Enclosure 1 to Attachment 1

Alion report supporting resolution of APLAB, CASA Grande - LOCA Frequencies: RAI 4

(ALION-REP-STP-8998-02, Rev. 0, "STP CASA Grande Analysis and LAR Enclosure 4-3 RAI Response")

ALION
SCIENCE AND TECHNOLOGY

TECHNICAL DOCUMENT COVER PAGE

Document No: ALION-REP-STP-8998-02	Revision:0	Page 1 of 5
Document Title: STP CASA Grande Analysis and LAR Enclosure 4-3 RAI 1Response		
Project No: STP-8898		
Project Name: STP Risk Informed GSI-191 Support		
Client: STP Nuclear Operating Company		
Document Purpose/Summary: Request for additional information 1 (RAI 1) inquired about reference specific, pertinent weld break frequency information that was used in the STP CASA Grande analysis documentation (LAR Enclosure 4-3). This document cross references LAR Enclosure 4-3 with references of interest and their contents, and provides high-level clarification of their usage. This document is not considered safety related. However, it has been prepared, reviewed, and approved.		
Design Verification Method: __X__ Design Review _____ Alternative Calculation _____ Qualification Testing		
Professional Engineer (if required) Approval: N/A Date N/A		

	Printed/Typed Name	Signature	Date
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Document Title: STP CASA Grande Analysis and LAR Enclosure 4-3 RAI I Response

REVISION	DATE	Description
0	See Cover Page	Initial release.

*Denotes a preparer from outside of the ALION organization. All technical information provided and its correctness are solely the responsibilities of internal staff.

Table of Contents

RAI #1 PRA Licensing Branch (APLA)

Volume 3 of the license amendment request (LAR) describes the process used to assign break frequencies to welds in containment and cites two documents listed as references 7 & 8:

> *7. KNF Consulting Services LLC and Scandpower Risk Management Inc. Development of LOCA Initiating Event Frequencies for South Texas Project GSI-191 Final Report for 2011 Work Scope. September 2011.*
>
> *8. University of Texas at Austin. Modeling and Sampling LOCA Frequency and Break Size for STP GSI-191 Resolution. September 2012.*

The staff notes that several versions of these documents are publically available in the NRC's Agency-wide Documents Access and Management System (ADAMS). A brief comparison of the fitted Johnson parameters in the above version of Reference 8 to Table 2.2.2 revealed differences between the LAR and the referenced document. Please confirm that Volume 3 contains the correct information from these reports and cites the correct versions of the aforementioned references. Please clarify exactly which aspects of the aforementioned references (e.g., by providing specific section or equation numbers) are used in the STP pilot application.

Response

Availability of Reference 8 for Review

LAR Enclosure 4-3 Reference 8 has been sent for publication in the NRC PDR with STP transmittal letter NOC-AE-13003070 (Letter, dated December 23, 2013, M.D. Meier to the NRC Document Control Desk) in order to make it publically available for review.

Confirmation of References

The two referenced documents number (7), and (8) in STP's GSI-191 submittal are shown below as listed in LAR Enclosure 4-3.

7. KNF Consulting Services LLC and Scandpower Risk Management Inc. *Development of LOCA Initiating Event Frequencies for South Texas Project GSI-191 Final Report for 2011 Work Scope*. September 2011.

8. University of Texas at Austin. *Modeling and Sampling LOCA Frequency and Break Size for STP GSI-191 Resolution*. September 2012.

The revision number and date of LAR Enclosure 4-3 Reference 7 as written has been confirmed to be correct.

The revision number and date of LAR Enclosure 4-3 Reference 8 as written has been confirmed to be correct.

Specific Aspects of References used in the LAR

Cross Reference Summary

Table 1: LAR Encl 4-3 Cross Reference Matrix

Enclosure 4-3 (Table)	Cross Reference			
	LAR Encl. 4-3 Ref. No.	Ref. Section	Ref. Page	Ref. Table
Table 2.2.2	(37)	7.8	7-55	7.19
	(8)	5	44	31
	(8)	2.1	7	2
	(8)	5	44	32
Tables 2.2.3-2.2.10	(7)	5	67-68	5-1 to 5-4

Clarification Details

Weld break frequencies are estimated in NUREG 1829 (Ref. 37 of LAR Encl. 4-3). The values from this elicitation are titled "NUREG-1829 Quantiles" in Table 2.2.2 of LAR Encl. 4-3, and are identical to the values given in Table 7.19 (Pg. 7-55) of NUREG-1829 for current-day break frequencies with the exception of two additional break sizes. These two additional break sizes (in LAR Encl. 4-3, Table 2.2.2) were linearly interpolated between NUREG-1829 frequencies to be consistent with the STP probabilistic risk assessment (PRA) SBLOCA and MBLOCA bounding break sizes of 2 inches (SBLOCA-MBLOCA) and 6 inches (MBLOCA-LBLOCA). Interpolation was performed for the 5th percentile, median, mean, and 95th quantiles of the NUREG-1829 distributions as described in Section 5 of Encl. 4-3 Reference 8, and the interpolated values are shown in Encl. 4-3 Reference 8, Table 31.

The quantiles of current-day break frequencies in NUREG-1829 Table 7.19 were fit to a parametric (Bounded Johnson) distribution as described in Section 2 of LAR Encl. 4-3 Reference 8. The Johnson parameters from Table 2.2.2 of LAR Encl. 4-3 are also described in LAR Encl. 4-3 Reference 8. As described, the parameters of the Johnson distributions closely fit the 5th percentile, median, and 95th percentile of the NUREG-1829 distribution values (Section 2.1, Table 3 of LAR Encl. 4-3 Reference 8) with explicitly listed parameter values in LAR Encl. 4-3 Reference 8 Table 2. The parametric fit for a Johnson distribution at the two additional break sizes at the interpolated values of 2 and 6 inches (described above) are given in LAR Encl. 4-3 Reference 8 Table 32. Estimates of the mean break frequency reported in NUREG-1829 Table 7.19 were not used in this analysis.

Reference 7 Tables 5-1 through 5-4 are the source for the values in LAR Encl. 4-3 Tables 2.2.3-2.2.10. The values from tables 5-1 through 5-4 were used as weighting factors to distribute NUREG-1829 total break frequencies across weld types and to containment locations by matching weld types with containment weld data. In LAR Encl. 4-3, conservation of NUREG-1829 total break frequency is referred to as the "top-down" portion of the "hybrid" break frequency approach. Tables 5-1 through 5-4 from reference 7 represent the product of "bottom-up" aggregation of cross-industry data on observed flaws or degradation that may lead to breaks.