

March 12, 2004

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

Subject: **Docket Nos. 50-361 and 50-362  
Additional Information Regarding Relaxation Request 2 for  
Reactor Pressure Vessel Head Penetration Inspection Requirements  
San Onofre Nuclear Generating Station (SONGS), Units 2 and 3  
(TAC Nos. MC1542 and MC1543)**

Dear Sir or Madam:

This letter transmits responses to NRC questions regarding the Relaxation Request 2 submitted to the NRC by letter dated December 9, 2003, as revised by letter dated February 28, 2004.

The response to the NRC's request for additional information is provided in Enclosure 1.

Should you have any questions, please contact Mr. Jack Rainsberry at (949) 368-7420.

Sincerely,



Enclosures

cc: B. S. Mallett, Regional Administrator, NRC Region IV  
B. M. Pham, NRC Project Manager, San Onofre Units 2, and 3  
C. C. Osterholtz, NRC Senior Resident Inspector, San Onofre Units 2 & 3

## Response to NRC Questions

### Question 1

In enclosure 2 to your letter dated February 28, 2004, a vessel head temperature of 591°F was used for crack growth calculations for SONGS Units 2 and 3. Describe in detail how the vessel head temperature was determined for each unit and also discuss its level of conservatism with respect to the actual temperature experienced by the vessel nozzle penetrations associated with the control element drive mechanism (CEDM), incore instrumentation (ICI) and the reactor head vent.

### Response

The Combustion Engineering Owner's Group (CEOG) performed calculations to determine the fluid temperature in the upper plenum for each Combustion Engineering plant, including San Onofre Nuclear Generating Station (SONGS) Units 2 and 3. Analyses were completed in February 1997 (CEOG Task 953) to evaluate the potential benefits in terms of primary water stress corrosion cracking (PWSCC) mitigation resulting from modification of core internals to increase bypass flow. Those results showed that the SONGS upper plenum temperature is 4.4°F lower than hot leg temperature ( $T_{hot}$ ). At that time, SONGS Units 2 and 3  $T_{hot}$  was nominally 608.5°F, calculated upper plenum temperature was 604.1°F, the nominal inlet temperature ( $T_{cold}$ ) operating program was 553°F +/-2°F, and the licensed power level was 3390 MW<sub>th</sub>. Since that time, SONGS Units 2 and 3 have increased the licensed power level to 3438 MW<sub>th</sub> and have reduced the nominal  $T_{cold}$  operating program to 539°F +/-2°F. As a result of these operational changes, SONGS Units 2 and 3  $T_{hot}$  is expected to increase by approximately 0.8°F due to the power increase and decrease by 14°F due to the change in nominal  $T_{cold}$  operating program. The net effect of these changes results in an expected upper plenum temperature of 590.9°F. SCE reports the upper plenum temperature to be 591°F, as found in the Pressurized Water Reactor (PWR) Materials Reliability Program Response to NRC Bulletin 2001-01 (MRP-48). In addition, SCE based crack growth predictions on 591°F.

The level of conservatism with respect to the actual temperature experienced by the vessel nozzle penetrations associated with the CEDM, ICI and head vent is not known and could not be quantified without plant modifications to install temperature measurement devices.

### Question 2

What are the actual (as built) minimum distances below the J-groove weld that are available for inspection for each group of CEDM as listed in Enclosure 4.

### Response

Reactor Vessel Head inspections were completed on San Onofre Unit-2 to support operating cycle 13 on March 1, 2004. Each measurement was performed from at least 2 inches above the highest point of the J-groove weld down to the maximum extent possible below the weld.

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The actual inspection distance achieved for each CEDM inspection is dependent on individual weld geometry and the physical characteristics, orientation and performance of the inspection tooling. Therefore, there is a variation in achievable inspection distances from nozzle to nozzle, as well as from measurement to measurement of a specific nozzle.

Although the final report is not yet completed, preliminary data summarized in the table below characterizes the CEDM inspection distances achieved at SONGS Unit 2 during this refueling outage. The inspection distances below the weld achieved at SONGS Unit 2 provide reasonable assurance that the proposed minimum inspection distances can be routinely achieved on both SONGS Units 2 and 3 with adequate allowance for measurement variations and fabrication differences.

<b>Preliminary Inspection Distances Below Weld</b>		
<b>Penetration(s)</b>	<b>SONGS 2 Actual Inspection Distance March 2004</b>	<b>Requested Relaxation</b>
<b>CEDM # 1</b>	<b>1.21 inches</b>	<b>0.43 inches</b>
<b>CEDM #'s 2 - 35</b>	<b>Avg. 1.21 inches Min. 0.93 inches Std. Dev. 0.15 inches</b>	<b>0.43 inches</b>
<b>CEDM #'s 36 - 87</b>	<b>Avg. 0.89 inches Min. 0.57 inches Std. dev. 0.17 inches</b>	<b>0.42 inches</b>
<b>CEDM #'s 88 - 91</b>	<b>Avg. 0.77 inches Min. 0.65 inches Std. dev. 0.08 inches</b>	<b>0.35 inches</b>

The standard deviation was calculated from the data of the actual inspection coverage distances below the toe of the J-groove weld within each group of nozzles. For example, the CEDM Group of 36 to 87 consisted of 52 data points of inspection distances. The average of these 52 numbers was 0.90. The standard deviation of these numbers was 0.18. The minimum data point of these 52 numbers was 0.57. The standard deviation was

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intended to provide some insight to the scatter of data around the average value of 0.90" for this group.

Reactor Vessel Head inspections were completed on SONGS Unit 2 for operating cycle 13 on March 1, 2004. A brief summary of the preliminary inspection results is provided below:

### Paragraph IV.C (5)(a) Bare Metal Visual Inspection

Bare metal visual inspection of the RPV head determined that there is no external leakage from any head penetration nozzle, and that there was no evidence of boron or corrosive product accumulation or degradation anywhere on the head surfaces.

### Paragraph IV.C(5)(b) Non visual NDE of each RPVH penetration

#### **Head Vent line (1):**

Inspections were performed to meet the requirements of the NRC Order without relaxation.

No rejectable indications were detected in the following examination:

Eddy Current Testing (ET) examination of all wetted penetration and J-groove weld surfaces below 2 inches above the top of the J-groove weld.

#### **CEDM Nozzles (91):**

Inspections were performed to meet the requirements of the NRC Order as modified by Relaxation Request 2.

No rejectable indications were detected in the following examinations:

Ultrasonic volumetric examination from 2 inches above the top of the J-groove weld down to the guide cone interference on all 91 CEDMs, including leak path detection

In addition to the inspections required by the NRC Order, No rejectable indications were detected in the following examinations:

ET surface examination of the penetration Inside Diameter (ID) from 2 inches above the weld down to the guide cone interference

ET examination of seven J-groove weld surfaces

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### **ICI Nozzles (10):**

Inspections were performed to meet the requirements of the NRC Order without relaxation.

Rejectable indications were detected and removed by grinding to remove up to 1/4 inch of material at two nozzles during the following examinations:

A combination of ET and dye penetrant testing (PT) examination of portions of J-groove weld surfaces and penetration outside diameter (OD) surfaces below the J-groove weld were required to cover equivalent volumes, surfaces and leak paths as provided in paragraph IV.C (5)(b)(iii)

No rejectable indications were detected in the following examinations:

Ultrasonic examination from 2 inches above the top of the J-groove weld down to at least the root of the weld, including leak path detection

ET surface examination of the penetration ID from 2 inches above the top of the J-groove weld and the bottom face

### **Paragraph IV.D Visual inspection of pressure retaining components above the RPV head**

Visual inspection found no boric acid leaks from pressure retaining components above the RPV head.

As required by paragraph IV.E of the revised Order, a report detailing these inspection results will be submitted within 60 days after returning SONGS 2 to operation.

### **Question 3**

Identify the inspection intervals that Units 2 and 3 are on.

### **Response**

A reactor pressure vessel head inspection is performed at SONGS Units 2 and 3 each refueling outage. SONGS Units 2 and 3 currently have planned cycle lengths of 585 effective full power days, which is approximately 19.5 months. The relaxation request is conservatively based on 21 months.