

January 8, 2013

10 CFR 50.4

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: **Docket No. 50-361
Response to Request for Additional Information (RAI 1)
Regarding Confirmatory Action Letter Response
(TAC No. ME 9727)
San Onofre Nuclear Generating Station, Unit 2**

- References:
1. Letter from Mr. Elmo E. Collins (USNRC) to Mr. Peter T. Dietrich (SCE), dated March 27, 2012, Confirmatory Action Letter 4-12-001, San Onofre Nuclear Generating Station, Units 2 and 3, Commitments to Address Steam Generator Tube Degradation
 2. Letter from Mr. Peter T. Dietrich (SCE) to Mr. Elmo E. Collins (USNRC), dated October 3, 2012, Confirmatory Action Letter – Actions to Address Steam Generator Tube Degradation, San Onofre Nuclear Generating Station, Unit 2
 3. Letter from Mr. James R. Hall (USNRC) to Mr. Peter T. Dietrich (SCE), dated December 26, 2012, Request for Additional Information Regarding Response to Confirmatory Action Letter, San Onofre Nuclear Generating Station, Unit 2

Dear Sir or Madam,

On March 27, 2012, the Nuclear Regulatory Commission (NRC) issued a Confirmatory Action Letter (CAL) (Reference 1) to Southern California Edison (SCE) describing actions that the NRC and SCE agreed would be completed to address issues identified in the steam generator tubes of San Onofre Nuclear Generating Station (SONGS) Units 2 and 3. In a letter to the NRC dated October 3, 2012 (Reference 2), SCE reported completion of the Unit 2 CAL actions and included a Return to Service Report (RTSR) that provided details of their completion.

By letter dated December 26, 2012 (Reference 3), the NRC issued Requests for Additional Information (RAIs) regarding the CAL response. Enclosure 2 of this letter provides the response to RAI 1.

Enclosure 2 of this submittal contains proprietary information. SCE requests that this proprietary enclosure be withheld from public disclosure in accordance with 10 CFR 2.390(a)(4). Enclosure 1 provides notarized affidavits from Mitsubishi Heavy Industries (MHI) and AREVA, which set forth the basis on which the information in Enclosure 2 may be withheld from public

**Proprietary Information
Withhold from Public Disclosure
Decontrolled Upon Removal From Enclosure 2**

IE 36
NRR

**Proprietary Information
Withhold from Public Disclosure**

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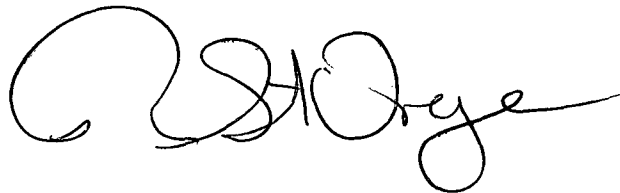
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disclosure by the NRC and address with specificity the considerations listed by paragraph (b)(4) of 10 CFR 2.390. Proprietary information identified in Enclosure 2 was extracted from MHI Report L5-04GA567, Evaluation of Stability Ratio for Return to Service and AREVA report 51-9187230, SONGS U2C17 Steam Generator Operational Assessment for Tube-to-Tube Wear, which are addressed in the affidavits. Enclosure 3 provides the non-proprietary version of Enclosure 2.

There are no new regulatory commitments contained in this letter. If you have any questions or require additional information, please call me at (949) 368-6240.

Sincerely,

A handwritten signature in black ink, appearing to read "R. E. Lantz". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Enclosures:

1. Notarized Affidavits
2. Response to RAI 1 (Proprietary)
3. Response to RAI 1 (Non-proprietary)

cc: E. E. Collins, Regional Administrator, NRC Region IV
R. Hall, NRC Project Manager, San Onofre Units 2 and 3
G. G. Warnick, NRC Senior Resident Inspector, San Onofre Units 2 and 3
R. E. Lantz, Branch Chief, Division of Reactor Projects, NRC Region IV

**Proprietary Information
Withhold from Public Disclosure
Decontrolled Upon Removal From Enclosure 2**

ENCLOSURE 1

Notarized Affidavits

MITSUBISHI HEAVY INDUSTRIES, LTD.

AFFIDAVIT

I, Jinichi Miyaguchi, state as follows:

1. I am Director, Nuclear Plant Component Designing Department, of Mitsubishi Heavy Industries, Ltd. ("MHI"), and have been delegated the function of reviewing the referenced MHI technical documentation to determine whether it contains information that should be withheld from public disclosure pursuant to 10 C.F.R. § 2.390 (a)(4) as trade secrets and commercial or financial information that is privileged or confidential.
2. In accordance with my responsibilities, I have determined that the following MHI document contains MHI proprietary information that should be withheld from public disclosure pursuant to 10 C.F.R. § 2.390 (a)(4). Those pages of the document containing proprietary information have been bracketed with an open and closed bracket as shown here "[]" / and should be withheld from public disclosure.

MHI document

Document: L5-04GA567

3. The information identified as proprietary in the enclosed document has in the past been, and will continue to be, held in confidence by MHI and its disclosure outside the company is limited to regulatory bodies, customers and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and is always subject to suitable measures to protect it from unauthorized use or disclosure.
4. The basis for holding the referenced information confidential is that it describes unique design, manufacturing, experimental and investigative information developed by MHI and not used in the exact form by any of MHI's competitors. This information was developed at significant cost to MHI, since it is the result of an intensive MHI effort.
5. The referenced information was furnished to the Nuclear Regulatory Commission ("NRC") in confidence and solely for the purpose of information to the NRC staff.
6. The referenced information is not available in public sources and could not be gathered readily from other publicly available information. Other than through the provisions in



paragraph 3 above, MHI knows of no way the information could be lawfully acquired by organizations or individuals outside of MHI.

7. Public disclosure of the referenced information would assist competitors of MHI in their design and manufacture of nuclear plant components without incurring the costs or risks associated with the design and the manufacture of the subject component. Therefore, disclosure of the information contained in the referenced document would have the following negative impacts on the competitive position of MHI in the U.S. and world nuclear markets:
 - A. Loss of competitive advantage due to the costs associated with development of technologies relating to the component design, manufacture and examination. Providing public access to such information permits competitors to duplicate or mimic the methodology without incurring the associated costs.
 - B. Loss of competitive advantage of MHI's ability to supply replacement or new heavy components such as steam generators.



I declare under penalty of perjury that the foregoing affidavit and the matters stated therein are true and correct to the best of my knowledge, information and belief.

Executed on this 14 day of September, 2012.

Jinichi Miyaguchi

Jinichi Miyaguchi,
Director- Nuclear Plant Component Designing Department
Mitsubishi Heavy Industries, LTD

Sworn to and subscribed

Before me this 14 day

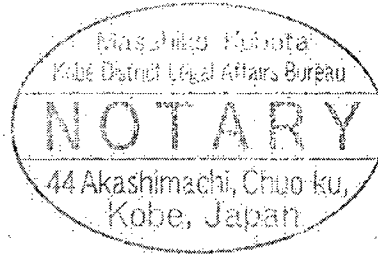
of September, 2012

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SEP. 14. 2012

Masahiko Kubota

Notary Public

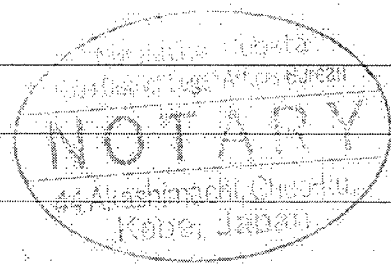


My Commission Expires _____

登簿平成24年第 277 号

認 証

囑託人 三菱重工業株式会社 原子力事業部 原
子力誠三総括部 原子力機器設計部 部長 宮口
仁一 は本職の面前で添付書面に 署名 した。



よって認証する。

平成24年9月14日

本職役場に於て

神戸市中央区明石町44番地

神戸地方法務局所属

公証人

窪田正彦

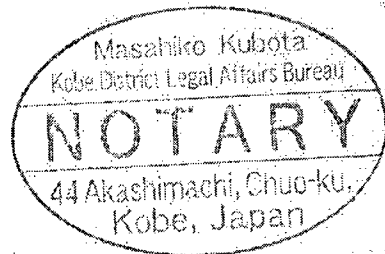
公証人役場

Registered Number 277

Date SEP. 14, 2012

NOTARIAL CERTIFICATE

This is to certify that JINICHI MIYAGUCHI, Director-Nuclear Plant
Component Designing Department MITSUBISHI HEAVY INDUSTRIES, LTD
has affixed his signature in my very presence to the attached
document.



Masahiko Kubota

MASAHIKO KUBOTA

Notary

44 Akashimachi, Chuo-Ku,

Kobe, Japan

Kobe District Legal Affairs Bureau

(面前法2)

requested qualifies under 10 CFR 2.390(a)(4) "Trade secrets and commercial or financial information".

6. The following criteria are customarily applied by AREVA NP to determine whether information should be classified as proprietary:

- (a) The information reveals details of AREVA NP's research and development plans and programs or their results.
- (b) Use of the information by a competitor would permit the competitor to significantly reduce its expenditures, in time or resources, to design, produce, or market a similar product or service.
- (c) The information includes test data or analytical techniques concerning a process, methodology, or component, the application of which results in a competitive advantage for AREVA NP.
- (d) The information reveals certain distinguishing aspects of a process, methodology, or component, the exclusive use of which provides a competitive advantage for AREVA NP in product optimization or marketability.
- (e) The information is vital to a competitive advantage held by AREVA NP, would be helpful to competitors to AREVA NP, and would likely cause substantial harm to the competitive position of AREVA NP.

The information in the Document is considered proprietary for the reasons set forth in paragraphs 6(b) and 6(c) above.

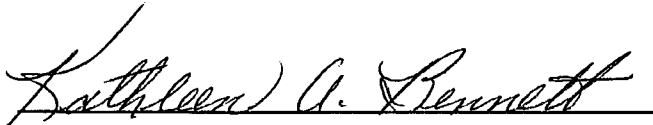
7. In accordance with AREVA NP's policies governing the protection and control of information, proprietary information contained in this Document has been made available, on a limited basis, to others outside AREVA NP only as required and under suitable agreement providing for nondisclosure and limited use of the information.

8. AREVA NP policy requires that proprietary information be kept in a secured file or area and distributed on a need-to-know basis.

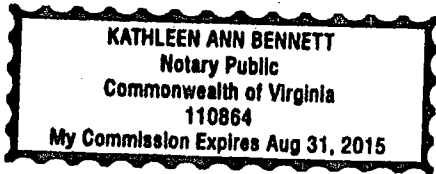
9. The foregoing statements are true and correct to the best of my knowledge, information, and belief.

A large, stylized handwritten signature in black ink, appearing to be 'A. Bennett', written over a horizontal line.

SUBSCRIBED before me this 2nd
day of October 2012.

A handwritten signature in black ink that reads 'Kathleen A. Bennett', written over a horizontal line.

Kathleen A. Bennett
NOTARY PUBLIC, COMMONWEALTH OF VIRGINIA
MY COMMISSION EXPIRES: 8/31/2015
Reg. #110864



ENCLOSURE 3

SOUTHERN CALIFORNIA EDISON

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

REGARDING RESPONSE TO CONFIRMATORY ACTION LETTER

DOCKET NO. 50-361

TAC NO. ME 9727

Response to RAI 1

(NON-PROPRIETARY)

RAI 1

The Operational Assessment (OA) in Attachment 6, Appendix A (Reference 2), reports the 3 times normal operating pressure differential as being 4290 psi for 100% power conditions. This is the same value assumed in the Condition Monitoring Assessment provided in Attachment 2. This value is significantly higher than the values ranging from 3972-3975 psi for 100% power reported in Attachment 6, Appendices B, C, and D (References 3-5). Describe the reason for the differences.

RESPONSE

Table 1 summarizes the bases for the values of 3 times normal operating pressure differential (3xNOPD) used in each operational assessment (OA). Steam generator (SG) secondary side pressure, and consequently the 3xNOPD, is influenced by power, T_{COLD} (see discussion at end of this response), and SG tube plugging. Each of the OAs assumes a different set of relevant conditions in their respective analysis. The reference numbers in the discussion below correspond to the RAI reference numbers.

Reference 2 (AREVA document number 51-9182833-002, *SONGS U2C17 Outage – Steam Generator Operational Assessment*) assesses tube integrity due to all wear mechanisms, with the exception of tube-to-tube wear (TTW). The OA analysis uses a 3xNOPD equal to 4290 psid, which was selected to bound the potential operating conditions for the next operating interval including possible changes due to tube plugging and/or a decrease in power level. As shown in Table 1, the NOPD is based on the operating pressures in the SGs during the previous operating cycle, which included operation at 100% power, increased T_{COLD} , and no tube plugging (same conditions used in *SONGS 2C17 Steam Generator Condition Monitoring Report*). The 0% plugging condition is bounding because as plugging increases, secondary side pressure increases reducing NOPD.

Reference 3 (AREVA document number 51-9187230-000, *SONGS U2C17 Steam Generator Operational Assessment for Tube-to-Tube Wear*) uses a conservative approach to demonstrate that TTW due to fluid elastic instability will be prevented while operating at 70% power. This OA utilizes probability of stability rather than 3xNOPD to determine SG inspection interval. However, the defense in depth section of this OA uses a 3xNOPD equal to [] psid, which is derived from the secondary side pressure in Table 6.2-1 “Basic parameters for calculation for 2A SG evaluation after plugging” of MHI document L5-04GA567 R6. It is based on operation at 70% power, increased T_{COLD} , and approximately 3% tube plugging. When power level is decreased, the secondary side pressure increases resulting in a reduction in differential pressure.

Reference 4 (APTECH OA document number AES 12068150-2Q-1, *Operational Assessment for SONGS Unit 2 Steam Generators for Upper Bundle Tube-to-Tube Wear Degradation at End of Cycle 16*) uses established industry methods to predict TTW degradation based on Unit 3 TTW data and a 70% power. The table in Section 4.2 of Reference 4 lists three values of NOPD. The NOPD of [] psid (3xNOPD = [] psid) was used for the OA analysis, which was the same value used in Reference 3 and described above. The other two NOPD values in the Section 4.2 table were not used in the OA analysis. The first value of NOPD equal to [] psid (3xNOPD = [] psid) is for Cycle 16 actual secondary side pressures at 100% power. The second value of NOPD equal to [] psid (3xNOPD = [] psid) was based on secondary side pressure of [] psia (rounded to [] psia, conservative) at 100% power, increased T_{COLD} , and approximately 3% tube plugging.

Reference 5 (Westinghouse OA document number SG-SGMP-12-10, Rev 3, *Operational Assessment of Wear Indications in the U-bend Region of San Onofre Nuclear Generating Station Unit 2 Replacement Steam Generators*) uses a 3xNOPD equal to [] psid. This OA uses the 100% power NOPD, which is derived from the secondary side pressure in Table 6.2-1 “Basic parameters for calculation for 2A SG evaluation after plugging” of MHI Document L5-04GA567 R4, and is based on operation at 100% power, increased T_{COLD} , and approximately 3% tube plugging.

At the end of Cycle 16, the Unit 2 original reactor vessel head (ORVH), comprised of Alloy 600, was replaced with a replacement reactor vessel head (RRVH), comprised of Alloy 690, due to Alloy 690’s enhanced resistance to stress corrosion cracking (SCC) at elevated temperatures. Prior to the reactor vessel head replacement, T_{COLD} had been lowered to reduce Alloy 600’s susceptibility to SCC. Increasing T_{COLD} increases secondary side pressure and decreases NOPD. With the installation of the RRVH, T_{COLD} will be increased to a nominal value of [] °F, reducing effective velocities and increasing margin to fluid elastic instability.

Table 1 Summary of 3xNOPD Differences in Operational Assessments

	RTSR Attachment 6, Appendix A (RAI Reference 2)	RTSR Attachment 6, Appendix B (RAI Reference 3)	RTSR Attachment 6, Appendix C (RAI Reference 4)	RTSR Attachment 6, Appendix D (RAI Reference 5)
Primary Side Pressure (psia)	2250	2250	2250	2250
Secondary Side Pressure (psia)	820	[]	[]	[]
NOPD (psid)	1430	[]	[]	[]
3xNOPD (psid)	4290	[]	[]	[]
Power Level (%)	100	70	70	100
Plugging (%)	0	≈ 3	≈ 3	≈ 3
T _{COLD} (°F)	541	[]	[]	[]
Summary of Operating Parameters Used and basis	NOPD is based on operating pressures in the SGs during the previous operating cycle at 100% power and reduced T _{COLD} . Parameters were selected to bound possible conditions for the next operating cycle at the time the document was issued. The 0% plugging condition is bounding because as plugging increases, secondary side pressure increases reducing NOPD.	NOPD based on 70% power at increased T _{COLD} with approximately 3% tube plugging.	NOPD based on 70% power at increased T _{COLD} with approximately 3% tube plugging.	NOPD based on 100% power at increased T _{COLD} with approximately 3% tube plugging.