

Steam Generator Task Force Meeting with NRC



February 19, 2026

Agenda

1:00 pm	Welcome and Introductions	All Participants
1:10 pm	Opening Remarks	NRC and Industry
1:15 pm	Industry Presentation: <ol style="list-style-type: none">1. Recently Published Reports2. Status of Industry Guidance3. Interim Guidance4. NEI 03-08 Deviations5. Recent Operating Experience6. Status of Inspection Technique Qualifications	Industry
2:00 pm	Address Public Questions/Comments	NRC
2:15 pm	Adjourn	



**Recently Published Reports
Helen Cothron**

Steam Generator Digital Twin 2025 Project Update, 3002032167, Sept. 2025

- Outlines ongoing progress in developing a framework and web application hosted by EPRI for a steam generator Digital Twin platform.
- Previous reports detailed a generalized framework and a prototype web application.
- This update provides a status on the development of the prototype web application:
 - Additional security considerations
 - Expansion of database structure to store multiple plants data
 - Standardize unit handling and tools for data filtering
 - Plans for continued development

Steam Generator Examination Guidelines, 3002032139, Sept. 2025

- One of SGMP's six guidelines required by NEI 97-06 and SG Technical Specifications
- High level changes:
 - To more efficiently utilize the responsibility of ECT analysts, the QDA testing protocol was revised, the necessary training prior to a retest is now the responsibility of the proctor, and the waiting periods between retest have been removed.
 - Provided guidance for using flaws created with simulation software.
 - The appendix for automated data analysis was revised to incorporate lessons learned and to strength the grading criteria relating to testing and qualifying these systems.
 - Allow for using a vendor representative to verify critical aspects of the SG inspection. This change allows a utility to designate a vendor to fulfill a past plant/utility function.

Automated Analysis Performance Demonstration Database Qualification Program Protocol, R1, 3002032140, Sept. 2025

- This revision establishes a process for requesting administration of AAPDD proctoring to ensure EPRI SGMP member utilities may direct EPRI resources to best meet their needs.
- Updates the text to include machine learning (Data-Driven Predictive Analytics) auto analysis systems, e.g., Artificial Intelligence (AI) and Neural Networks (NN)
- The AAPDD grading criteria was updated to include new retest requirements along with a limitation on the number of false calls as specified within the SG Exam. Guidelines, Appendix L.

Multivariate Risk Assessment: Risk-Informed PWR Chemistry Strategies, 3002029522, Nov. 2025

- Most of the recommended measured parameters in the Primary and Secondary water chemistry guidelines are single variable, meaning that their recommended limits are considered independent of other parameters.
- An investigation was conducted to determine if chemistry control based on multiple variable measurements would provide benefit from a plant operations standpoint while also minimizing risk to plant components.
- Five multivariate combinations were investigated, two in the primary chemistry system, and three in the secondary chemistry system. Plant data and available literature regarding plant degradation mechanisms were used to inform recommendations in pursuit of these potential control methods.
- This information will be reviewed by the Guideline Revision Committee to determine if changes are needed to the water chemistry guidelines.

Assessment for Mitigating BOP Corrosion Product Behavior in PWRs/PHWRs During Layup and Startup, 3002030346, Dec. 2025

- In an effort to provide an optimized layup strategy for the BOP piping and components, a review of available literature data was performed to identify the effect of chemistry conditions during layup and startup on the stability of oxide layers, the corrosion of materials, and the corrosion product transport to the steam generators.

New Quantification Methodology for Polyacrylic Acid in PWR Secondary Water Chemistry, 3002030345, Dec. 2025

- This report presents the development and validation of a new method for quantifying polyacrylic acid (PAA) in secondary water.
- Key activities included optimizing the method solution matrix, calibration curve generation across various secondary water chemistries, recirculating loop testing to simulate plant conditions, and a plant demonstration of the method.
- Results show the method yields accurate, reproducible measurements over a broad concentration range with limits of detection suitable for typical operating conditions.
- This technique offers a simpler, faster, and more cost-effective alternative for routine PAA monitoring in plant laboratories.

Nuclear Steam Generator Thermal Performance State of Knowledge Sourcebook, 3002032146, Dec. 2025

- This Sourcebook is meant to provide SG Engineers with a single resource to understand SG thermal performance.
- It covers theoretical treatment of topics as well as operating experience including thermal performance tracking and effects of deposits to ensure plant performance can be sustained.



Status of Industry Guidance
Kester Thompson

NEI 03-08 Guidance Documents

Guideline Title	Current Rev #	Report #	Last Pub Date	Implementation Date(s)	Interim Guidance	Review Date	Comment
SG Integrity Assessment Guidelines	5	3002020909	Dec 2021	1/31/22	None		Reviewed 2025 - Revision in progress
EPRI SG In Situ Pressure Test Guidelines	5	3002007856	Nov 2016	8/31/17	None		Reviewed 2025 - Revision in progress
PWR SG Examination Guidelines	9	3002032139	Sept 2025	9/29/26	None	2029	

SGMP has no open deviations

NEI 03-08 Guidance Documents

Guideline Title	Current Rev #	Report #	Last Pub Date	Implementation Date(s)	Interim Guidance	Review Date	Comments
Primary Water Chemistry Guidelines	7	3002000505	April 2014	1/28/2015		2027	Reviewed in 2025 - No revision recommended
Secondary Water Chemistry Guidelines	8	3002010645	Sept 2017	6/27/2018	Published 2019, 2020, 2023, 2026	2027	Reviewed in 2025 - No revision recommended
PWR SG Primary-to-Secondary Leakage Guidelines	5	3002018267	Dec 2020	12/22/2021	None	2026	Reviewed in 2024 - No revision recommended



**No Significant Operating Experience Reported Since
the Last SGTf Meeting**



Status of Inspection Technique Qualifications
Randy Atkinson



ETSS Development Status

ETSSs Currently in Development

Common parameters (all techniques below)

- **Region of Interest:** Expansion Transition | **Material:** Inconel 600 MA | **Tube:** 0.043” wall, 0.75” OD
- 20511.1 was updated to include an eddy current signal tail adjustment procedure to account for false phase-based depths at the tail (small voltage, large depth); aligns well with MET profile

Status	ETSS #	Flaw Orientation	Probe Type	Technique Approach	Frequency
Pending sign-off	20511.1	ID Axial	Plus Point	Phase Based	300 kHz
Pending sign-off	20511.2*	ID Axial	Plus Point	Amplitude	300 kHz
Pending sign-off	20501.1	ID Axial	X-Probe	Detection	300 kHz
Pending sign-off	20501.2	ID Axial	X-Probe	Detection	200 kHz
In-progress	21410.1	OD Circ	Plus Point	Phase Based	300 kHz
In-progress	20400.1	OD Circ	X-Probe	Detection	300 kHz
In-progress	20400.2	OD Circ	X-Probe	Detection	200 kHz
*New ETSS					



ENSA Crack Library & Pedigree

Built a Library of Lab-Produced Cracks

- ENSA Lab-Produced Cracks in Tubing Freespan
- Eddy Current Data Acquired
- Metallurgical Analysis

Flaws	Amount	Type	% Through-Wall
Axial	12	PWSCC	30-90%TW
Circumferential	20	ODSCC	32-74%TW

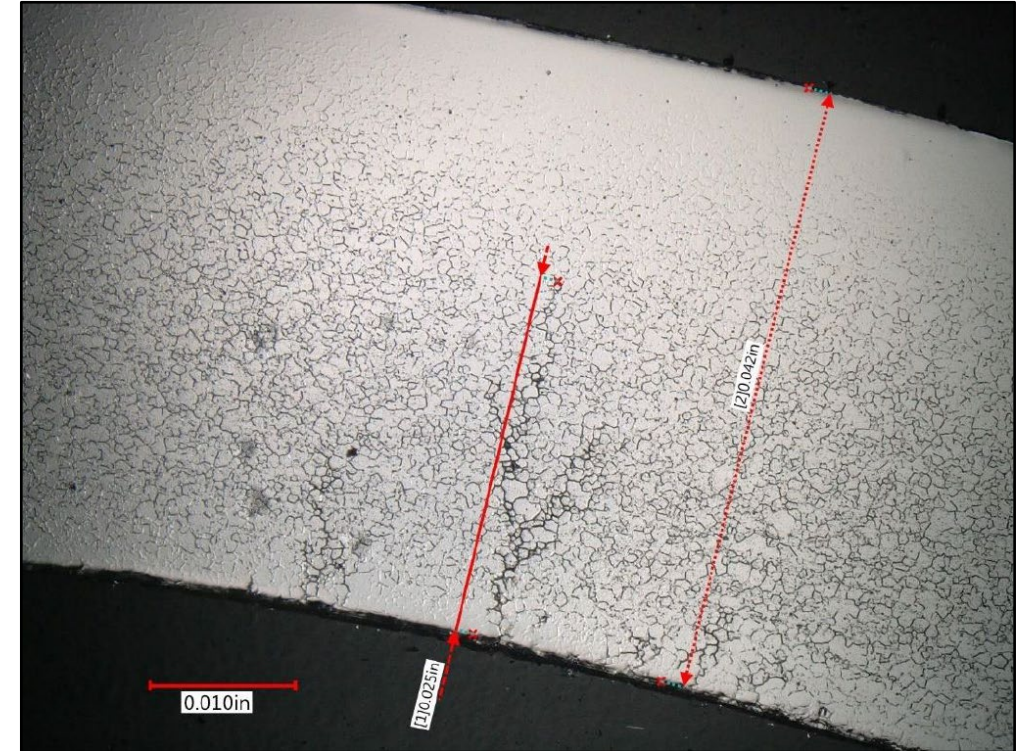


Specimens with ENSA Cracks

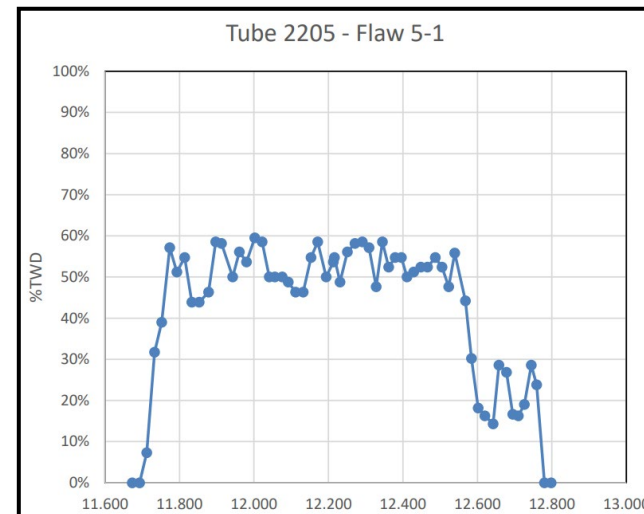
Metallurgically Analyzed ENSA Crack 2205-5-1 – Axial PWSCC

Final Mount Height	Wall Thickness	Depth	% Through Wall	Distance From Marked End
0.485	-	0	0%	11.673
0.505	-	0	0%	11.693
0.524	41	3	7%	11.712
0.545	41	13	32%	11.733
0.564	41	16	39%	11.752
0.586	42	24	57%	11.774
0.605	41	21	51%	11.793
0.626	42	23	55%	11.814
0.645	41	18	44%	11.833
0.665	41	18	44%	11.853
0.690	41	19	46%	11.878
0.709	41	24	59%	11.897
0.725	43	25	58%	11.913
0.755	42	21	50%	11.943
0.773	41	23	56%	11.961
0.792	41	22	54%	11.980
0.814	42	25	60%	12.002
0.834	41	24	59%	12.022
0.853	42	21	50%	12.041
0.868	42	21	50%	12.056
0.888	42	21	50%	12.076
0.904	41	20	49%	12.092
0.924	41	19	46%	12.112
0.944	41	19	46%	12.132
0.965	42	23	55%	12.153
0.983	41	24	59%	12.171
1.006	42	21	50%	12.194
1.025	41	22	54%	12.213
1.043	41	20	49%	12.231
1.063	41	23	56%	12.251
1.083	43	25	58%	12.271
1.103	41	24	59%	12.291
1.121	42	24	57%	12.309
1.140	42	20	48%	12.328
1.157	41	24	59%	12.345
1.174	42	22	52%	12.362

1.191	42	23	55%	12.379
1.208	42	23	55%	12.396
1.223	42	21	50%	12.411
1.241	41	21	51%	12.429
1.260	42	22	52%	12.448
1.278	42	22	52%	12.466
1.299	42	23	55%	12.487
1.317	42	22	52%	12.505
1.335	42	20	48%	12.523
1.351	43	24	56%	12.539
1.250	43	19	44%	12.568
1.234	43	13	30%	12.584
1.216	44	8	18%	12.602
1.198	43	7	16%	12.620
1.176	42	6	14%	12.642
1.160	42	12	29%	12.658
1.140	41	11	27%	12.678
1.123	42	7	17%	12.695
1.108	43	7	16%	12.710
1.092	42	8	19%	12.726
1.073	42	12	29%	12.745
1.059	42	10	24%	12.759
1.038	-	0	0%	12.780
1.020	-	0	0%	12.798



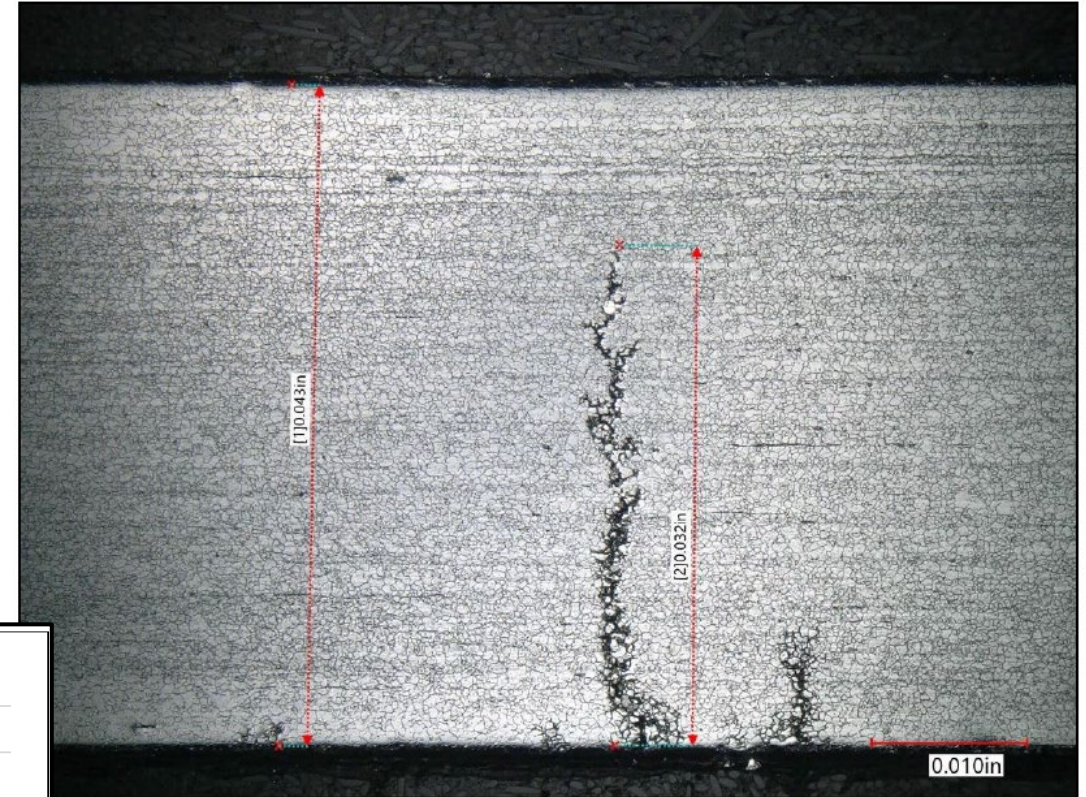
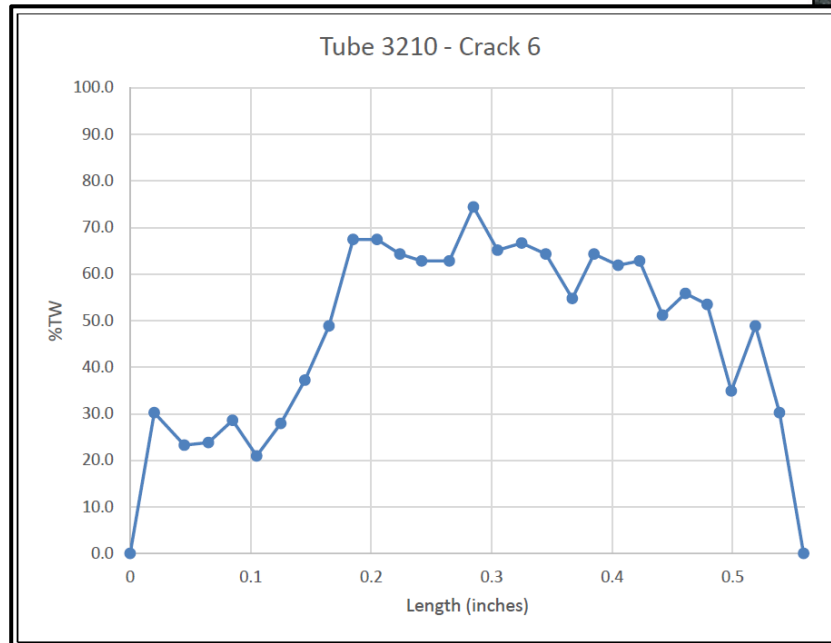
Metallurgical Photo



Metallurgically Analyzed - Tube 3210 – Circ ODSCC Flaw 6

Flaw Depth (mils)	Wall Thick (mils)	No. of Cracks	Circ Position (degrees)	%TW
0	42	0	333.3	0.0
0	42	0	336.3	0.0
0	42	0	339.4	0.0
0	43	0	346.5	0.0
13	43	6	349.6	30.2
10	43	8	353.4	23.3
10	42	9	356.5	23.8
12	42	6	359.5	28.6
9	43	10	2.6	20.9
12	43	8	5.6	27.9
16	43	10	8.7	37.2
21	43	6	11.8	48.8
29	43	4	14.8	67.4
29	43	4	17.9	67.4
27	42	9	20.8	64.3
27	43	4	23.5	62.8
27	43	2	27.0	62.8
32	43	2	30.1	74.4
28	43	3	33.2	65.1
28	42	1	36.2	66.7
27	42	3	39.3	64.3
23	42	4	42.6	54.8
27	42	2	45.4	64.3
26	42	2	48.5	61.9
27	43	3	51.2	62.8
22	43	3	54.1	51.2
24	43	3	57.0	55.8
23	43	2	59.8	53.5

Flaw Depth (mils)	Wall Thick (mils)	No. of Cracks	Circ Position (degrees)	%TW
15	43	5	62.8	34.9
21	43	2	65.9	48.8
13	43	1	68.9	30.2
0	42	0	72.0	0.0



Metallurgical Photo



Use of Signal Injection to Supplement the Data Set

Injection of Freespan SCC into Expansion Transition

- New ENSA axial PWSCC Lab-Cracks are ~1.00” in length
- Expansion Transitions are ~0.25” in length; field flaws range from about 0.15” to 0.3” NDE length
- Signal Injection Software was used to compress the length of ENSA flaws from ~1.00” to ~ 0.20 to 0.25”
- Zetec Signal InjECT™ Software was used to inject the ENSA cracks
 - EPRI completed Signal InjECT Software validation 2024
 - QDAs completed peer review the Signal InjECT Software 2025





How We Update an ETSS

How SGMP Updates an ETSS

- 1) **Assemble candidate data** (new lab-produced cracks + existing ETSS data).
- 2) **Check compatibility** against an accepted benchmark set (e.g., pulled/doped steam tubes or the axial PWSCC ARC). (new practice)
- 3) **Apply statistical tests** per EPRI guidance to confirm the data sets behave consistently. (new practice)
- 4) **Exclude outliers** only if they fail the compatibility tests; re-run the statistics. (new practice)
- 5) **Rebuild the sizing model** (regression) using the accepted data set.
- 6) **Deliver ETSS outputs** used by integrity analyses (e.g., BED/BEL, indices, POD inputs).

Additional Tube Integrity Inputs

- For the axial PWSCC ETSS updates, the following elements were added to assist the Tube Integrity Engineers
 - BED — Burst Effective Depth
 - BEL — Burst Effective Length
 - POD / MAPOD inputs (A-hat bases)
 - Total length measurement uncertainty (allows for rapid assessment of CM)

	ROW	COL	PHASE	P-P VOLTS	MAX VOLTS	Max Depth EST	RA Max Depth MET	Total Length EST	Total Length MET	BED EST	BED MET	BEL EST	BEL MET
	2498	SP1 (2,3)	24	0.97	0.40	73	49	0.24	0.18	58.30	46.70	0.17	0.13
	2498	SP1 (4)	21	0.97	0.35	61	60	0.20	0.14	49.00	58.50	0.13	0.11
	2498	SP1 (6,5)	17	0.67	0.20	46	49	0.15	0.18	39.70	46.70	0.09	0.14



New Voltage Based Sizing Option

Methodology Variance Between 20511.1 and 20511.2

- 20511.1 (Phase-Based Sizing):
 - The maximum depth sizing procedure was updated to align the procedure more with flaw morphology characteristics
 - Eddy current signal tail adjustment procedure is included to account for false phase-based depths at the tail (small voltage, large depth); aligns well with MET profile
 - Eddy current signal tail adjustment procedure can influence both maximum depth and BED/BEL
- 20511.2 (Voltage-Based Sizing):
 - A log-normal fit of %TW on +Pt voltage is used; same as for axial ODSCC depth sizing
 - Voltage based sizing eliminates analyst judgment and phase-related effects from the tubesheet material, deposits, and expansion transition geometry

Summary

- Axial PWSCC at Expansion Transition ETSSs
 - In final review pending QDA and Engineering signatures
- Circumferential ODSCC Expansion Transition ETSSs
 - In development pending release in 2026



NRC Address Public Comments



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