Sequoyah Unit 2
Fall 2003 Outage Phone Call Discussion Points
November 24, 2003

1. Discuss whether any primary to secondary leakage existed in this unit prior to shutdown.

During fuel cycle 12, SQN Unit 2 experienced a fuel defect beginning ~ 100 days into the cycle, which increased reactor coolant activity by about a factor of 1000 in iodine and xenon levels. The increased reactor coolant xenon activity increased the ability of the Condenser Vacuum Exhaust Radiation Monitors (CVE RM's) to detect primary to secondary leakage. This increased detection ability made possible the detection of a primary to secondary leak rate of 0.16 gpd by the CVE RM's on December 5, 2002. The primary to secondary leak indication then dissipated, and, following a forced outage in late December, has decreased to less than detectable when using CVE RM indication. Steam Generator samples have been concentrated on resin impregnated filters and on cation columns. A small amount of activity has been noted in Steam Generators 2 and 3. Further sampling using these methods indicated that a very small leak is probably in SG 3. Late in September of 2003, primary-to-secondary leakage spiked up to 0.25 gpd and decreased in October and has held steady at 0.14 gpd.

2. Discuss the results of secondary side pressure tests.

Since primary to secondary leakage was so low, no pressure test is planned.

3. For each steam generator, provide a description of areas examined, including the expansion criteria utilized and type of probe used in each area. Also, be prepared to discuss your inspection of the tube within the tubesheet, particularly the portion of the tube below the expansion/transition region.

Inspection Plan

100% Full-length bobbin examination in all 4 SGs.

100% Hot leg top of tubesheet (TTS) RPC examination in all 4 SGs using a plus point probe +2"/-8".

100% Rows 1-11 and 20% rows 12-20 U-bends using a +Point probe or MHI probe

100% freespan dings $\geq$ 2 volts (Cycle 11) from HTS to H07 using the +Pt probe

100% TSPs H01 to C07 dented greater than or equal to 2 volts using the +Pt probe

100% of AVB locations with dents with a +Pt probe

100% of all dents or dings in the U-bend region (any voltage) using the +Pt probe

Expansion Criteria

TTS +Point

The top of tubesheet RPC examinations will be expanded to the cold leg (20% sample) if any SG is categorized as C-3 or if any tube with a top of tubesheet indication fails the NEI 97-06 performance criteria.

U-Bend MHI Probe

If one or more circumferential crack-like indications are detected in Rows 9-11, then 100% of Row 12-20 U-bends shall be examined with the MHI probe (or equivalent). If one or more circumferential crack-like indications is detected in Rows 12-20, then 100% of all U-bends shall be examined with the MHI probe (or equivalent). If axial crack-like indications are detected in Row 3-8 U-bends, then 100% of Rows 12-17 shall be examined with the MHI probe (or equivalent). If axial crack-like indications are detected in Rows 9-10, then 100% of U-bends up to and including Row 25 shall be examined with the MHI probe (or equivalent).

Dented TSP Intersection +Point

The hot leg dented intersections are considered the critical area and C07 is considered the buffer zone. If a PWSCC axial or circ at a dented TSP or ODSCC circ at a dented TSP is identified at C07, then a expansion to 20% of the C06 intersection (dented >2v) would then be required. The new buffer zone would be considered as C06.

If circ cracking is identified in the dent inspection in a lower voltage dent (2-5) volts, then, 100% expansion to the >1-volt dent population (critical area and buffer area to be defined) would be performed to bound the condition. Refer to U1C10 operational assessment and U1C11 condition monitoring.

Straight length Freespan Ding +Point

If one or more crack-like indications are identified associated with freespan dings from H06-H07, then 100% of $\geq$ 2 volt dings (Cycle 11 voltage) between C07 and C06 will be inspected.

4. Discuss any exceptions taken to industry guidelines.

Two exceptions with Rev. 6:

The MHI Intelligent Array Probe (IAP) utilizes a nominal 0.004 inch radial dent (360º) in lieu of the radial expansion for establishing phase. This deviation has no impact to the plant or its' operation nor does it have any impact on the technique's capabilities. The methodology put into Revision 6 relied primarily on a particular vendor of the array probe and made no effort to accommodate variations. Either method provides for a reproducible method of establishing phase. The deviation was successfully utilized during the Peer Review process for the IAP at EPRI in Charlotte to qualify the probe we will be using for the detection of PWSCC in low row U-bends.

9 probes utilized during the inspection were expedited to site from Japan and from Issaquah WA. These were previously manufactured probes that did not have a certificate of conformance as required by Rev. 6. The probes were however, receipt inspected onsite and each probe was connected to a test instrument and functionally tested.

5. Provide a summary of the number of indications identified to-date of each degradation mode and steam generator tube location (e.g., tube support plate, top-of-tubesheet, etc.). Also provide information, such as voltages, and estimated depths and lengths of the most significant indications.

	S/G	Row	Col	Location	Crack X of X	ID/OD	Ax/Circ	FLDA	360 Degree Degraded Area	Length		Max Depth	Max Volts	Burst from NDE indicated
										Inches	Deg			
ODSCC HTS Axial														
	2	10	23	HTS+0.21		OD	AXIAL	24.70		0.19		49	0.12	7861
	2	14	67	HTS+0.21		OD	AXIAL	26.50		0.12		48	0.11	7936
	4	4	5	HTS-0.85	1OF3	OD	AXIAL	33.33		0.16		57	0.23	7345
	4	4	5	HTS-0.26	3OF3	OD	AXIAL	22.00		0.16		33	0.15	8210
	4	4	5	HTS-0.35	2OF3	OD	AXIAL	16.43		0.21		47	0.26	8517
	4	5	6	HTS-0.53	1OF3	OD	AXIAL	38.11		0.09		61	0.13	7177
	4	5	6	HTS-0.09	3OF3	OD	AXIAL	47.67		0.08		93	0.09	6526
	4	5	6	HTS-0.28	2OF3	OD	AXIAL	57.67		0.09		81	0.11	5697
	4	6	6	HTS-0.26		OD	AXIAL	30.47		0.21		49	0.16	7412
	4	7	6	HTS-0.16		OD	AXIAL	25.64		0.48		49	0.61	7351
	4	13	32	HTS-0.08		OD	AXIAL	60.63		0.16		84	0.37	5117
	4	20	33	HTS-0.02		OD	AXIAL	15.88		0.22		61	0.15	8568
ODSCC HTS Circ														
	3	15	22	HTS+0.00		OD	CIRC		0.00		30	1	0.13	
	4	8	53	HTS-0.09		OD	CIRC		0.00		29	4	0.12	
ODSCC SLUDGE PILE AXIAL														
	2	16	57	HTS+0.91		OD	AXIAL	35.44		0.27		62	0.12	6859
PWSCC HTS Axial														
	1	15	33	HTS-8.67		ID	AXIAL	66.68		0.69		98	2.94	
	2	11	60	HTS-6.74		ID	AXIAL	27.04		0.47		47	0.59	
	2	19	72	HTS-0.79		ID	AXIAL	38.24		0.17		68	0.35	6904
	2	20	60	HTS-0.52		ID	AXIAL	42.60		0.15		85	0.42	6692
	2	35	40	HTS-7.25	2of3	ID	AXIAL	61.53		0.77		98	2.39	
	2	35	40	HTS-6.75	1of3	ID	AXIAL	27.50		0.10		41	0.33	
	2	35	40	HTS-7.96	3of3	ID	AXIAL	25.67		0.09		41	0.49	
	3	21	30	HTS-9.48		ID	AXIAL	65.14		0.21		99	0.72	
	3	35	31	HTS-9.42		ID	AXIAL	38.58		0.31		86	1.91	
	4	6	46	HTS-0.68		ID	AXIAL	28.60		0.10		61	0.51	7932
PWSCC HTS Circ														
	3	8	23	HTS-0.03		ID	CIRC	17.87	1.35		27	39	0.50	9003
	3	24	31	HTS-0.22		ID	CIRC	34.73	4.04		41	65	0.71	8767
	3	34	31	HTS-9.80		ID	CIRC	44.39	5.56		45	96	1.35	8656

We will discuss ODSCC indications at supports (GL 9505) on the phone call as well as AVB Wear and Cold Leg Thinning

6. Describe repair/plugging plans for the SG tubes that meet the repair/plugging criteria.

All crack-like indications will be plugged on detection except for ODSCC at TSPs, which will follow alternate repair criteria GL 95-05

AVB wear and Cold Leg Thinning is plugged at 40%. All other wear is plugged on detection.

7. Discuss the previous history of SG tube inspection results, including any "look backs" performed. Specifically for significant indications or indications where look backs are used in support of dispositioning (e.g., manufacturing burnish marks).

All new indications including manufacturing burnish marks (MBM) will be traced back to the first optical recording of that data (Cycle 5- April, 1992). Indications exhibiting change or not verifiable in the Cycle 5 data will be dispositioned by enhanced techniques and/or repair

8. Discuss, in general, new inspection findings (e.g., degradation mode or location of degradation new to this unit).

We have found no new degradation.

9. Discuss your use or reliance on inspection probes (eddy current or ultrasonic) other than bobbin and typical rotating probes, if applicable.

MHI array probe is being used for the U-Bend exams in rows where the probe will pass through the U-Bend. This probe was qualified through the EPRI Appendix H process for 7/8” tubing

10. Describe in-situ pressure test plans and results, if applicable and available, including tube selection criteria.

No indication thus far exceeds criteria for in situ testing.

11. Describe tube pull plans and preliminary results, if applicable and available; include tube selection criteria.

No tube pull is required for this outage.

12. Discuss the assessment of tube integrity for the previous operating cycle (i.e., condition monitoring).

Each indication is sized using appropriate sizing techniques, and a burst pressure is

calculated. If the burst pressure is below performance criteria, the indication will be in situ pressure tested. Each indication is also evaluated for leakage using voltage screening.

13. Provide the schedule for steam generator-related activities during the remainder of the current outage.
Eddy current will be completed on 26th.

14. Discuss the following regarding loose parts:
> what inspections are performed to detect loose parts

Bobbin coil exam identifies potential loose parts. FOSAR is performed on all 4 SGs. Look down several columns, down the tube lane, both sides of the annulus.

> a description of any loose parts detected and their location within the SG

No significant parts have been identified thus far.

> if the loose parts were removed from the SG

> indications of tube damage associated with the loose parts

No indications of loose parts wear thus far

> The source or nature of the loose parts if known

15. If steam generators contain thermally treated tubing (Alloy 600 or 690), discuss actions taken (if any) based on Seabrook's findings documented in Information Notice (IN) 2002-21)?

N/A