



South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

February 6, 2012  
NOC-AE-12002786  
10 CFR 54  
STI: 33263076  
File: G25

U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
One White Flint North  
11555 Rockville Pike  
Rockville, MD 20852-2746

South Texas Project  
Units 1 and 2  
Docket Nos. STN 50-498, STN 50-499  
Response to Requests for Additional Information for the  
South Texas Project License Renewal Application  
Aging Management Program, Set 10 (RAI 4.7.3-2) (TAC Nos. ME4936 and ME4937)

- References:
1. STPNOC letter dated October 25, 2010, from G. T. Powell to NRC Document Control Desk, "License Renewal Application" (NOC-AE-10002607) (ML103010257)
  2. NRC letter dated December 14, 2011, "Requests for Additional Information for the Review of the South Texas Project, Units 1 and 2 License Renewal Application – Aging Management, Set 10 (TAC Nos. ME4936 and ME 4937)" (ML11332A100)
  3. STPNOC letter dated January 18, 2012, from D. W. Rencurrel to NRC Document Control Desk, "Response to Requests for Additional Information for the South Texas Project License Renewal Application Aging Management Program, Set 10 (TAC Nos. ME4936 and ME 4937)" (NOC-AE-11002779) (ML12020A072)

By Reference 1, STP Nuclear Operating Company (STPNOC) submitted a License Renewal Application (LRA) for South Texas Project (STP) Units 1 and 2. By Reference 2, the NRC staff requests additional information (RAI) for review of the STP LRA. STPNOC's response to the requests for additional information was provided by Reference 3 with the exception of a response to RAI 4.7.3-2. Enclosure 1 to this letter provides a response to RAI 4.7.3-2. Changes to LRA described in Enclosure 1 are depicted in a line-in/line-out page provided in Enclosure 2.

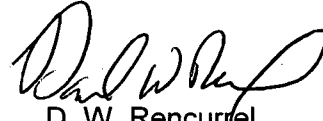
There are no regulatory commitments provided in this letter.

Should you have any questions regarding this letter, please contact either Arden Aldridge, STP License Renewal Project Lead, at (361) 972-8243 or Ken Taplett, STP License Renewal Project regulatory point-of-contact, at (361) 972-8416.

A147  
NR2

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 2/6/2012  
Date



D. W. Rencurrel  
Senior Vice President,  
Technical Support & Oversight

KJT

Enclosure:    1. STPNOC Response to RAI 4.7.3-2  
                    2. STPNOC LRA Changes with Line-in/Line-out Annotations

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**Enclosure 1**

**STPNOC Response to RAI 4.7.3-2**

**STPNOC Response to RAI 4.7.3-2**

**SOUTH TEXAS PROJECT, UNITS 1 AND 2  
REQUEST FOR ADDITIONAL INFORMATION -  
AGING MANAGEMENT, SET 10  
(TAC NOS. ME4936 AND ME4937)**

**RAI 4.7.3-2 (066)**

**Background:**

In a letter dated September 21, 2011, the staff issued RAI 4.7.3-1, requesting that the applicant state how visual inspections in the Open-Cycle Cooling Water System program are capable of ensuring that corrosion in the essential cooling water (ECW) system will not exceed the 40-mil corrosion allowance, given that LRA Section 4.7.3 documented the use of this program as the disposition for the related TLAA.

In its response dated November 21, 2011, the applicant stated that ECW corrosion is managed consistent with NRC Generic Letter 89-13. The applicant also stated that, when visual inspections identify corrosion, thickness measurements are taken as part of the corrective action program.

**Issue:**

The staff lacks sufficient information to conclude that visual inspections alone will be capable of prompting follow-up thickness measurements such that the 40-mil corrosion allowance will not be exceeded during the period of extended operation. The staff believes that visual examinations may need to be augmented with physical measurements, using tools such as inside calipers, to ensure that corrosion is not approaching the limit. Given that physical measurements may be required to augment the visual inspections, the staff requires further details on how the program will manage this TLAA, such as how often physical measurements will be conducted, how many locations will be checked, how the most susceptible location will be selected, what devices will be used, and the criteria that would result in a follow-up volumetric examination.

**Request:**

1. State how visual inspections of the ECW system, without augmented physical measurements, will be capable of detecting a 40-mil loss of material.
2. Alternatively, state what augmented inspection techniques will be used to detect loss of material. Include information such as how often physical measurements will be conducted, how many locations will be checked, how the most susceptible location will be selected, what devices will be used, and the criteria that would result in a follow-up volumetric examination in sufficient detail such that the staff can independently conclude that the inspection methodologies will adequately manage loss of material for this TLAA.

STPNOC Response:

LRA Section 4.7.3 was reviewed along with the station's responses to NRC Generic Letter (GL) 89-13, "Service Water System Problems Affecting Safety-Related Equipment". The review concluded that the corrosion effects in the Essential Cooling Water (ECW) system were incorrectly identified as a time-limiting aging analysis (TLAA) in the LRA. They are not a TLAA as defined by 10 CFR 54.3(a), criteria 3 and 4.

STP response to GL 89-13 dated January 29, 1990 (ST-HL-AE-3341), "Service Water System Problems Affecting Safety-Related Equipment" stated:

STPEGS has a program to chemically treat the ECW to limit biological fouling. Clams have not been found since the ECP was chemically shocked with sodium hypochlorite. The predominant biological fouling species of concern is bryozoa, which is controlled using sodium hypochlorite additions on a routine basis. Scaling and corrosion inhibitors are also added to the ECW. HL&P has not found it necessary to continuously chlorinate the ECP.

The revised response to GL 89-13 dated June 23, 1992, (ST-HL-AE-4126), "Revised Response to NRC Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment," presented the following statements:

Under Recommended Action I of the Generic Letter, HL&P was to implement and maintain an ongoing program of surveillance and control techniques to significantly reduce the incidence of flow blockage problems as a result of biofouling of the Essential Cooling Water System (ECW). Included in the response was a statement that "scaling and corrosion inhibitors are also added to the ECW." HL&P considers the addition of corrosion inhibitors to the ECW system an option and has discontinued this treatment.

Use of corrosion inhibitors was discontinued because operational experience has shown that the corrosion rate without inhibitors has no impact on the design life of the ECW system. Without the inhibitors, the corrosion rate is 0.6 mil/year compared to less than 0.1 mil/year with the inhibitor. Assuming 40 years of service life, this will not result in corrosion exceeding the design level of 40 mils.

The statements regarding corrosion rate, service life, and design level do not represent licensee calculations or analyses that meet the 10 CFR 54.3(a) definition of a TLAA for reasons stated below.

- Corrosion rate

The corrosion rate of 0.6 mil/year and the design level of 40 mils were originally utilized as justification for eliminating use of corrosion inhibitors in the response to GL 89-13 dated June 23, 1992. Application of corrosion inhibitors was intended to address the potential for flow blockage in the ECW heat exchangers. Subsequent review determined that use of corrosion inhibitors could be discontinued because ECW heat exchanger fouling, as well as ECW piping integrity, are effectively managed through proper water

chemistry, routine heat exchanger testing, and system maintenance, consistent with the guidance of GL 89-13.

The corrosion rate of 0.6 mil/year was identified through a NALCO corrosion correlator which measures the corrosive characteristics of the water chemistry. The correlator provides an indication of the general corrosion rate but does not measure a corrosion rate in any specific area of the pipe wall. This instrument is utilized as one parameter in adjusting and optimizing the ECW water chemistry. The optimized ECW chemistry is used as a basis to address potential heat exchanger fouling or flow blockage. The 0.6 mil/year corrosion rate is not utilized in a plant analysis for making a safety determination for the ECW system. Therefore, criterion 4 of 10 CFR 54.3(a) is not met.

The Open Cycle Cooling Water System Program, B2.1.9, manages aging effects of the ECW system to provide reasonable assurance that the intended safety functions will be met.

- Design level of 40 mils

The 40 mils is not a design level or limit but is an allowance that is part of the design methodology which provides an additional conservative factor for determining the design minimum wall requirements for the piping service pressure, temperature, and allowable stresses. The 40 mils includes the threading, grooving, mechanical strength, corrosion, erosion, etc, allowance applied to the piping design piping minimum wall thickness calculations for aluminum-bronze piping with diameters of greater than or equal to four inches. There is no time dependence placed on this allowance. Utilization of the 40 mil design allowance does not meet 10 CFR 54.3(a) criterion 3 in that there is not a time-limited assumption inferred in the piping minimum wall thickness calculations where the 40 mil allowance is applied.

ECW heat exchanger performance is effectively managed through proper water chemistry, routine heat exchanger testing, and system maintenance. The ECW piping integrity is monitored with visual inspections and/or non-destructive examinations (NDE) through the Open-Cycle Cooling Water System Program, B2.1.9, consistent with the requirements of NRC Generic Letter 89-13.

Corrosion effects will be managed during the period of extended operation as described in Open-Cycle Cooling Water System Program B2.1.9, to provide reasonable assurance that the intended function of the ECW system is maintained during the period of extended operation.

It is concluded that the 0.6 mil/year corrosion rate used in the response to GL 89-13 as well as the 40 mils allowance were incorrectly identified in LRA section 4.7.3 as a time-dependent analysis. The LRA is revised to delete Section 4.7.3.

See Enclosure 2 for the revision to LRA Section 4.7.3.

**Enclosure 2**

**STPNOC LRA Changes with Line-in/Line-out Annotations**



**List of Revised LRA Section**

<b>RAI</b>	<b>Affected LRA Section</b>
RAI 4.7.3-2	4.7.3

**4.7.3      This section not used. TLAA for the Corrosion Effects in the Essential-Cooling Water (ECW) System**

~~In response to NRC Generic Letter 89-13, STP committed to implementation and maintenance of a surveillance and control program to significantly reduce the incidence of flow blockage problems as a result of biofouling. Included in this response is a statement that "Scaling and corrosion inhibitors are also added to the ECW." This commitment was subsequently revised, and the use of corrosion inhibitors was discontinued at STP, based on the following:~~

~~Without the inhibitors, the corrosion rate is 0.6 mil/year compared to less than 0.1 mil/year with the inhibitor. Assuming 40 years of service life, this will not result in corrosion exceeding the design level of 40 mils. This conclusion is based on a 40-year plant life. Therefore, this analysis is a TLAA.~~

**~~Disposition: Aging Management, 10 CFR 54.21(c)(1)(iii)~~**

~~Corrosion effects in the essential cooling water system are managed under the Open-Cycle Cooling Water program described in B2.1.9. Therefore, corrosion effects will be managed during the period of extended operation. This TLAA is dispositioned in accordance with 10 CFR 54.21(c)(1)(iii).~~