Letter from James Hall, Nuclear Regulatory Commission to Ross T. Ridenoure, Southern California Edison Company re "San Onofre Nuclear Generating Station, Units 2 and 3- Issuance of Amendments Re: Technical Specification Changes in Support of Steam Generator Replacement (TAC Nos. MD9160 and MD9161)" (June 25, 2009).

³ See *Statement of Policy on Conduct of Adjudicatory Proceedings*, 48 N.R.C. 18, 20, 1998 WL 518232 (N.R.C.); *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), CLI-90-3, 31 NRC 219, 229 (1990).

As will be shown below, operating San Onofre after SCE replaced the steam generators six years ago without a license amendment and § 2.309 proceeding was improper under NRC regulations. The failure of the replacement steam generators has only made that impropriety more obvious. Though SCE apparently convinced itself that it did not have to seek a license amendment for the replacement steam generators,⁴ the major changes in the steam generators proposed by SCE created risks not considered in the Updated Final Safety Analysis Report (UFSAR). Under 10 C.F.R. § 50.59, these changes triggered the Commission's obligation to convene a formal license amendment proceeding.⁵

Only two years after the installation of the replacement steam generators it has become apparent that the changes in the steam generators have resulted in risks not considered in the UFSAR. The excessive degradation of the SG tubes in both units and the tube rupture in Unit 3 demonstrate graphically the new safety issues created, but never analyzed, by the licensee or the NRC. Thus, San Onofre Units 2 and 3 may not properly be restarted until the Commission approves a license amendment under the process provided in 10 C.F.R. § 2.309.

It is immaterial that NRC staff has not called its current action a "license amendment proceeding," since that is the function served by the NRC's current activity and what is required by NRC's own regulations. *See, e.g., Brodsky v. U.S. Nuclear Regulatory Com'n*, 578 F.3d 175 (2009), quoting *Columbia Broad. Sys., Inc. v. United States*, 316 U.S. 407, 416 (1942) ("The particular label placed upon [an order] by [an agency] is not necessarily conclusive, for it is the

⁴ *See* Boguslaw Olek & Tomoyuki Inoue, "Improving Like-for-Like RSGs," *Nuclear Engineering International* 36, 37 (Jan. 2012) ("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"). In the end, SCE sought and received minor licensing amendments that encompass neither the full suite of changes nor the most significant structural alterations made to the design of the replacement steam generators.

⁵ To date, the NRC has sought to treat the failure of the steam generators as an enforcement matter, but this approach lacks credibility and legal authority, given that the poorly performing and potentially hazardous steam generator replacements are currently outside the approved licensing basis for the plant.

substance of what the [agency] has purported to do and has done which is decisive”). Where changes of the magnitude of those at San Onofre are made, the NRC’s own regulation requires the licensee to apply for a license amendment, which requires the NRC to evaluate its effect on the safety of the plant and hold a public hearing if requested so that the public may evaluate the safety risks associated with the proposed changes. While the federal courts often defer to an agency’s procedural determinations, they will not permit an agency to ignore its own regulations. *Auer v. Robbins*, 519 U.S. 452, 461 (1997) (finding that an agency’s application of its own regulations is “controlling unless plainly erroneous or inconsistent with the regulation[s]”).

To support Petitioner’s contention, the Declaration from Mr. Arnold Gundersen, MSNE, a nuclear engineer with Fairewinds Associates, is attached.⁶ A former nuclear industry Senior Vice President, Mr. Gundersen earned his Bachelor's and Master's Degrees in nuclear engineering and was a licensed reactor operator during a twenty-year career in the nuclear industry. During his nuclear industry career, Mr. Gundersen reviewed projects at seventy nuclear plants and was frequently called upon to testify to the NRC and Congressional and State officials on nuclear power operations. He was also an expert witness in the cases involving Three Mile Island, Western Atlas, Peach Bottom, and Florida Power and Light.

In addition to the Declaration Mr. Gundersen has provided, he has authored three expert reports providing an analysis of the reasons for the tube degradation and rupture at San Onofre and offering an assessment of possible technical solutions.⁷ Mr. Gunderson’s third report from May 11th, 2012, entitled “San Onofre’s Steam Generator Failures Could Have Been Prevented,”

⁶ Fairewinds Associates is a nuclear safety firm retained as a consultant to Petitioner. Mr. Gunderson is the Chief Engineer at Fairewinds Associates.

⁷ Arnie Gunderson, Fairewinds Associates, Inc., STEAM GENERATOR FAILURES AT SAN ONOFRE (Mar. 2012); SAN ONOFRE CASCADING GENERATOR FAILURES CREATED BY EDISON (Apr. 10, 2012); and WHY SAN ONOFRE STEAM GENERATORS ARE NOT “LIKE-FOR-LIKE” (May 4, 2012).

contains extensive analysis of the steam generator design changes likely responsible for the vibration causing the tube degradation and failures, as well as the options for continued operation of the reactors.

II. STANDING

FOE is a national non-profit environmental organization headquartered and incorporated in the District of Columbia with an office in San Francisco, California. Declaration of Marcelin Keever at ¶ 2, May 30, 2012 (“Keever Decl.”). 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, FOE 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 Commission 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 Commission 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 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 Commission “construe[s] 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.* Lyn Harris Hicks, a member of FOE, resides at 3908 Calle Ariana, San Clemente, California, 92672. Declaration of Lyn Harris Hicks at ¶ 1, May 29, 2012 (“Hicks Decl.”). 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 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 this proceeding. The Declaration of Mr. Gundersen affirms the engineering basis for Ms. Hicks’s concerns. *See* Gundersen Expert Decl. Ms. Hicks supports this 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 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 thorough analysis 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.

Petitioner's expert, Mr. Gundersen, discusses 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. 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.⁸ Petitioner's experts confirm the engineering behind Ms. Hicks's assertions as to these risks, which will occur 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

⁸ 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).

cause(s) degrading the steam generator are not fully understood and appropriate action 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 in the NRC's own regulations, and, as consequence, neither SCE nor the NRC is required to provide the public with a root cause analysis of what has happened at San Onofre and explain how, and whether, it can be repaired.

The Commission is capable of granting the Petitioner redress by requiring SCE to undergo the license amendment process of 10 C.F.R. § 2.309, including convening a public adjudicatory hearing in which Petitioner has the opportunity to participate as a party. Such a hearing will assure that the Commission obtains the benefit of the testimony of Petitioner's witnesses regarding the root cause of the untimely deterioration of the San Onofre steam generators. 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 will be protected.

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.

III. TIMELINESS

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.

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.

As described above, Petitioner FOE has retained the services of consultant Fairewinds Associates with expertise in nuclear engineering and operation of nuclear power plants. Mr. Gunderson can provide important expert assistance to the NRC in understanding and correcting the steam generator problems at San Onofre.

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 II, 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. Operation of SCE's defective steam generators, without undergoing the proper license amendment process, poses a grave threat to those interests.

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 II, above.

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, a catastrophic failure of the San Onofre steam generators that resulted in cascading tube failure could cause substantial releases of radioactivity into the air of southern California. Petitioner's interests, described in Section II, in the health and physical safety of its members, such as Ms. Hicks, and the economic well-being, and environmental quality of the area surrounding San Onofre are all potentially threatened by the current situation at the plant, where a radioactive release has already occurred. Whether the order(s) resulting from this proceeding are adequate to assure that the San Onofre reactor is safe to operate thus could directly and profoundly affect the interests of Petitioner and its members.

Likewise, an order requiring that SCE amend its license to account for the potential effects on public health and safety and the environment related to the replacement steam generators, and requiring an adjudicatory hearing on the health, safety and environmental issues

associated with the replacement steam generators, will affect the Petitioner's interests in open and accountable government and corporate decision making.

Availability of other means whereby the Petitioner's interest will be protected. The CAL issued by the NRC is not sufficient to protect Petitioner's interest. Foremost, the CAL merely restates SCE's description of the steam generator problems and the commitments SCE made as of March 23, 2012 to rectify the issues at Units 2 and 3. The CAL, issued only four days later, shows no independent analysis by the NRC, nor does it require anything further than what the licensee had itself volunteered. Thus, the CAL simply reiterates the licensee's plan for managing the technical issues at the reactors and facilitating an expeditious restart; it does not demonstrate that the NRC, as the regulator, has intervened on behalf of the public to require any particular action by the licensee to ensure that both reactor units will operate safely prior to restart.

The current situation at San Onofre may be seen as result of a too close and closed relationship between the NRC staff and the licensee. While the Petitioner does not know the full details of that relationship on the steam generator matter, it is apparent already that the licensee went to considerable trouble in an attempt to avoid any public review of its decision to install significantly different steam generators built by a company that was unfamiliar with the particular needs of a steam generator in the San Onofre type of reactor, and that the NRC staff willingly acceded. As detailed in Mr. Gundersen's Declaration, under NRC regulation 10 C.F.R. § 50.59 it is clear that a formal license amendment was required. Gundersen Expert Decl. at ¶¶ 24-32. Yet the NRC mutely accepted the licensee's incorrect conclusion that no license amendment was called for.

The requirements of the license amendment process recognize that for the NRC to do its job it must keep the public informed. Even the best technical oversight is insufficient if the

public does not have the opportunity to participate to ensure its interests are being protected. While it makes no sense to require a public proceeding on every change a licensee makes to a nuclear power plant, a nearly \$671 million entire replacement of one of the major structures that determines whether the public health and safety will be protected is not a minor change. The NRC's CAL fails to provide the public involvement that NRC regulations, *e.g.*, 10 C.F.R. § 2.309, require. By passively accepting the licensee's self-evident misreading of 10 C.F.R. § 50.59 to avoid any public process, the NRC failed to do its job. Now, with the potentially dangerous results of that failure apparent, the Commission needs to reassure the public by providing an adjudicatory public hearing. Speaking for the public, Petitioner's interests are not satisfied by the continuation of the private conversation between the licensee and the Commission that has produced the failure of the San Onofre steam generators; nor are Petitioner's interests satisfied by the promised public meetings, which do not offer the kind of procedure guaranteed by 42 U.S.C. § 2239 and 10 C.F.R. § 2.309.

The CAL, a mere restatement of the licensee's conclusion about what actions are necessary, does not afford meaningful opportunity for independent technical evaluation of the adequacy of the fixes proposed to be adopted and for public participation in the form of an opportunity for an adjudicatory hearing. As one might suppose from a document that is devoid of any directive originated from the expert government agency entrusted with ensuring the safe commercial operation of nuclear power plants, the CAL also does not adequately assure the public of the safety of the replacement steam generators, in particular because it does not require a root cause analysis of the excessive tube vibration and resulting untimely wear.

Lastly, the Augmented Inspection Team (AIT) ordered by the CAL to "assess the circumstances surrounding the tube leak and unexpected wear of tubes in the Unit 3 steam

generators”⁹ is insufficient to protect the Petitioner’s interests. First, the AIT investigation does not reflect the reality that severe tube wear was discovered in both Unit 2 and Unit 3.

Petitioner’s interest lies in assuring the adequate safety of *both* units, not just Unit 3. Second, the AIT charter does not include an assessment of whether SCE illegally skirted the license amendment process by incorrectly asserting that no amendment is necessary for the major design changes it made to the replacement steam generators under the criteria of 10 C.F.R. § 50.59.¹⁰

Third, while the AIT has promised public meetings to review the AIT’s report, such meetings are not an adequate substitute for the kind of adjudicatory public hearing available under 10 C.F.R. § 2.309. Petitioner requests a hearing on the root cause of the rapid tube wear in *both* Unit 2 and Unit 3, with the ability to participate in review of the safety issues using adjudicatory procedures. The kind of public meetings the Commission promises will not provide Petitioner with the hearing contemplated by 10 C.F.R. § 2.309 (*see, e.g.*, 10 C.F.R. § 2.310 (detailing the required procedures for hearings granted under § 2.309)). For these reasons, there are no other means outside the requested proceeding by which Petitioner’s interests can be protected.¹¹

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. The continuing failure of both SCE and the NRC staff to recognize the need for a public adjudicatory hearing on a matter of such concern demonstrates that neither can represent the interests of the Petitioner.

⁹ Memorandum to Gregory Werner, Chief, Plant Support Branch 2, Division of Reactor Safety from Elmo Collins, Regional Administrator, Region IV, “Augmented Inspection Team Charter to Evaluate the Steam Generator Tube Integrity Issues at San Onofre Nuclear Generating Station Unit 3, Revision 1,” at 1 (May 16, 2012).

¹⁰ *Id.*

¹¹ Petitioner’s request is properly before the Commission under 10 C.F.R. §2.309 rather than 10 C.F.R. §2.206 for two reasons. First, Petitioner is requesting the opportunity to participate in a license amendment proceeding. Section 2.206 does not provide for such a request. It instead offers the public a means by which to request enforcement action by NRC. Second, there is no authority under §2.206 for the staff to entertain requests for public participation in a proceeding. Section 2.309, on the other hand specifically provides that authority.

SCE's economic interest lies in restarting San Onofre Units 2 and 3 as soon as possible. For the reasons stated in this petition, specifically in Contention 1, 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. Given the prima facie case that it may have erred both technically and legally in allowing installation of substantially modified steam generator replacements at San Onofre, the NRC staff involved in that decision may have a vested interest in defending the adequacy of its prior review, and this interest would detract from taking a clear-eyed objective view of the implications of this troubled steam generator replacement for public health and safety.

The NRC has given no indication to date that it plans to afford the public this adjudicatory hearing opportunity. Thus, Petitioner's interests are not represented by existing parties to the proceeding.

Extent to which the Petitioner's participation will broaden the issues or delay the proceeding. Of its own accord, the NRC has already ordered Units 2 and 3 to remain shut down until the internal technical evaluations formalized in the CAL are completed. Petitioner simply asks that the NRC follow its established public procedures for considering a license amendment application with respect to the replacement of all four steam generators in San Onofre Units 2 and 3 with ones that contain a significantly different design than the original generators. Although Petitioner brings new information and perspective, it wishes to focus on the safe operation of the replacement steam generators.

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 contentions 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 to assist in developing the record regarding the problems with the steam generator replacements, and to date Mr. Gundersen has produced three technical reports, referenced above, providing analysis on the causes and potential remedies for the steam generator failures. His 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.

IV. ADDITIONAL COMMISSION AUTHORITY

In addition to its authority to convene a license amendment proceeding under 10 C.F.R. § 2.309, the Commission can convene such a proceeding, including an adjudicatory public hearing, under its inherent supervisory authority.¹² In the interest of assuring adequate protection of the health and safety of the public, the Commission must consider what amendment(s) to the license is/are required by the cumulative changes made to the replacement generators, both in their original design and manufacture and in response to the recently revealed tube wall erosion, rupture, and vibration problems.

¹² *See supra*, n. 3.

V. CONTENTION

CONTENTION 1

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

BASES FOR CONTENTION:

1. The San Onofre Nuclear Operating Station consists of two twin units, Unit 2 and Unit 3, each of which originally had two recirculating steam generators fabricated by 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 Mitsubishi Heavy Industries (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 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 shared by SCE and MHI was to avoid NRC 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.¹³

¹³ Boguslaw Olek & Tomoyuki Inoue, “Improving Like-for-Like RSGs,” *Nuclear Engineering International* 36, 37 (Jan. 2012).

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)." Facility Change Report at 4.

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." Facility Change Report at 4.

6. Contrary to SCE's claim that the new steam generators were in-kind replacements, the MHI generators differ significantly from the previous CE model. The key fabrication change in the new generators was the decision to add almost 400 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 generator's 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 showed 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.

SUPPORTING EVIDENCE

A. UNDER NRC REGULATION 10 C.F.R. § 50.59, THE NRC CONTINUES TO BE OBLIGED TO REQUIRE A LICENSE AMENDMENT BEFORE SAN ONOFRE UNITS 2 AND 3 MAY BE RESTARTED

11. Under 10 C.F.R. § 50.59, a licensee is required to obtain a license amendment if the proposed modification meets any one of eight criteria affecting the existing safety analysis as enumerated in subpart (c)(2) of section 50.59. The criteria, in part, require an amendment when the proposed changes would:

- a. Create a possibility for an accident of a different type than any previously evaluated in the final safety analysis report [(FSAR)] (as updated);
- b. Create a possibility for a malfunction of an SSC [system, structure, or component] important to safety with a different result than any previously evaluated in the final safety analysis report (as updated);
- c. Result in a departure from a method of evaluation described in the FSAR (as updated) used in establishing the design bases or in the safety analyses.

12. The design of the replacement steam generators at San Onofre met the criteria that trigger a license amendment thirty-nine separate times. Gundersen Expert Decl. at ¶ 32. Thus, the replacement of the steam generators at San Onofre triggered an obligation that the NRC determine, through a license amendment proceeding, whether the new design was safe.

13. As an example, SCE's removal of the stay cylinder alone meets at least three of the criteria in section 50.59. Each criterion independently triggers the requirement to seek a license amendment. As has now become apparent, the removal of the stay cylinder alone

increased the possibility of a structural malfunction or a different type of accident than previously analyzed as a result of the changes in structural loading. While every one of the regulation's eight triggering criteria has since been subsequently manifested through the failures at San Onofre in 2012, even at the time of replacement the changes SCE proposed required it to seek a license amendment under section 50.59. Gundersen Expert Decl. at ¶ 32.

14. Despite their own regulations, the NRC staff failed to require SCE to propose a formal license amendment. Had a license amendment proceeding been convened, it is likely that the NRC staff would have understood the important safety-related changes SCE planned, and the untimely tube degradation and radioactivity leak might have been avoided.

B. FAILURES IN TUBE INTEGRITY AND REACTOR PERFORMANCE AT SAN ONOFRE IN 2012 DEMONSTRATE THE NEED FOR A PUBLIC REVIEW OF THE SAFETY OF SAN ONOFRE, INCLUDING A ROOT CAUSE ANALYSIS OF THE TUBE FAILURES AND REVIEW OF NECESSARY DESIGN CHANGES IN THE SAN ONOFRE STEAM GENERATORS

15. SCE's assertion that the design modifications would have no impact on safety and reliability have also proven to be wrong in practice, as evidenced by the current inoperability of both reactors and the uncontrolled radioactive leak from Unit 3 into the environment. SCE's claim that the new MHI steam generators are replacements "in-kind" has thus been demonstrated empirically to be incorrect. Gundersen Expert Decl. at ¶ 32.

16. As explained further in Mr. Gundersen's Declaration, had the NRC conducted a review of the SG replacement design, it would have identified inadequacies in MHI's and SCE's analysis and design that could have prevented the present situation. Specifically, the NRC would have identified the inadequacy of the MHI computer codes applied to validate the tube design and vibration pattern prior to fabrication. MHI has had very little experience with the type of CE

reactor design at San Onofre, in particular the tight tube pitch and unique egg crate tube supports in the original SGs that kept the tubes from vibrating and colliding, and which MHI changed to broached plate tube supports in the replacement steam generator design. The computer code MHI used for design validation simply was not capable of analyzing the reactor design at San Onofre; rather, the code was qualified only for Westinghouse generators, which are not similar to CE generators. Review by the NRC would have identified this and other deficiencies, and is now necessary to rectify the public safety problem the generators present in their current state. *Id.* at ¶ 39-41.

17. A root cause analysis is necessary to determine the cause of the tubal degradation and failure, and to identify what design changes are needed to assure safe operation of the replacement steam generators. To this end, a public hearing process would enable experts such as Mr. Gundersen to contribute their knowledge of the current steam generator problem to the NRC's diagnostic work. Mr. Gundersen explains in his Declaration how the flow resistance of the broached plate designed by MHI is much higher than the original CE egg crate design because of the reduced spacing of the tubes in the broached plate. *Id.* at ¶ 33, 34. This key design difference between the old and new steam generators that both MHI and SCE missed has resulted in almost no water reaching the top of the steam generator, creating regions where the U-tubes are almost dry. Without liquid in the mixture, there is no damping against vibration, resulting in a severe fluid-elastic instability. A fundamental problem in the steam generator causing the vibration and, consequently, the tube wear is that there is too much steam and too little water at the top of the steam generators in the U-bend region. *Id.* at ¶ 35-38.

18. SCE has begun plugging damaged tubes in an attempt to return the reactor units to service quickly. This solution is inadequate, as Mr. Gundersen's analysis of the problem

demonstrates: plugging tubes will not address the root cause of the vibration and therefore additional large numbers of tubes will continue to degrade rapidly or rupture, leaving the public perpetually at risk. *Id.* at ¶ 43. Further, even if the tubes are not leaking or have not ruptured, they are at risk of bursting in a main steam line accident scenario. If a steam line break accident were to occur, the depressurization of the steam generator caused by the steam line break, coupled with the lack of water at the top of the steam generators, would cause cascading tube failures resulting in a massive radiation leak. *Id.* at ¶ 44. Plugging tubes as a solution fails to address the design deficiency causing the vibration and thus will never be sufficient to ensure the safety of the reactors. Input from experts like Mr. Gundersen will assist the Commission in determining an appropriate solution to the tube wear following a root cause analysis.

19. The magnitude of the risks to public health and safety from the excessive and rapid tube degradation at San Onofre is too great for too many people to be dealt with without public participation. The current shutdown and potentially very large financial penalty for replacing or repairing the steam generators is the result of a closed process including only the licensee and the NRC staff. An open hearing will allow the Commission to obtain the valuable insights of experts outside SCE and NRC staff. It will also help to assure the public that their health and safety are not being compromised behind closed doors.

20. The real-world evidence now available proving that the replacement steam generators meet the section 50.59 criteria triggering the licensing amendment process provides further reason for the Commission to require a formal adjudicative hearing at this time and allow parties such as Petitioner full rights of participation as contemplated in 10 C.F.R. § 2.309.

21. This Contention is supported by the Expert Declaration attached hereto. Specific paragraphs of the Declaration that support each basis are identified following each basis, and the Declaration as a whole is also generally supportive of the Contention.

VI. CONCLUSION

For the foregoing reasons, Petitioner has demonstrated that it has standing and that its contention should be admitted. Under 10 C.F.R. § 50.59, the cumulative changes in the licensing basis of San Onofre, carried out to accommodate substantially modified steam generators, necessitate a formal license amendment proceeding. The Commission should either clarify that the CAL process is a license amendment proceeding convened under 10 C.F.R. § 2.309 requiring an adjudicatory hearing, or in the alternative, pursuant to § 50.59 and its inherent supervisory authority¹⁴ find that such a proceeding is in the public interest to fulfill the NRC's mandate to ensure adequate protection of the public health and safety. The Petitioner should be permitted to intervene in this proceeding and is entitled under 10 C.F.R. §2.309 to a hearing on its contention.

Respectfully submitted,

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¹⁴ See *supra* note 3.

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