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From: Elton, Loree [leelton@STPEGS.COM]
Sent: Monday, March 15, 2010 6:10 PM
To: Muniz, Adrian; Dyer, Linda; Wunder, George; Tonacci, Mark; Eudy, Michael; Kallan, Paul; Plisco, Loren; Anand, Raj; Foster, Rocky; Joseph, Stacy; Govan, Tekia; Tai, Tom
Subject: Transmittal of Letter U7-C-STP-NRC-100060
Attachments: U7-C-STP-NRC-100060.pdf

Please find attached a courtesy copy of letter number U7-C-STP-NRC-100060, which contains a supplemental response to an NRC staff question included in Request for Additional Information (RAI) letter number 236 related to Combined License Application (COLA) Part 2, Tier 2, Appendix 6C.

The official version of this correspondence will be placed in today's mail. Please call Jim Tomkins at 805-215-6129 if you have any questions concerning this letter.

Thank you,

Loree Elton
Licensing, STP 3 & 4
leelton@stpegs.com
361-972-4644

Hearing Identifier: SouthTexas34Public_EX
Email Number: 2033

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Subject: Transmittal of Letter U7-C-STP-NRC-100060
Sent Date: 3/15/2010 6:09:48 PM
Received Date: 3/15/2010 6:09:53 PM
From: Elton, Loree

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Options
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Nuclear Operating Company
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March 15, 2010
U7-C-STP-NRC-100060

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

South Texas Project
Units 3 and 4
Docket Nos. 52-012 and 52-013
Response to Request for Additional Information

Attached is a supplemental response to an NRC staff question included in Request for Additional Information (RAI) letter number 236 related to Combined License Application (COLA) Part 2, Tier 2, Appendix 6C. The attachment addresses the response to the RAI question listed below:

RAI 06.02.02-20 Supplement

The COLA changes in this response will be incorporated in the next routine revision of the COLA following NRC acceptance of the RAI response.

There are no commitments in this letter.

If you have any questions regarding these responses, please contact me at (361) 972-7136, or Bill Mookhoek at (361) 972-7274.

STI 32631372

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

Executed on 3/15/10

Scott Head
Manager, Regulatory Affairs
South Texas Project Units 3 & 4

jet

Attachment:

RAI 06.02.02-20 Supplement

cc: w/o attachment except*
(paper copy)

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CPS Energy

RAI 06.02.02-20 Supplement

QUESTION:

In its RAI 06.02.02-6 Supplemental Response, dated October 29, 2009, the applicant proposed a change to the STP 3&4 FSAR that "The ECCS suction strainer design to be used on STP 3&4 is the same as the design for the Reference Japanese ABWR." (page 4 of 247)

The applicant should provide sufficient information in the FSAR on the strainers rather than referring to a plant for which information is not readily available.

RESPONSE SUPPLEMENT:

The original response to this RAI was provided to the NRC in STPNOC Letter No. U7-C-STP-NRC-100007 dated January 13, 2010. This supplemental response is provided in response to an NRC review comment. The review comment stated that STPNOC needs to state in the COLA that the assumed Emergency Core Cooling System (ECCS) pump flow rate, which is the one area of non-conservatism between the Reference Japanese ABWR and the STP 3&4 strainer head loss and sizing analyses, has been evaluated. Also, the COLA should state that this evaluation concluded that this non-conservatism is more than compensated for by other conservative assumptions in the Reference Japanese ABWR head loss analysis. This includes use of materials that are significant contributors to strainer head loss (i.e., fiber and calcium silicate) that are prohibited in the STP 3 & 4 primary containment. This is addressed in the updated COLA markup attached with the addition of the last paragraph to Section 6C.5.1. This supplemental response replaces the January 13 response in its entirety. The changes from the January response are indicated by revision bars in the margin.

The basic design of the STP 3 & 4 suction strainer, which is the same as that for the Reference Japanese plant, is a cassette-type strainer that is described in the text and associated references in Appendix 6C to Part 2, Tier 2 of the STP 3 & 4 COLA. That appendix also provides the criteria to be used for sizing of the suction strainer. As noted in the response to RAI 06.02.02-6 (U7-C-STP-NRC-090179, October 29, 2009), the STP 3 & 4 strainers will be at least as large as the strainers for the Reference Japanese ABWR ECC systems.

As requested by this RAI, this response provides additional details on the suction strainer design as a revision to the COLA. The FSAR markup previously provided on October 29, 2009 in Letter No. U7-C-STP-NRC-090179 (page 4 of 247) will be revised by replacing the markup of Section 6C.5.1 with the one below. In addition, Section 6C.2 will be revised as shown below to provide additional design details on the strainer. Section 6C.6 is updated to add the three references which are described in the markup to Section 6C.5.1. Changes from COLA Rev. 3 are highlighted with gray shading.

Revised FSAR Markup to Tier 2

6C.2 ABWR Mitigating Features

The suction strainers design *at* Perry preceded and *did not meet the current regulatory requirements. The ABWR ECCS suction strainers will utilize* ~~*a "T" arrangement with conical strainers on the 2 free legs of the "T"*~~ ~~the state-of-the art~~ a cassette type strainer design. ~~*This design separates the strainers so that it minimizes the potential for a contiguous mass to block the flow to an ECCS pump*~~. The design of the strainers will be based on Regulatory Guide 1.82, NUREG/CR-6224 (Reference 6C-4), NUREG/CR-6808 (Reference 6C-5) and the Utility Resolution Guidance, NEDO-32686-A. The cassette type strainer design is based on a set of cassette modules with U-shaped filter pockets attached to ~~their exterior~~ the cylindrical outer jacket. Each strainer consists of filter modules, the outer jacket and flange plates on each end of the cylindrical assembly. The filter module is constructed with cassettes which are arranged axially along the strainer axis. One cassette consists of pocket shaped filters which are arranged radially. A cut-away drawing of the strainer is shown in Figure 6C-1. The materials used in the cassette type strainer are stainless steel. The cylindrical strainer assemblies are mounted in pairs on piping tees at each ECCS pump suction line. When the ECCS pump operates, the suction flow in the suppression pool runs into all pockets through the outer jacket windows. Each pocket has five flow paths from the inlet through the five perforated walls to the outlet of the pocket towards the cassette strainer. By using the cassettes with the pocket shaped filters, the strainer has an available filter area which is larger per volume than cylindrical and other shaped strainers. The number of cassettes and pockets is adjusted to produce a specific head loss performance for the strainer. To avoid debris clogging the flow restrictions downstream of the strainers, the size of the holes in the perforated sheets is chosen by considering specific paths of ECCS equipment and piping (for example, the containment spray nozzle and the ECCS pump seal cooling flow orifices). The STP 3&4 strainers will have holes no larger than 2.1 mm. ~~As a result, the cassette type strainer has increased available suction surface area without increasing the overall size of the strainer. The holes in each pocket filter are sized to prevent a deleterious quantity of debris from passing through the strainer, but still allow fluid to pass through.~~

A key feature in the design of these strainers is to collect debris where velocity is low, since the pressure drop across the debris bed is known to be proportional to the velocity through the bed. This minimizes head loss across the strainer. ~~Further technical details and methodologies are used to determine the head loss across the strainer for design debris loadings and to determine the structural loads on ECCS penetrations, piping and strainers caused by LOCA induced hydrodynamic forces~~. *The ABWR design also has additional features not utilized in earlier designs that could be used in the highly improbable event that all suppression pool suction strainers were to become plugged. The alternate AC (Alternating Current) independent water addition mode of RHR allows water from the Fire Protection System to be pumped to the vessel and sprayed*
in the wetwell and drywell from diverse water sources to maintain cooling of the fuel

and containment. The wetwell can also be vented at low pressures to assist in cooling the containment.

6C.5.1 ECCS Suction Strainer Sizing Design Basis

The ECCS suction strainer design to be used on STP 3&4, which is described in the STP 3&4 FSAR Appendix 6C.2 and its associated references, is the same as the design for
the Reference Japanese ABWR (see References 6C-11, 6C-12 and 6C-13), and the STP 3&4 strainers will be at least as large as the Reference Japanese ABWR strainers. Application of the Reference Japanese ABWR ECCS suction strainer design to STP 3&4 is conservative for the following reasons:

- The sizing of the Reference Japanese ABWR strainers is based on the methodology defined in the BWROG's Utility Resolution Guideline (URG) (Reference 6C-3).

- The Reference Japanese ABWR primary containment includes fibrous and calcium silicate thermal insulation, both of which are significant contributors to strainer head loss. For STP 3&4, the only type of thermal insulation allowed inside the primary containment is all stainless steel reflective metal insulation (RMI), which results in a much lower head loss across the ECCS suction strainers.

The application of the reference Japanese ABWR strainer head loss analysis to STP 3 & 4 is less conservative in one area. The ABWR DCD Section 6C.3 and Regulatory Guide 1.82, Rev. 3 state that the head loss calculations are to be performed at runout flow rate conditions. For the reference Japanese ABWR, these calculations were performed at design flow rate conditions. Because pump runout flow rate is greater than design flow rate and strainer head loss is proportional to flow rate, a higher suction strainer head loss is calculated at runout flow rate. However this higher head loss is more than compensated for by other changes made by STP 3 & 4 compared with the reference Japanese ABWR, including the removal of fibrous and calcium silicate insulation materials from the containment. Consequently, the use of the reference Japanese ABWR for the licensing basis for STP 3 & 4 is conservative. This evaluation is documented in Ref 6C-13.

6C.6 References

6C-9 Application Methodology for the ECCS Strainer, Toshiba Corporation, PDR-2008-100575, Rev 0, June 3, 2008.

6C-11 The Evaluation Report for Net Positive Suction Head of Pump in Emergency Core Cooling System, STP Doc. U7-RHR-M-RPT-DESN-0001, Rev. A, May 27, 2009.

6C-12 The Supplementary Document for the Head Loss Evaluation Report of Japanese ABWR ECCS Suction Strainer, STP Doc. U7-RHR-M-RPT-DESN-0002, Rev. B, October 20, 2009.

6C-13 The Evaluation Example of the Head Loss of the ECCS Suction Strainer and Pipe in the ECCS Pump Run-out Flow condition, STP Doc. U7-RHR-M-RPT-DESN-0003, Rev. A, May 27, 2009.

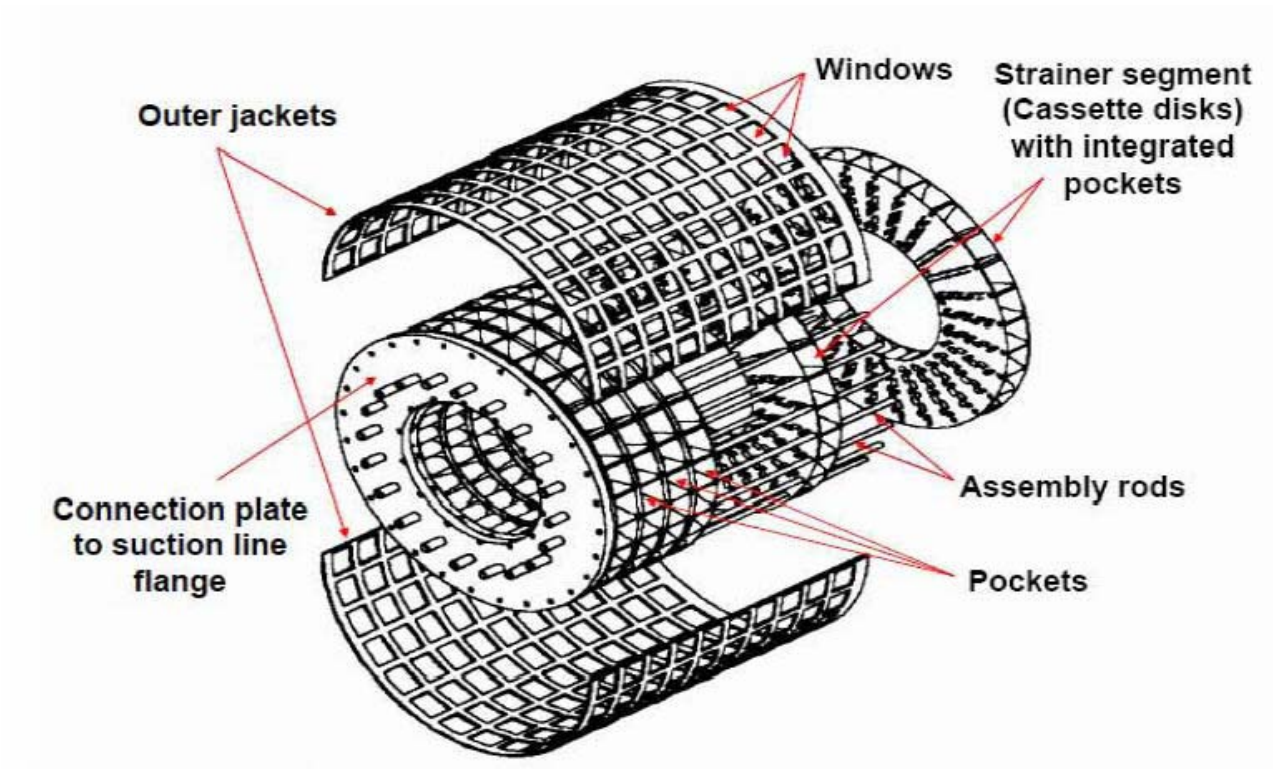

Figure 6C-1 Cassette Strainer Cutaway