

RS-20-067

10 CFR 50.55a

May 13, 2020

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

Clinton Power Station, Unit 1
Facility Operating License No. NPF-62
NRC Docket No. 50-461

Subject: Response to Request for Additional Information Related to Relief Request I4R-01
for the Fourth Inservice Inspection Interval

- References:
1. Letter from D. M. Gullott (Exelon Generation Company, LLC) to U.S. NRC, "Relief Requests Associated with the Fourth Inservice Inspection Interval," dated December 16, 2019
 2. Email from J. Wiebe (U.S. NRC) to K. M. Nicely (Exelon Generation Company, LLC), "Request for Additional Information Regarding Clinton Relief Request I4R-01," dated April 14, 2020

In Reference 1, in accordance with 10 CFR 50.55a, "Codes and standards," paragraph (z)(1), Exelon Generation Company, LLC (EGC) requested NRC approval of the several relief requests associated with the fourth Inservice Inspection (ISI) interval for Clinton Power Station (CPS), Unit 1. One of the relief requests (i.e., Relief Request I4R-01) was related to alternative risk-informed inservice inspection (RI-ISI) selection and examination criteria for Category B-F, B-J, C-F-1, and C-F-2 pressure-retaining piping welds.

In Reference 2, the NRC requested additional information that is needed to complete review of Relief Request I4R-01, "Alternate Risk Informed Selection and Examination Criteria for Examination Category B-F, B-J, C-F-1, and C-F-2 Pressure Retaining Piping Welds." In response to this request, EGC is providing the attached information.

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There are no regulatory commitments contained within this letter. Should you have any questions concerning this letter, please contact Mr. Kenneth M. Nicely at (630) 657-2803.

Respectfully,

A handwritten signature in black ink, appearing to read "Patrick R. Simpson", with a long horizontal flourish extending to the right.

Patrick R. Simpson
Sr. Manager Licensing

Attachment: Response to Request for Additional Information Regarding Relief Request I4R-01

cc: NRC Regional Administrator, Region III
NRC Senior Resident Inspector – Clinton Power Station

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Response to Request for Additional Information Regarding Relief Request I4R-01

NRC Request

By letter dated December 16, 2019 (Agencywide Documents and Access Management System (ADAMS) Accession No. ML19350C642), Exelon Generation Company, LLC submitted for staff review and approval inservice inspection (ISI) Program Relief Request I4R-01, which requests an alternative risk-informed inservice inspection (RI-ISI) selection and examination criteria for Category B-F, B-J, C-F-1 and C-F-2 pressure-retaining piping welds for the Clinton Power Station (CPS) Unit 1. To complete its review, the staff requests the following additional information.

1. Are the inspection locations that have been developed for the fourth 10-year interval RI-ISI program the same locations as those in the third 10-year interval RI-ISI approved in NRC safety evaluation dated December 22, 2010 (ADAMS Accession No. ML103360335)? If there are changes in the inspection locations from the CPS third 10-year interval RI-ISI program, provide information for the fourth 10-year interval RI-ISI program regarding examinations, systems, components, degradation mechanisms, class, etc. similar to that provided in Table 1 from Attachment 1 (page 2 of 15) and Tables 2, 3 and 4 of Attachment 2 (pages 2, 3 and 4 of 6) of the RAI response for the CPS third 10-year interval RI-ISI program dated July 14, 2010 (ADAMS Accession No. ML101960011).

Response

The CPS RI-ISI program is a living program maintained in accordance with routine requirements that are not driven specifically by a ten-year update, but rather by the requirements of the RI-ISI methodology. The NRC safety evaluation from December 22, 2010, was based on that defined methodology, and the inspection locations then were a snapshot based on the plant and program component populations and inputs at that time. The CPS RI-ISI program was first implemented at the beginning of the Second Ten-Year Inspection Interval. In accordance with the methodology and the NRC endorsement and approval of such methodology, the RI-ISI program is required to be a living program and maintained in real time by licensees. As such, the components, risk rankings, and element selections change throughout the interval and life of the plant. The living program aspect is common to regulatory endorsement of risk-informed techniques and applications, and requires plant owners to modify the program as inputs, experience, plant design, and plant Probabilistic Risk Assessment (PRA) changes. Thus, the inspection locations at the time of the December 22, 2010, safety evaluation are historical and are only indicative of the RI-ISI program at that point in time.

CPS maintains the RI-ISI as a living program per the governing methodology and NRC approval of such. Throughout the interval, this means performing routine program updates to incorporate plant design changes, system classifications, PRA model updates, operating experience, and specific selection locations to maintain the required risk rankings and categories and associated element selections for examination. Exelon Generation Company, LLC (EGC) implements these requirements at three levels, through real time program updates for plant and system design and classification changes, by doing impact assessments of new PRA models as they occur, and by conducting RI-ISI updates based on ISI Program Inspection Periods, as defined in ASME Section XI. These activities manage and maintain the RI-ISI program as a living

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process, implementing component and inspection location changes real time as plant operations proceed.

Further, CPS maintains the plant safety related systems and components in accordance with applicable design and licensing bases. This includes assigning appropriate ISI Classifications, which in turn feed into the RI-ISI program scoping. Systems, piping, and components are continually evaluated and maintained through the station engineering change procedures. When modifications are made that impact the station safety functions and ISI Classifications, the RI-ISI program scoping and evaluations are updated accordingly.

As noted at the end of Relief Request I4R-01 Section 4, CPS implements an evaluation and ranking process that includes the Consequence Evaluation and Degradation Mechanism Assessment portions of the approved RI-ISI program to maintain the Risk Categorization and Element Selection methods of EPRI TR-112657, Revision B-A. These portions of the RI-ISI program are continually maintained and are reevaluated as major revisions of the site PRA occur and as modifications to plant configuration and/or design are made. The Consequence Evaluation, Degradation Mechanism Assessment, Risk Ranking, Element Selection, and Risk Impact Assessment steps encompass the complete living program process applied under the CPS RI-ISI program.

This living program evaluation was conducted at the end of each Section XI inspection period, including at the end of the Third Ten-Year Inspection Interval, in support of the transition to the new Fourth Interval. Changes resulting from plant modifications such as the Flexible Coping Strategy (FLEX) system connections and Reactor Water Cleanup (RWCU) piping replacement, as well as changes from the latest PRA model and historical examination coverage data were incorporated into the new Fourth Interval RI-ISI Program Risk Ranking and Element Selections. Finally, the EPRI TR-112657 prescribed Risk Impact Assessment was completed to confirm the Fourth Interval element selections met the governing risk metrics. The results of this evaluation are provided in the tables included in Relief Request I4R-01 Section 4 (Pages 4, 5, and 6), and the criteria were met for all individual systems as well as for the overall plant rollup.

As a result of the required process for the CPS ISI Fourth Interval Program, the RI-ISI evaluation was maintained as a living program, and a snapshot of the associated data at that point in time is included in the tables below which are similar to those provided in the Third Interval Program RAI response.

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Table 1
FAILURE POTENTIAL ASSESSMENT SUMMARY FOR CLINTON²

System	Thermal Fatigue		Stress Corrosion Cracking				Localized Corrosion			Flow Sensitive	
	TASCS	TT	IGSCC	TGSCC	ECSCC	PWSCC	MIC	PIT	CC	E-C	FAC
AAI ¹	X	X	X								X
AAP	X	X							X		
PFW	X	X									X
PHP	X										
PLP	X										
PMS											
PRH	X	X	X							X	X
PRI	X	X									
PRR			X								
PRT			X								X
PSC											
PSD											

Notes:

1. Includes Nuclear Boiler (PNB) System.
2. This table shows the assessed failure mechanisms for each system. The RI-ISI program addresses the cumulative impact of all mechanisms that were identified in each system.

TASCS – thermal stratification, cycling and striping, TT – thermal transients, IGSCC – intergranular stress corrosion cracking, TGSCC – transgranular stress corrosion cracking, ECSCC – external chloride stress corrosion cracking, PWSCC – primary water stress corrosion cracking, MIC – microbiologically influenced corrosion, PIT – pitting, CC – crevice corrosion, E-C – erosion-cavitation, FAC – flow accelerated corrosion

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Table 2
NUMBER OF ELEMENTS (WELDS) BY RISK CATEGORY FOR CLINTON²

System	High Risk			Medium Risk		Low Risk	TOTAL
	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6 or 7	All Categories
AAI¹			9	2			11
AAP					1	3	4
PFW	53	4			14		71
PHP		5		8		114	127
PLP		5		16		77	98
PMS				73		13	86
PRH		19	46	80	36	517	698
PRI		27		14	38	138	217
PRR		16		133		20	169
PRT	72	8		23	2		105
PSC				12		82	94
PSD						44	44
Total	125	84	55	361	91	1008	1724

Notes:

1. Includes Nuclear Boiler (PNB) System.
2. This table shows the results of the Risk Categorization for Clinton. The risk categories are defined in Figure 3-4 of EPRI TR-112657.

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Table 3
NUMBER OF INSPECTIONS BY RISK CATEGORY FOR CLINTON^{2, 3}

System	High Risk						Medium Risk				Low Risk		All Risk Categories	
	Category 1		Category 2		Category 3		Category 4		Category 5		Category 6 or 7			
	Pre-RI-ISI	RI-ISI	Pre-RI-ISI	RI-ISI	Pre-RI-ISI	RI-ISI	Pre-RI-ISI	RI-ISI	Pre-RI-ISI	RI-ISI	Pre-RI-ISI	RI-ISI	Pre-RI-ISI	RI-ISI
AAI ¹							2	1					2	1
AAP									1	1			1	1
PFW	9	14	4	1					7	2			20	17
PHP			2	2			1	1			21	0	24	3
PLP			2	2			2	2			18	0	22	4
PMS							16	8			5	0	21	8
PRH			8	4	1	4	11	8	9	4	82	0	111	20
PRI			27	7			7	2	38	4	5	0	77	13
PRR							44	14					44	14
PRT							3	3					3	3
PSC							0	2					0	2
PSD											4	0	4	0
Total	9	14	43	16	1	4	86	41	55	11	135	0	329	86

Notes:

1. Includes Nuclear Boiler (PNB) System.
2. This table provides a comparison of the current RI-ISI element selection to the previous Second Interval's 1989 ASME Section XI and BER programs (Pre-RI-ISI).
3. This table includes the number of welds previously selected for ASME Section XI and BER (Pre-RI-ISI), but excludes the number of welds previously selected for ASME Section XI and BER (Pre-RI-ISI) that now default to the augmented programs for IGSCC and FAC.