

Beaver Valley 1R14 NRC Outage Status Discussion Points  
September 19, 2001

**1. Primary to secondary leakage prior to shutdown**

No primary to secondary leakage was reported for any SG prior to shutdown.

**2. Results of secondary hydro**

No secondary hydro planned for 1R14

**3. General description of areas examined, expansion plans, probes**

- Hot Leg TTS: 100% +Pt inspection from 6" above to 8" below TTS
- Small Radius U-bends: 100% mid-range +Pt, 100% high frequency +Pt inspection of Row 1, Row 2, and 20% of Row 3
- Bobbin: 100% full length bobbin Row 3 and greater. 100% bobbin in straight length tube region in Rows 1 and 2.
- Dents >5V: 100% +Pt inspection
- Expanded cold leg TSP Intersections (SG A only): 100% +Pt inspection

The above program encompass 100% inspection of the target area and therefore, no expansion plan is necessary.

- Cold Leg TTS: Not required per EPRI ISI Guideline, 20% of sludge pile region inspected at cold leg TTS from 6" above to 8" below TTS. Expansion to 100% of sludge region with 20% buffer zone if indications are detected. Expansion to 100% of cold leg TTS if flaws observed in buffer zone.
- Freespan Dings: 20% +Pt inspection for dings >5V by bobbin. Expansion to 100% of dings >5V if indication is reported.
- Alloy 690 Roll Plugs: 20% +Pt inspection of hot leg plugs. Expansion to 100% of all roll plugs if indication is reported.
- Dents and Dings >2V but <5V up to 03H: 20% +Pt inspection of dents and dings from TTS up to and including 03H. Expansion to 100% of dents and dings >2V but <5V if PWSCC is reported.

**4. Description of Indications**

TSP ODSCC: Detected amplitude distribution appears consistent with the past 4 outages, however, 1 large voltage (5.30 volts) DSI was reported in SG C. Next largest DSI amplitude is 2.2 volts in SG C. Largest DSI in SG A is 2.71 volts, in SG B, largest DSI amplitude is 2.01 volts. Preliminary bobbin data suggests slight decrease in TSP ODSCC growth rates compared to Cycle 13 (0.07 volts average vs 0.135 volts average). Number of indications is essentially equal to 1R13.

TTS ODSCC/PWSCC: The following table presents a summary of tubesheet region/sludge pile flaws reported to date.

BVPS 1R14 Hot Leg TTS Flaw Summary to Date							
SG	Axial ODSCC	Axial PWSCC *	Circ ODSCC	Circ PWSCC *	VOL OD	Total	% Complete
A	19	1	0	0	0	20	36(+) **
B	17	3	3	0	1 (wear)	24	99
C	23	3	0	2	0	28	100

\*: All PWSCC indications are located >1.5" below TTS

\*\*:

The ODSCC indications detected have been very low amplitude, of short length, and shallow. The average axial ODSCC +Pt amplitude is 0.12 volts, with a maximum of 0.26 volts.

The circ ODSCC indications reported are likely not attributed to a corrosion mechanism.

The circ PWSCC indications reported are less than 60 degrees arc length.

Small Radius U-bend PWSCC: To date, U-bend mid-range and high frequency +Pt has been completed performed in all SGs.

The following table presents a summary of U-bend PWSCC flaws reported to date.

BVPS 1R14 Small Radius U-bend Flaw Summary to Date			
SG	Axial PWSCC	Circ PWSCC	% Complete
A	0	1	100
B	1	0	100
C	0	1	100

Chemical cleaning was performed at the beginning of the outage. All evidence of the residual sludge pile appears to have been removed. Tube freespan OD deposits appear to have been removed. The removal of the OD deposits/sludge pile has enhanced the flaw detection capabilities. As a result, an increased number of tube OD flaws at the TTS was anticipated. The number of indications is greater than reported at 1R13, however, the flaw parameters indicate that all appear to be of shallow depth.

##### 5. Description of Repair/Plugging Plans

All reported crack-like indications except those addressed by GL 95-05 are repaired by plugging. Tube repair consistent with GL 95-05 will be followed.

AVB wear indications are sized using the bobbin coil, and plugging is performed if depth is  $\geq 40\%TW$ . Cold leg thinning indications are sized using the bobbin coil, and plugging is performed if depth  $\geq 40\%TW$ .

All loose part/foreign object wear indications are repaired by plugging.

**6. Discussion of look-backs performed, consideration of similar plant experience**

Growth rate analyses per GL 95-05 is being performed. Look back analysis is performed for all flaw calls within tubesheet, sludge pile, and U-bend region. History lookups of 1R14 sludge pile indications suggest precursor signals are present in the 1R13 data, with possible sludge influence.

**7. Discussion of new inspection findings**

No new degradation modes have been observed to date. No freespan indications outside of the historical sludge pile boundaries have been observed.

**8. Description of in situ pressure test plans**

Screening of indications will follow guidance of EPRI in situ guidelines. Flaw screening parameters have been developed prior to the outage. Lower tolerance limit material properties and conservative flaw assumptions have been used. Indications that exceed the screening criteria will be in situ tested. FENOC has conservatively chosen to in situ pressure test a subset of indications if no indications are required to be tested.

**9. Describe tube pull plans**

GL 95-05: Tube pull is scheduled to occur. If possible, the largest amplitude bobbin DSI signal will be pulled.

Tube pull for other reasons will only be performed if an indication is observed which is believed to not meet the structural performance criterion.

**10. Assessment of tube integrity for previous outage**

Indicated that all structural and leakage integrity characteristics were met.

**11. Assessment of tube integrity for next operating cycle**

Based on TTS +Pt results, no sludge pile ODS/CC indications that could challenge either structural or leakage integrity criteria are expected.

A conservative allowance for flaw growth will be combined with both assumed non-detected flaws and an allowance for new initiate appearance will be included.

**12. Schedule for steam generator related activities during remainder of outage**

1R14 S/G inspections expected to be complete by 9/26/01.

### 13. Lessons Learned

- a) New degradation modes if detected, will be thoroughly examined using all available inspection techniques (bobbin, RPC). In situ pressure testing will be considered if a mechanism not seen at any other plant is reported.
- b) Noise levels based on 1R13 eddy current data were evaluated using the Westinghouse methodology, and it was determined that the noise levels were sufficiently low such that indications that could potentially grow to structural or leakage limits would not be masked by the noise. Chemical cleaning was performed at the beginning of the outage. The chemical cleaning process applied combined a bulk cleaning process and an additional TSP crevice cleaning process. The clarity of the eddy current signals is markedly increased, and potential noise influence has dramatically decreased.
- c) Data quality issues are addressed by use of a "data cop" for each shift. The data cop is a qualified data analyst who reviews the quality of the data during the acquisition process. Data judged to be too noisy is rejected prior to analysis. Control tubes are used for bobbin data. Control tubes are a small group of tubes that are tested at the beginning and end of each calibration group. By testing each control tube in each cal group, probe response consistency is shown. EDM notch response amplitudes and non-notch region responses are compared for each +Pt calibration group to establish consistency.