



# **PWR Supplemental Surveillance Program (PSSP): Update**

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# MRP Programs to Address Paucity of High-Fluence PWR Surveillance Data

1. Withdraw/Test CLB (current licensing basis) capsules at a higher fluence (Coordinated Reactor Vessel Surveillance Program, CRVSP, see MRP-326) (2011)
  - CRVSP has been fully implemented
2. Design, fabricate, irradiate and test 2 supplemental capsules (PWR Supplemental Surveillance Program, PSSP)
  - In development
3. Related research: atom probe tomography (APT) examination of high-fluence PWR surveillance specimens to identify microstructural characteristics of highly irradiated LAS specimens (2014-2015)

# PWR Supplemental Surveillance Program (PSSP) Overview

- Design/Fabricate/Irradiate 2 supplemental surveillance capsules containing previously-irradiated PWR materials
  - Reconstitute previously-irradiated specimens (per ASTM E1253)
  - Goal: Obtain ~24 new high-fluence transition temperature shift (TTS) data points
    - Each capsule will contain ~12 materials
- Insert capsule(s) in 2016
- Irradiate ~10 years
  - Withdraw capsules & obtain data by ~2026/2027

# PSSP Overview, continued

- PSSP is a research program designed to generate data for informing future ETCs
- PSSP is not an integrated surveillance program
- PSSP does not alter any plant's 10 CFR 50 Appendix H program or commitments
- Future data generated by the PSSP will need to be considered by plants in vessel embrittlement evaluations, per 10 CFR 50.61 and other guidance, if a PSSP material is in an RPV beltline

# Permissions for Use of Material

- After 12/5/2013 Public Meeting on RPV issues, MRP reviewed specific license conditions and license renewal commitments of plants from whom surveillance materials are desired
  - No plants with relevant license conditions
  - 2 plants with relevant license renewal commitments
    - Kewaunee – awaiting approval of license amendment to remove commitment
    - Other plant was removed from list because the few specimens desired for upper shelf energy did not justify plant expense to address issue; substitute was found
- In process of obtaining plant permissions to use specimens
  - Most plant permissions to use archive broken CVN specimens have been provided to MRP

# Specific Materials Selected<sup>1</sup> for PSSP & APT Research Programs

<sup>1</sup>Not all plant owner permissions have been obtained and some Licensees may not give permission. Therefore, substitutions may be required.

# Selected<sup>1</sup> Materials for the PSSP (1 of 3)

Type	Material ID or Heat	Plant Name	No. of Broken Halves for Use in the PSSP <sup>1,6</sup> + APT Testing <sup>4</sup>	Est. No. of Irradiated Charpy Broken Halves in Storage <sup>2</sup>	Remaining Untested Capsules <sup>3</sup>	Relevant (Restricting) License Conditions or LR Commitments ?
A533B1	B9004-2	Beaver Valley 2	12	300	2	No
A533B1	B6919-1	Farley Unit 1 <sup>5</sup>	11	300	0	No
A533B1	B7212-1	Farley Unit 2 <sup>5</sup>	12 + 2	450	0	No
A5082	125P666	Ginna	12	82	1	No
A5082	125S255	Ginna	12	68	1	No
A5082	123V500	Point Beach 2	12	48	2	No
A5082	980919/ 281587	Sequoyah Unit 1	12	156	4	No
BOLA	BOLA	Farley Unit 2 <sup>5</sup>	12	270	0	No



# Selected<sup>1</sup> Materials for the PSSP (2 of 3)

Type	Material ID or Heat	Plant Name	No. of Broken Halves for Use in the PSSP <sup>1,6</sup> + APT Testing <sup>4</sup>	Est. No. of Irradiated Charpy Broken Halves in Storage <sup>2</sup>	Remaining Untested Capsules <sup>3</sup>	Relevant (Restricting) License Conditions or LR Commitments?
L1092	1P3571	Kewaunee	11 + 2	~100	2	Yes – LR commitment
L0091	33A277	Farley 1 <sup>5</sup>	11 + 2	180	0	No
SMIT 89	25295	Sequoyah 1	12	108	4	No
A533B1	C5161-1	Diablo Canyon 2	4	225	2	No
A533B1	R1606-2	South Texas 1	12	300	2	No
A533B1	B5012-1	McGuire Unit 1	11	240	1	No
A302B	PSO102	San Onofre 1	11	Decommissioned		
A5082	5P-5933	Byron Unit 1	12	225	3	No
A5082	990496/292424	North Anna 2	11	52	5	No

# Selected<sup>1</sup> Materials for the PSSP (3 of 3)

Type	Material ID or Heat	Plant Name	No. of Broken Halves for Use in the PSSP <sup>1,6</sup> + APT Testing <sup>4</sup>	Est. No. of Irradiated Charpy Broken Halves in Storage <sup>2</sup>	Remaining Untested Capsules <sup>3</sup>	Relevant (Restricting) License Conditions or LR Commitments ?
A5082	526840	McGuire Unit 2	11	300	2	No
L80	442002	Byron Unit 1	11	135	3	No
L124	4P4784	V.C. Summer	12	180	1	No
L124	PTRO01	Trojan	12	Decommissioned		
L80	61782	Ginna	12	74	1	No
L124	90209	South Texas 2	11	180	2	No
L0091	90136	Millstone Unit 2	12	36	3	No
L1092	20291/12008	McGuire Unit 1	3	210	1	No

# Notes to Selected Materials Table

1. Not all plant owner permissions have been obtained and some may not give permission. Therefore, substitutions may be required.
2. Based on experience, some broken halves may not be useable for reconstitution; however, most are. To reconstitute a capsule with 12 weld Charpy specimens and 12 base material specimens, approximately 24 to 28 useable broken Charpy halves are required.
3. Each capsule produces 72 to 120 broken Charpy halves after testing.
4. Atom Probe Tomography (APT) examination.
5. Unit has tested 80-year fluence capsule.
6. A minimum of 11 or 12 broken CVN halves are required; up to three more could be required, depending on suitability for reconstitution.

# PSSP – Host Plant Status

- Duke Energy has agreed for Shearon Harris to host a PSSP capsule, insertion in 2016
- Southern Nuclear has agreed for Farley Nuclear Plant to host a PSSP capsule, insertion in 2016
- Contracting action for vendor to fabricate capsules in progress
- Plan is to start building capsules in 3Q14, ship in 2015, insertion in 2016

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