

## **MRP** Materials Reliability Program \_\_\_\_\_ MRP 2020-015

August 14, 2020

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U.S. Nuclear Regulatory Commission  
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ROCKVILLE, MD 20852

SUBJECT: 2020 Biennial Report of Recent MRP-227-A Reactor Internals Inspection Results

Dear Sir:

The purpose of this document is to provide NRC staff members with a report of recent pressurized water reactor (PWR) utility inspection results as delineated by the Inspection and Evaluations guidelines of MRP-227-A. Previous results were provided in EPRI letters MRP 2014-006 (ML14135A383-85), MRP 2016-008 (ML16144A789), and MRP 2018-025 (ML18204A161).

Enclosed with this document are individual plant utility outage reports through mid-2020 using the templates provided by EPRI letter MRP 2012-013. Twenty-five (25) additional MRP-227-A-related reactor internals inspections at U.S. domestic plant inspections have been included in this document.

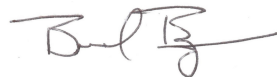
In the next 24 months, several additional U.S. domestic plants will perform these inspections and the MRP will continue to monitor the inspection results and findings in accordance with NEI 03-08.

If additional information is required, please contact K. Amberge, B. Burgos or me.

Sincerely,



Chris Koehler, Xcel Energy  
MRP Research Integration Committee Chair



Brian Burgos, Sr. Program Manager  
EPRI-MRP

Enclosure: MRP-227 Related Inspections Performed in USA

Cc: MRP RIC, MRP Internals & Integrity TAC, MRP Pressure Boundary TAC, MRP Inspection TAC, PMMP EC

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MRP-227 Related Inspections Performed in USA through mid-2020

1. Surry unit 2, May 2014, 31.28 EFPY
2. Calvert Cliffs unit 1, Feb. 2018, 34 EFPY
3. Catawba unit 2, March 2018, 27.1 EFPY
4. Indian Point unit 2, March 2018, 32.76 EFPY
5. DC Cook unit 2, March 2018, 27.884 EFPY
6. North Anna unit 1, March 2018, 32.44 EFPY
7. Farley unit 1, April 2018, 33.89 EFPY
8. Beaver Valley unit 1, May 2018, 30.71 EFPY
9. McGuire unit 2, Sept.2018, 29.58 EFPY
10. Turkey Point unit 3, Oct. 2018, 34.45 EFPY
11. ANO unit 2, Oct. 2018, 31.63 EFPY
12. Catawba unit 1, Nov. 2018, 28.47 EFPY
13. Sequoyah unit 2, Nov. 2018, 28.3 EFPY
14. Indian Point unit 3, March 2019, 30.3 EFPY
15. Calvert Cliffs unit 2, March 2019, 35 EFPY
16. North Anna unit 2, March 2019, 32.5 EFPY
17. D.C. Cook unit 1, March 2019, 29.1 EFPY
18. Farley unit 2, April 2019, 32.83 EFPY
19. McGuire unit 1, April 2019, 30.15 EFPY
20. Salem unit 1, April 2019, 29.5 EFPY
21. Millstone unit 3, April 2019, 26.3 EFPY
22. Beaver Valley unit 1, Oct.2019, 32.12 EFPY
23. Saint Lucie unit 1, Oct. 2019, 34.95 EFPY
24. Oconee unit 3, March 2020, 37.4 EFPY
25. Vogtle unit 1, March 2020, 29.6 EFPY

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## Tables for Reporting MRP-227-A Inspection Results for Westinghouse Plants

Plant Name: Surry Unit 2 Utility: Dominion Generation

Date of Exams: April 30<sup>th</sup> – May 8<sup>th</sup>, 2014 Plant Age: 41 (Jan 29, 1973) (years) / 31.28 EFPY

**Note:** This report includes the cumulative results of three separate inspections. New results for Spring 2014 include external core barrel inspections (girth welds, thermal shield flexures, clevis inserts, etc.)

### Primary Components

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings (Note 1)
<b>Control Rod Guide Tube Assembly</b> Guide plates (cards)	Visual examination (VT-3)	20% examination of the number of CRGT assemblies, with all guide cards within each selected CRGT assembly examined.  See Figure 4-20 of MRP-227-A	100% of the 20% examination requirement. 10 CRGTs were selected, and a discussion of these CRGT assemblies is below.	No findings – all examinations were satisfactory. Ligament wear was $\leq$ 10%.

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings (Note 1)
<p><b>Comments:</b> The following CRGTs were examined per the requirements of MRP – 227 – A: C7 (Shutdown Bank A) Near ‘C’ Cold Leg Nozzle, D4 (Bank C) Near ‘C’ Cold Leg Nozzle, F10 (Bank D) Control Bank Near ‘B’ Cold Leg Nozzle, G9 (Shutdown Bank B) Shutdown Bank Near Core Center, J7 (Shutdown Bank B) Shutdown Bank Near Core Center, J13 (Shutdown Bank A) Shutdown Bank Near ‘B’ Hot Leg, K4 (Bank B) Control Bank B Near ‘A’ Hot Leg Nozzle [RHR Supply], L11 (Shutdown Bank B) Shutdown Bank Near ‘B’ Hot Leg Nozzle, M10 (Bank B) Control Bank B Between ‘A’ Cold Leg Nozzle and ‘B’ Hot Leg Nozzle, N9 (Shutdown Bank A) Near ‘A’ Cold Leg. Bank refers to control or shutdown bank group (typ). Of the CRGTs examined, one was common to Surry Unit 1. No findings to report – all examinations were satisfactory, and ligament wear was <math>\leq 10\%</math> (<math>&lt;5\%</math> by volume). These CRGTs are different than the ones inspected for Surry Unit 1 in that they have 9 card levels instead of 8; the 20% sample included most CRGTs that were identified by Westinghouse as having high wear based on an FME inspection in 2005.</p> <p>Surry is 3 loop design with 15 x 15 fuel. It operates as a “low flow” plant, and it has operated with a “low leakage” core loading pattern since 1984. The inspected guide tubes are original except for the split pins with 9 guide cards per tube; the split pins were replaced in 2005. Since the replacement split pins were functionally equivalent to the original ones, the replacements should not affect guide card wear rates. The accumulated EFPY on the guide tubes was 30.22 EFPY.</p> <p>The guide card listed below had wear volume equal to approximately 5%: N – 9 – 7 – Ligament C. The rest had wear <math>&lt; 5\%</math>; therefore, all guide cards examined fell into a wear level of GREEN described in WCAP – 17562 – P, Rev. 0.</p>				
<b>Control Rod Guide Tube Assembly</b> Lower flange welds	Enhanced visual examination (EVT-1) to determine the presence of crack-like surface flaws in flange welds	100% of outer (accessible) CRGT lower flange weld surfaces and adjacent base metal on the individual periphery CRGT assemblies. (Note 2)  See Figure 4-21 of MRP-227-A.	Accessible Lower Flange Welds (Upper and Lower) 24 outer CRGT assemblies were inspected during the 1R24 outage. 272 welds achieved some level of EVT-1 access. Of these, some did not have 100% coverage. The average coverage for the 272 welds was 95.7% which exceeds the minimum 75% requirement of MRP-227-A.	All accessible welds were examined, and the MRP-227-A inspection requirement was satisfied. No relevant indications were noted.

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings (Note 1)
<p><b>Comments:</b>            Specific Guide Tubes inspected: B – 6, B – 8, B – 10, C – 7, C – 9, D – 4, D – 6, D – 10, D – 12, E – 5, E – 11, F – 2, F – 4, F – 12, F – 14, G – 3, G – 13, H – 2, H – 14, J – 3, J – 13, K – 2, K – 4, K – 12, K – 14, L – 5, L – 11, M – 4, M – 6, M – 10, M – 12, N – 9, P – 6, P – 8, and P – 10.</p> <p>The continuous section of Surry's guide tubes is of the "open" design and is not enclosed by a shroud. Therefore, the welds of the continuous section "sheaths" were inspected.</p> <p>Each guide tube sheath has a "U" shaped weldment, the three legs of which were considered to be three separate welds for inspection and coverage calculation purposes. The lower or end leg of each weldment was typically more accessible for an EVT-1 inspection than the two side legs. A greater number of welds could be inspected on the upper flange of the continuous section as compared to the lower. Some of the lower flanges were obstructed by core exit thermocouple mixer tubes.</p> <p>An additional 21 welds were attempted but could not be inspected to the EVT-1 standard; these are recorded as "best effort" examinations. No relevant conditions were identified among these 21 best effort examinations.</p> <p><b>The inspected guide tubes are the original tubes. The accumulated EFPY on the guide tubes was 30.04 EFPY. The degradation mechanisms of concern in this inspection are fatigue (high cycle) and SCC. For constant parameters conducive to degradation both these mechanisms would be expected to have observable effects at a relatively early stage in plant life. This inspection was conducted during 2R24 Fall 2012).</b></p>				
<b>Core Barrel Assembly</b> Upper core barrel flange weld	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).  See Figure 4-22 of MRP-227-A.	100% of the accessible weld received an EVT – 1 examination.	The EVT – 1 examination of the one upper core barrel weld was SAT; the weld was examined from the ID surface as required per the MRP guidance. There were no indications. The exam fulfilled the requirements of MRP-227-A.
<p><b>Comments:</b></p> <p><b>It is not feasible to inspect the OD of this weld when the core barrel is removed because it sits above the water and must be heavily shielded. There were no reportable indications observed on the Upper Core Barrel Flange Weld, but a rub – mark was observed below the Upper Core Barrel Flange Weld in the 90° - 180° Quadrant.</b></p>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings (Note 1)
<b>Core Barrel Assembly</b> Upper and lower core barrel cylinder girth welds	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).  See Figure 4-22 of MRP-227-A	Examination has not been done yet.  These exams were completed during 2R25.	100% of the Upper Girth Weld was inspected, and 71.6% of the Lower Girth Weld was inspected during 2R25. Within Table 4-3 of MRP – 227 – A, the UGW and the LGW are identified as having the same effect – cracking due to stress corrosion cracking (SCC), irradiated – assisted stress corrosion cracking (IASCC), and fatigue. A minimum of 75% of the total weld length must be examined in accordance with Note 4 of the Table 4 – 3. The total combined length for the UGW and the LGW is 853.929 inches. A total of 730.857 inches was examined which results in 85.6% coverage. The requirements of MRP – 227 – A, Table 4-3, Note 4 have been met
<p><b>Comments:</b> The Upper Circumferential Weld received an EVT – 1 examination per the requirements of MRP – 227 – A, Table 4 – 3. This weld was inspected from the interior of the core barrel. Cleaning of the weld was required following the cleaning assessment. The EVT-1 inspection was performed on the inside of the core barrel so inspection length is determined from the inner core barrel diameter. The total weld length inspected for the upper circumferential weld was 420.58 inches. A total of 420.58 inches were examined resulting in 100% coverage. No issues were identified.</p> <p>The Lower Circumferential Weld received an EVT – 1 examination per the requirements of MRP – 227 – A, Table 4 – 3. This weld was inspected from the exterior of the core barrel. Cleaning of the weld was not required. The total weld length is 433.348 inches. A total of 310.277 inches were examined resulting in 71.6% coverage. The coverage was limited by obstructions between the core barrel and the thermal shield. Other limitations occurred due to the narrow gap between the core barrel and reactor cavity wall. No issues were identified.</p> <p>Within Table 4-3 of MRP – 227 – A, the UGW and the LGW are identified as having the same effect – cracking due to stress corrosion cracking (SCC), irradiated – assisted stress corrosion cracking (IASCC), and fatigue. A minimum of 75% of the total weld length must be examined in accordance with Note 4 of the Table 4 – 3. The total combined length for the UGW and the LGW is 853.929 inches. A total of 730.857 inches was examined which results in 85.6% coverage. The requirements of MRP – 227 – A, Table 4-3, Note 4 have been met.</p>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings (Note 1)
<b>Core Barrel Assembly</b> Lower core barrel flange weld (Note 5)	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).	Examination has not been done yet.  These exams were completed during 2R25.	The Lower Flange Weld, as displayed in Figure 1, received an EVT – 1 examination per the requirements of MRP – 227 – A, Table 4 – 3. No issues were noted; see comments below for additional detail.
<b>Comments:</b> The Lower Flange Weld received an EVT – 1 examination per the requirements of MRP – 227 – A, Table 4 – 3. This Lower Flange Weld was inspected from the exterior of the core barrel; therefore, the weld inspection length is determined from the outer core barrel diameter. Cleaning of the weld was not required. The total weld length is 433.348 inches computed from the calculated outer diameter of 137.939 inches. A total of 353.177 inches were examined resulting in 81.5% coverage. Coverage limitations occurred due to the narrow gap between the core barrel and reactor cavity wall. No issues were identified.				
<b>Baffle-Former Assembly</b> Baffle-edge bolts	Visual examination (VT-3)	Bolts and locking devices on high fluence seams. 100% of components accessible from core side (Note 3).  See Figure 4-23 of MRP-227-A.	During 2R23 (Spring 2011), 936 accessible baffle – edge bolts received VT – 3 inspection.	All 936 accessible edge bolts received the required VT – 3 examinations. No issues were note; all examinations were acceptable.
<b>Comments:</b> These exams were completed before EPRI had prepared a MRP – 227 reporting template. EPRI was notified of these data through a detailed narrative summary submitted to the MRP.				



Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings (Note 1)
<b>Baffle-Former Assembly</b> Baffle-former bolts	Volumetric examination (UT)	100% of accessible bolts (Note 3). Heads accessible from the core side. UT accessibility may be affected by complexity of head and locking device designs.  See Figures 4-23 and 4-24 of MRP-227-A.	During 2R23 (Spring 2011), 1088 baffle – to – former bolts received UT examination and the locking bars received VT – 3 examinations.	The most significant examination results were detection of likely flaws in two bolts, identified as Baffle Plate 22 Bolt “G63” and Baffle Plate 42 Bolt “A125”. The depth of the flaw in G63 and A125 were not quantified; however, each flaw was located at the head to shank region of the bolt. Also, some channels of the UT signals showed a “back wall” reflection from the end of each bolt, so each bolt is not completely severed. The lock bar for each of these bolts has no relevant conditions and is considered capable of performing its retention function.
<p><b>Comments: See above.</b></p> <p><b>These exams were completed before EPRI had prepared a MRP – 227 reporting template. EPRI was notified of these data through a detailed narrative summary submitted to the MRP.</b></p>				
<b>Baffle-Former Assembly</b> (Includes: Baffle plates, baffle edge bolts and indirect effects of void swelling in former plates)	Visual examination (VT-3)	Core side surface as indicated.  See Figures 4-24, 4-25, 4-26 and 4-27 of MRP-227-A.	The inspection for gaps and distortion due to void swelling has not been done yet. The edge bolt inspection is reported above.  These exams were completed during 2R25.	The Baffle Plate Seams were inspected for any evidence of void swelling – evidence of void swelling would be misaligned baffle plates. All VT – 3 inspections of the Baffle – Former Assembly Baffle Seams were Satisfactory.

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings (Note 1)
<p><b>Comments:</b> All VT – 3 inspections of the Baffle – Former Assembly Baffle Seams were Satisfactory. There was no evidence of displacement of the baffle plates with respect to the tops and the bottoms of the plates. The baffle seams were vertical; there was no evidence of warping or misalignment along the baffle seams.</p> <p>Also, the baffle edge bolts were examined during 2R23, and only two indications were noted in the 1088 baffle bolts inspected that had bolt heads and lock bars exposed for visual inspections. Baffle Bolt A125 on Plate 42 had an indication in the head – to – shank region of the bolt and Baffle Bolt G63 on Plate 22 had an indication in the head – to – shank region of the bolt. These two baffle bolts were re – inspected as part of Surry’s Augmented Inspection program per ER – SU – AUG – 101 Attachment 54, Visual Examination of Baffle – Former and Baffle – Edge Bolting Materials with Known Indications, during 2R25. These two bolts received a VT – 3 examination looking at the bolt head, locking bar, and locking bar welds; all items were intact, and the VT – 3 exam was satisfactory.</p>				
<p><b>Alignment and Interfacing Components</b> Internals hold down spring</p>	Direct measurement of spring height	<p>Measurements should be taken at several points around the circumference of the spring, with a statistically adequate number of measurements at each point to minimize uncertainty.</p> <p>See Figure 4-28 of MRP-227-A.</p>	<p>Direct measurement of the Reactor Vessel HDS was completed during 2R24 – measurements were taken at 8 locations in the same general areas as the as – built measurements. Unit 2’s HDS is 304 – SS.</p>	<p>The estimated average spring height was 3.6384±0.0001 inches. This result is greater than the minimum requirement of 3.621 inches; therefore, the final result is acceptable. This result confirms adequate hold down capability through at least 60 total years of reactor operation.</p>
<p><b>Comments:</b> Because Unit 2 has an austenitic (304 – SS) stainless steel hold down spring, measurements of its relaxation was required per the MRP-227-A guidance. Per analysis, considering Surry Unit 2 as-built dimensions and the required hold down force for design conditions, the minimum acceptable height for assuring a minimum for 60 year service life was computed.</p> <p>Spring height measurements were taken at eight locations (every 45°) with three individual measurements taken at each location.</p> <p>The estimated average spring height was 3.6384±0.0001 inches. This result is greater than the minimum requirement; therefore, the final result is acceptable. This result confirms adequate hold down capability through at least 60 total years of reactor operation, and no further measurements are required.</p>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings (Note 1)
<b>Thermal Shield Assembly</b> Thermal shield flexures	Visual examination (VT-3)	100% of thermal shield flexures.  See Figures 4-29 and 4-36 of MRP-227-A.	The examinations were completed during 2R25 – Spring of 2014.	The Thermal Shield Flexures were examined for evidence of cracking (fatigue) or loss of material (wear) which could result in thermal shield flexure excessive wear, fracture, or complete thermal shield flexure separation from the core barrel. The VT – 3 examinations of the thermal shield flexures were satisfactory; no issues were noted.
<b>Comments: Completed during 2R25 – Spring 2014; see examination findings column.</b>				

Notes to Westinghouse Primary Components Table:

1. Examination acceptance criteria and expansion criteria for the Westinghouse components are in Table 5-3 of MRP-227-A.
2. A minimum of 75% of the total identified sample population must be examined.
3. A minimum of 75% of the total population (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-3 of MRP-227-A, must be examined for inspection credit.
4. A minimum of 75% of the total weld length (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-3 of MRP-227-A, must be examined from either the inner or outer diameter for inspection credit.
5. The lower core barrel flange weld may be alternatively designated as the core barrel-to-support plate weld in some Westinghouse plant designs.

*No Expansion components were inspected at Surry Unit 2 in May 2014 RFO.*

**Existing Programs Components**

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings
<b>Core Barrel Assembly</b> Core barrel flange	Visual examination (VT-3) to determine general condition for excessive wear.	All accessible surfaces at specified frequency.	100% Coverage was achieved; VT – 3 examination was completed Spring of 2014.	Examination was SAT. No issues were noted.
<b>Comments: Completed during 2R25.</b>				
<b>Upper Internals Assembly</b> Upper support ring or skirt	Visual examination (VT-3)	All accessible surfaces at specified frequency.	100% Coverage was achieved; VT – 3 examination was completed Spring of 2014.	Examination was SAT. No issues were noted.
<b>Comments: Completed during 2R25.</b>				
<b>Lower Internals Assembly</b> Lower core plate XL lower core plate (Note 1)	Visual (VT-3) examination of the lower core plates to detect evidence of distortion and/or loss of bolt integrity.	All accessible surfaces at specified frequency.	N/A – examination scheduled for 2R25 – Spring of 2014.	N/A – examination scheduled for 2R25 – Spring of 2014.

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings
<b>Comments: Completed during 2R25.</b>				
<b>Lower Internals Assembly</b> Lower core plate XL lower core plate (Note 1)	Visual examination (VT-3)	All accessible surfaces at specified frequency.	100% Coverage was achieved; VT – 3 examination was completed Spring of 2014.	Examination was SAT. One issue was noted.
<b>Comments: An area of minor deformation was noted on the lower core plate near fuel assembly location L - 13. The Dominion NDE Level III examiner confirmed the absence of crack – like indications in this area. The depth is shallow and there are no sharp interior edges that would create a notch discontinuity. The indication is sufficiently remote from the edge of the flow hole that the slight discontinuity of the indication does not interact with the stress field near the flow hole. Since the indication is not crack-like it is considered benign and does not present a potential for propagation to a more significant size. Therefore it is acceptable for continued service and no corrective measures are required. We were unable to determine when this deformation occurred. It was noted during the 2014 10 year ISI inspection and will be monitored during future 10 year ISI inspections.</b>  <b>No relevant conditions were seen with the pins on the lower core plate.</b>				
<b>Bottom Mounted Instrumentation System</b> Flux thimble tubes	Surface examination (ET)	Eddy current surface examination as defined in plant response to IEB 88-09.	2R24 (Nov. 2012). All 50 of 50 were inspected. No tubes are capped. All tubes were inspected full length. 14 tubes had been replaced prior to this inspection. They are presented below.	No issues noted during the examinations.

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings
<b>Comments: The following flux thimble tubes were replaced prior to the Nov 2012 inspection: B5, C12, D3, D5, D12, G9, H6, H13, L4, L6, M3, N7, N8, &amp; N12.</b>				
<b>Alignment and Interfacing Components</b> Clevis insert bolts	Visual examination (VT-3)	All accessible surfaces at specified frequency.	All clevis insert bolting was specifically examined (VT – 3) during 2R25, Spring of 2014.	There was no evidence of wear, bolting failure or loss of lock bar integrity. Mating surfaces of clevis insert also inspected with no indication of significant wear.
<b>Comments: Completed during 2R25 – Spring 2014.</b>				
<b>Alignment and Interfacing Components</b> Upper core plate alignment pins	Visual examination (VT-3)	All accessible surfaces at specified frequency.	100% Coverage was achieved; VT – 3 examination was completed Spring of 2014.	Examination was SAT. No issues were noted.
<b>Comments: Completed during 2R25 – Spring 2014.</b>				

Notes to Westinghouse Existing Programs Components Table:

1. XL = “Extra Long” referring to Westinghouse plants with 14-foot cores.

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## Tables for Reporting MRP-227-A Inspection Results for CE Plants, Rev. 3

(Please include only the results of the current inspection)

Plant Name: Calvert Cliffs Unit 1 Utility: Exelon

Date of Exams: Feb 25 – Mar 4, 2018 Plant Age: 43 (years) / 34 EFPY

### Primary Components

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Core Shroud Assembly (Welded)</b> Core shroud plate-former plate weld	Enhanced visual examination (EVT-1)	Axial and horizontal weld seams at the core shroud re-entrant corners as visible from the core side of the shroud, within six inches of central flange and horizontal stiffeners.  See Figures 4-12 and 4-14 of MRP 227-A.	100% of required scope	NRI
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
Comments: None				



Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Core Shroud Assembly (Welded) Assembly</b>	Visual examination (VT-1)	If a gap exists, make three to five measurements of gap opening from the core side at the core shroud re-entrant corners. Then, evaluate the swelling on a plant-specific basis to determine frequency and method for additional examinations.  See Figures 4-12 and 4-14 of MRP-227-A.	100% of required scope.	NRI  (no gap measurements required)  See comments for indication found outside of MRP-227A inspection scope.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b> No gap was identified by the VT-1 exam and thus measurements were not required.  During concurrent ASME Section XI, B-N-3, VT-3 examination of the eight (8) core shroud tie rods, nuts, locking bars and locking bar welds, the tie rod at the 15-degree location was observed to be displaced to a point below the nut. Issue was entered in site Corrective Action Program (as documented in IR 04110377) and the condition was evaluated as acceptable as-is for one cycle. The remaining seven tie rods had no relevant indications identified.				
<b>Core Support Barrel Assembly</b> Upper (core support barrel) flange weld	Enhanced visual examination (EVT-1)	100% of the accessible surfaces of the upper flange weld (Note 3).  See Figure 4-15 of MRP-227-A.	90% of the OD weld length EVT-1 10% of the OD weld length VT-1	NRI
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b> The required greater than 75% EVT-1 coverage was achieved.				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1)  <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Core Support Barrel Assembly</b> Lower cylinder girth welds	Enhanced visual examination (EVT-1)	100% of the accessible surfaces of the lower cylinder welds (Note 3).  See Figure 4-15 of MRP-227-A	1. Upper: 100% of the OD weld length 2. Middle: 100% of the OD weld length	NRI NRI
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
Comments: Adopted MRP-227, Revision 1, corrected core support barrel weld nomenclature.				
<b>Lower Support Structure</b> Core support column welds	Visual examination (VT-3)	100% of the accessible surfaces of the core support column welds (Note 4). See Figures 4-16 and 4-31 of MRP-227-A	100% coverage	NRI
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
Comments: None				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Core Support Barrel Assembly</b> Lower flange weld	If fatigue life cannot be demonstrated by time-limited aging analysis (TLAA), enhanced visual (EVT-1) examination	Examination coverage to be defined by evaluation to determine the potential location and extent of fatigue cracking.  See Figures 4-15 and 4-16 of MRP-227-A.	Excluded from MRP-227 scope per fatigue evaluation	NA
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b> The Core Support Barrel lower flange (lower girth) weld and flexure weld were examined to meet the ASME Section XI, B-N-3, VT-3 requirements with 100% coverage attained and no recordable indications.				
<b>Lower Support Structure</b> Core support plate	If fatigue life cannot be demonstrated by time-limited aging analysis (TLAA), enhanced visual (EVT-1) examination	Examination coverage to be defined by evaluation to determine the potential location and extent of fatigue cracking.  See Figure 4-16 of MRP-227-A.	Excluded from MRP-227 scope per fatigue evaluation	NA
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b> The Core Support Plate was included in ASME Section XI, B-N-3, VT-3 examination scope. 100% coverage was achieved and no recordable indications were noted in these examinations.				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Control Element Assembly</b> Instrument guide tubes	Visual examination (VT-3)	100% of tubes in peripheral CEA shroud assemblies (i.e., those adjacent to the perimeter of the fuel alignment plate).  See Figure 4-18 of MRP-227-A.	All accessible guide tubes and supports attached to CEA shrouds on upper guide structure periphery.	NRI
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b> The examination scope also included the two (2) reactor vessel level monitoring system heated junction thermocouple probe holders' attachment welds to CEA shrouds.				

## Notes to CE Primary Components Table:

1. Examination acceptance criteria and expansion criteria for the CE components are in Table 5-2 of MRP-227-A.
2. A minimum of 75% of the total population (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-2 of MRP-227-A, must be examined for inspection credit.
3. A minimum of 75% of the total weld length (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-2 of MRP-227-A, must be examined from either the inner or outer diameter for inspection credit.
4. A minimum of 75% of the total population of core support column welds.

## Expansion Components

**[X] Check here if NO Expansion Components were inspected this outage—DELETE this table if NO Expansion inspections were performed.**

## Existing Components

**[ ] Check here if NO Existing Components were inspected this outage—DELETE this table if NO Existing inspections were performed.**

Item	Examination Method	Required Examination Coverage	Coverage Achieved  <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings  <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Core Shroud Assembly</b> Guide lugs Guide lug inserts and bolts	Visual examination (VT-3), general condition examination for detection of excessive or asymmetrical wear.	Accessible surfaces at specified frequency.	100% of bolting, inserts and guide lugs were accessed for inspection, 4 locations	NRI
<b>Disposition of Indications (check each required):</b> [ ] Code Analysis    [ ] NRC Submittal    [ ] WCAP-17096 Criteria    [ ] Other (Specify)    [X] N/A				
<b>Comments:</b> Note that the guide lugs are attached to the top of the core shroud assembly, while the guide lug inserts are attached to the Upper Guide Structure fuel alignment plate and thus are examined in separate evolutions. Additionally, the core stabilizing lugs and shims were also examined per ASME Section XI and Westinghouse TB 14-5.				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings  <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Lower Support Structure</b> Fuel alignment pins (plants with core shrouds assembled in two vertical sections)	Visual examination (VT-3)	Accessible surfaces at specified frequency.	100% of fuel alignment pins accessed for inspection.	NRI
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
Comments: None				
<b>Core Barrel Assembly</b> Upper flange	Visual examination (VT-3)	Area of the upper flange potentially susceptible to wear.	100% of accessible surfaces.	NRI
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
Comments: None.				

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## Tables for Reporting MRP-227-A Inspection Results for Westinghouse Plants, Rev.3

(Please include only the results of the current inspection)

Plant Name: Catawba Unit 2 Utility: Duke Energy

Date of Exams: March 2018 (C2R22) Plant Age: 31.5 (years) / 27.1 EFPY

### Primary Components

Item	Examination Method	Required Examination Coverage	Coverage Achieved  <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1)  <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
Control Rod Guide Tube Assembly Guide plates (cards)	Visual examination (VT-3)	Examination per WCAP-17451-P of CRGT assemblies, with all guide cards within each selected CRGT assembly examined.  See MRP-2014-006 and WCAP-17451-P	N/A	N/A

Control Rodlet Surface Finish (circle each applicable):    Ion Nitride    Chrome Plated    No Surface Modification    Other (Specify)

Disposition of Indications (check each required): [ ] Code Analysis    [ ] NRC Submittal    [ ] WCAP-17096 Criteria    [ ] Other (Specify)    [ X ] N/A



Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
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**Comments:**

No examinations performed in C2R22, but guide card wear measurements of all 53 Control Rod Guide Tubes (CRGTs) were performed in C2R21 (Fall 2016). As a result of the C2R21 guide card wear measurements, 4 additional worn CRGTs (core locations D8, F8, J3, and C9) were relocated to unrodded locations in the reactor vessel upper internals during C2R22 and replaced with unworn spare CRGTs previously in the unrodded locations. The information below identifies the relocations performed in C2R22 and when the worn CRGTs were projected to reach the "red zone" per WCAP-17451-P Rev. 1 prior to being relocated.

Original Core Location	Relocated "New" Core Location
D8	F4
D6	D8
F8	D6
K4	F8
J3	K4
M6	J3
C9	M6
F4	C9

Original Core Location	Projected to Red Zone during Cycle Following RFO:
D8	C2R23 (Fall 2019)
F8	C2R23 (Fall 2019)
J3	C2R22 (Spring 2018)
C9	C2R22 (Spring 2018)

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Control Rod Guide Tube Assembly</b> Lower flange welds	Enhanced visual examination (EVT-1) to determine the presence of crack-like surface flaws in flange welds	100% of outer (accessible) CRGT lower flange weld surfaces and adjacent base metal on the individual periphery CRGT assemblies. (Note 2)  See Figure 4-21 of MRP-227-A.	N/A	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b>  Examination tentatively planned for C2R24 (Spring 2021) or C2R25 (Fall 2022).				
<b>Core Barrel Assembly</b> Upper core barrel flange weld	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).  See Figure 4-22 of MRP-227-A.	N/A	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b>  Examination tentatively planned for C2R24 (Spring 2021) or C2R25 (Fall 2022).				

Item	Examination Method	Required Examination Coverage	Coverage Achieved <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1) <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Core Barrel Assembly</b> Upper and lower core barrel cylinder girth welds	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).  See Figure 4-22 of MRP-227-A	N/A	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b>  Examination of upper core barrel cylinder girth weld tentatively planned for C2R24 (Spring 2021) or C2R25 (Fall 2022), examination lower core barrel cylinder girth weld tentatively planned for C2R25 (Fall 2022) or C2R26 (Spring 2024).				
<b>Core Barrel Assembly</b> Lower core barrel flange weld (Note 5)	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).	N/A	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b>  Examination tentatively planned for C2R25 (Fall 2022) or C2R26 (Spring 2024).				

Item	Examination Method	Required Examination Coverage	Coverage Achieved <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1) <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Baffle-Former Assembly</b> Baffle-edge bolts	Visual examination (VT-3)	Bolts and locking devices on high fluence seams. 100% of components accessible from core side (Note 3).  See Figure 4-23 of MRP-227-A.	N/A	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b>  Not required for CNS2 - no baffle-edge bolts.				
<b>Baffle-Former Assembly</b> Baffle-former bolts	Volumetric examination (UT)	100% of accessible bolts (Note 3). Heads accessible from the core side. UT accessibility may be affected by complexity of head and locking device designs.  See Figures 4-23 and 4-24 of MRP-227-A.	N/A	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b>  Examination tentatively planned for C2R24 (Spring 2021) or C2R25 (Fall 2022).				

Item	Examination Method	Required Examination Coverage	Coverage Achieved <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1) <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Baffle-Former Assembly</b> Assembly (Includes: Baffle plates, baffle edge bolts and indirect effects of void swelling in former plates)	Visual examination (VT-3)	Core side surface as indicated.  See Figures 4-24, 4-25, 4-26 and 4-27 of MRP-227-A.	N/A	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b>  Examination tentatively planned for C2R24 (Spring 2021) or C2R25 (Fall 2022).				
<b>Alignment and Interfacing Components</b> Internals hold down spring	Direct measurement of spring height	Measurements should be taken at several points around the circumference of the spring, with a statistically adequate number of measurements at each point to minimize uncertainty.  See Figure 4-28 of MRP-227-A.	N/A	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b>  Not required for CNS2 - hold down spring is Type 403 stainless steel.				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Thermal Shield Assembly</b> Thermal shield flexures	Visual examination (VT-3)	100% of thermal shield flexures.  See Figures 4-29 and 4-36 of MRP-227-A.	N/A	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b>  Not required for CNS2 - no thermal shield.				

## Notes to Westinghouse Primary Components Table:

1. Examination acceptance criteria and expansion criteria for the Westinghouse components are in Table 5-3 of MRP-227-A.
2. A minimum of 75% of the total identified sample population must be examined.
3. A minimum of 75% of the total population (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-3 of MRP-227-A, must be examined for inspection credit.
4. A minimum of 75% of the total weld length (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-3 of MRP-227-A, must be examined from either the inner or outer diameter for inspection credit.
5. The lower core barrel flange weld may be alternatively designated as the core barrel-to-support plate weld in some Westinghouse plant designs.

**Expansion Components**

**[ X ] Check here if NO Expansion Components were inspected this outage—DELETE this table if NO Expansion inspections were performed.**

**Existing Components**

**[ X ] Check here if NO Existing Components were inspected this outage—DELETE this table if NO Existing inspections were performed.**

## Tables for Reporting MRP-227-A Inspection Results for Westinghouse Plants, Rev.3

(Please include only the results of the current inspection)

Plant Name: Indian Point 2 Utility: Entergy

Date of Exams: Spring 2018 Plant Age: 45 (years) / 32.76 EFPY

### Primary Components

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Control Rod Guide Tube Assembly</b> Guide plates (cards)	Visual examination (VT-3)	Examination per WCAP-17451-P of CRGT assemblies, with all guide cards within each selected CRGT assembly examined.  See MRP-2014-006 and WCAP-17451-P	Not Inspected.	Not Inspected.
<b>Control Rodlet Surface Finish (circle each applicable):</b> Ion Nitride            Chrome Plated            No Surface Modification            Other (Specify)				
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b>  (Please reference or include the inspection report, if possible)				



Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Control Rod Guide Tube Assembly</b> Lower flange welds	Enhanced visual examination (EVT-1) to determine the presence of crack-like surface flaws in flange welds	100% of outer (accessible) CRGT lower flange weld surfaces and adjacent base metal on the individual periphery CRGT assemblies. (Note 2)  See Figure 4-21 of MRP-227-A.	Not Inspected.	Not Inspected.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b> (Please reference or include the inspection report, if possible)				
<b>Core Barrel Assembly</b> Upper core barrel flange weld	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).  See Figure 4-22 of MRP-227-A.	Not Inspected.	Not Inspected.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b> (Please reference or include the inspection report, if possible)				

Item	Examination Method	Required Examination Coverage	Coverage Achieved <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1) <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Core Barrel Assembly</b> Upper and lower core barrel cylinder girth welds	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).  See Figure 4-22 of MRP-227-A	Not Inspected.	Not Inspected.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments:				
<i>(Please reference or include the inspection report, if possible)</i>				
<b>Core Barrel Assembly</b> Lower core barrel flange weld (Note 5)	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).	Not Inspected.	Not Inspected.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments:				
<i>(Please reference or include the inspection report, if possible)</i>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Baffle-Former Assembly</b> Baffle-edge bolts	Visual examination (VT-3)	Bolts and locking devices on high fluence seams. 100% of components accessible from core side (Note 3).  See Figure 4-23 of MRP-227-A.	Obtained 100% coverage from core side.  1232 baffle-edge bolts were inspected.	No indications detected.  (Please include a map of the inspected bolts, if possible)
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b> Inspection results reported in Westinghouse Report WDI-PJF-1319701-FSR-001.  These inspections were performed as a result of the inspection findings discovered during 2R22 and were performed on an interval established by a plant-specific evaluation as documented and dispositioned in the IPEC corrective action program. These inspections were also required by the IPEC PWR Vessel Internals Program, SEP-PVI-IPEC-001. Although these inspections are not required by MRP-227-A, these results are being reported utilizing the MRP-227-A Reporting template, for convenience in keeping the industry apprised of our findings.  (Please reference or include the inspection report, if possible)				
<b>Baffle-Former Assembly</b> Baffle-former bolts	Volumetric examination (UT)	100% of accessible bolts (Note 3). Heads accessible from the core side. UT accessibility may be affected by complexity of head and locking device designs.  See Figures 4-23 and 4-24 of MRP-227-A.	Total number of baffle-former bolts 832 Number of bolts visually inspected 832 Number with visual indications 0 Number of original baffle bolts 554 Number of bolts inspected UT 554 Number with no UT indications 541 Number of bolts with UT indications 13 Number with head-shank indications 13 Number with shank indications 0 Number with thread indications 0	13 baffle former bolts were unacceptable due to UT indications.  A Real Time Analysis was performed and the 13 baffle former bolts with UT indications were not repaired.  (Please include a map of the inspected bolts, if possible)
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input checked="" type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<p><b>Comments:</b> Inspection results reported in Westinghouse Report WDI-PJF-1319701-FSR-001.</p> <p>Due to the small number of unacceptable bolts, a Real Time Analysis (RTA) was performed in accordance with WCAP-15030-NP-A, with the exception that the analysis utilized elastic plastic methods and allowable stresses consistent with WCAP-18048-P. The RTA is documented in Westinghouse Letter LTR-AMLR-18-27. The RTA showed that the remaining baffle former bolts ensure structural integrity of the baffle former assembly during all design conditions. Therefore, the 13 baffle former bolts with UT indications were not repaired.</p> <p>These inspections were performed as a result of the inspection findings discovered during 2R22 and were performed on an interval established by a plant-specific evaluation as documented and dispositioned in the IPEC corrective action program. These inspections were also required by the IPEC PWR Vessel Internals Program, SEP-PVI-IPEC-001. Although these inspections are not required by MRP-227-A, these results are being reported utilizing the MRP-227-A Reporting template, for convenience in keeping the industry apprised of our findings.</p> <p><i>(Please reference or include the inspection report, if possible)</i></p>				
<b>Baffle-Former Assembly</b> Assembly (Includes: Baffle plates, baffle edge bolts and indirect effects of void swelling in former plates)	Visual examination (VT-3)	Core side surface as indicated.  See Figures 4-24, 4-25, 4-26 and 4-27 of MRP-227-A.	100% of baffle edge bolts (1232) and all (28) baffle plates examined.	No indications detected on Baffle-Edge Bolts or Baffle Plates.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<p><b>Comments:</b> Inspection results reported in Westinghouse Report WDI-PJF-1319701-FSR-001..</p> <p>These inspections were performed as a result of the inspection findings discovered during 2R22 and were performed on an interval established by a plant-specific evaluation as documented and dispositioned in the IPEC corrective action program. These inspections were also required by the IPEC PWR Vessel Internals Program, SEP-PVI-IPEC-001. Although these inspections are not required by MRP-227-A, these results are being reported utilizing the MRP-227-A Reporting template, for convenience in keeping the industry apprised of our findings.</p> <p><i>(Please reference or include the inspection report, if possible)</i></p>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Alignment and Interfacing Components</b> Internals hold down spring	Direct measurement of spring height	Measurements should be taken at several points around the circumference of the spring, with a statistically adequate number of measurements at each point to minimize uncertainty.  See Figure 4-28 of MRP-227-A.	Not Inspected.	Not Inspected.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b>  <i>(If hold down spring inspection is not required due to material type, state the material of fabrication and that the inspection is not required)</i> <i>(Please reference or include the inspection report, if possible)</i>				
<b>Thermal Shield Assembly</b> Thermal shield flexures	Visual examination (VT-3)	100% of thermal shield flexures.  See Figures 4-29 and 4-36 of MRP-227-A.	Not Inspected.	Not Inspected.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b>  <i>(Please reference or include the inspection report, if possible)</i>				

Notes to Westinghouse Primary Components Table:

- Examination acceptance criteria and expansion criteria for the Westinghouse components are in Table 5-3 of MRP-227-A.
- A minimum of 75% of the total identified sample population must be examined.
- A minimum of 75% of the total population (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-3 of MRP-227-A, must be examined for inspection credit.
- A minimum of 75% of the total weld length (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-3 of MRP-227-A, must be examined from either the inner or outer diameter for inspection credit.
- The lower core barrel flange weld may be alternatively designated as the core barrel-to-support plate weld in some Westinghouse plant designs.

## Tables for Reporting MRP-227-A Inspection Results for Westinghouse Plants, Rev.3

(Please include only the results of the current inspection)

**Plant Name:** D. C. Cook Unit 2 **Utility:** American Electric Power

**Date of Exams:** March 2018 **Plant Age:** 40 years / 27.884 EFPY

### Primary Components

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings (Note 1)
			<i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	<i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Control Rod Guide Tube Assembly</b> Guide plates (cards)	Visual examination (VT-3)	Examination per WCAP-17451-P of CRGT assemblies, with all guide cards within each selected CRGT assembly examined.  See MRP-2014-006 and WCAP-17451-P	Inspection performed during U2C23 RFO during Fall 2016. Results provided in 2017.	Maximum % volume wear:  N/A
<b>Control Rodlet Surface Finish (circle each applicable):</b> <input type="checkbox"/> Ion Nitride <input type="checkbox"/> Chrome Plated <input type="checkbox"/> No Surface Modification <input type="checkbox"/> Other (Specify)				
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b>  (Please reference or include the inspection report, if possible)				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Control Rod Guide Tube Assembly</b> Lower flange welds	Enhanced visual examination (EVT-1) to determine the presence of crack-like surface flaws in flange welds	100% of outer (accessible) CRGT lower flange weld surfaces and adjacent base metal on the individual periphery CRGT assemblies. (Note 2)  See Figure 4-21 of MRP-227-A.	Inspection performed during U2C23 RFO during Fall 2016. Results provided in 2017.	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments:  (Please reference or include the inspection report, if possible)				
<b>Core Barrel Assembly</b> Upper core barrel flange weld	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).  See Figure 4-22 of MRP-227-A.	Inspection planned for U2C25 RFO during Fall 2019	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments:  (Please reference or include the inspection report, if possible)				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Core Barrel Assembly</b> Upper and lower core barrel cylinder girth welds	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).  See Figure 4-22 of MRP-227-A	Inspection planned for U2C25 RFO during Fall 2019	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments:  (Please reference or include the inspection report, if possible)				
<b>Core Barrel Assembly</b> Lower core barrel flange weld (Note 5)	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).	Inspection planned for U2C25 RFO during Fall 2019	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments:  (Please reference or include the inspection report, if possible)				



Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Baffle-Former Assembly</b> Baffle-edge bolts	Visual examination (VT-3)	Bolts and locking devices on high fluence seams. 100% of components accessible from core side (Note 3).  See Figure 4-23 of MRP-227-A.	50% of baffle-edge bolts visible from the core side (616).	No relevant indications. The examination concluded that the previously recorded indications on the five baffle-edge bolts are non-relevant indications that were likely shadowing. The five baffle-edge bolts previously identified as containing relevant indications (during U2C23 refueling outage in fall of 2016) do not contain indications of cracking or any other age-related degradation.  (Please include a map of the inspected bolts, if possible)
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b> This inspection was performed per the Cook Nuclear Plant Corrective Action Program in response to the findings during the baseline visual inspection of baffle-edge bolts during the prior refueling outage. Only a portion of the baffle-edge bolts were inspected. The inspection was focused on the area of the baffle-former assembly that experienced large clustered failures of baffle-former bolts during the prior refueling outage. The results of the prior inspections were transmitted to EPRI in accordance with Section 7.6 of MRP-227-A in 2017. Inspection results from the spring 2018 refueling outage are contained in Westinghouse report WDI-PJF-1319683-FSR-001.  (Please reference or include the inspection report, if possible)				

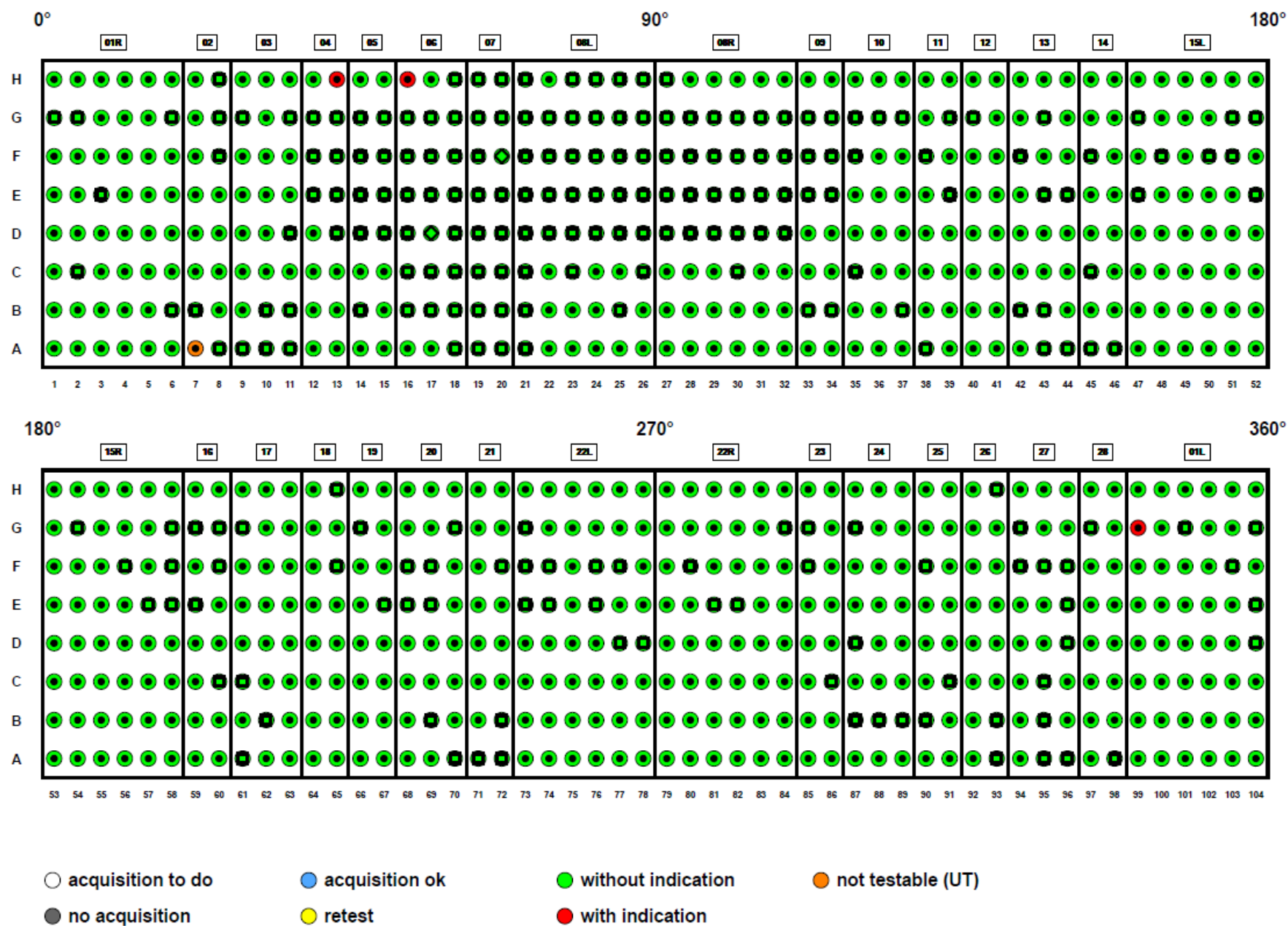
Item	Examination Method	Required Examination Coverage	Coverage Achieved  <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1)  <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Baffle-Former Assembly</b> Baffle-former bolts	Volumetric examination (UT)	100% of accessible bolts (Note 3). Heads accessible from the core side. UT accessibility may be affected by complexity of head and locking device designs.  See Figures 4-23 and 4-24 of MRP-227-A.	100% of baffle-former bolts (832) were inspected.	3 bolts with indications: -2 head-shank indications -0 indications in shank -1 indication in threaded region 1 bolt untestable (assumed to contain indications)  See attached map <i>(Please include a map of the inspected bolts, if possible)</i>
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input checked="" type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<p><b>Comments:</b> Inspection results contained in Westinghouse report WDI-PJF-1319683-FSR-001.</p> <p>A total of 210 bolts were replaced during the U2C24 RFO which included:</p> <ul style="list-style-type: none"> <li>- 3 BFBs that exhibited UT indications</li> <li>- 1 BFBs that were not testable via UT (assumed failed)</li> <li>- 206 BFBs that did not exhibit UT indications were replaced at various locations throughout the baffle-former assembly to complete implementation of an "Upflow Replacement Pattern"</li> </ul> <p><i>(Please reference or include the inspection report, if possible)</i></p>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1) <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Baffle-Former Assembly</b> Assembly (Includes: Baffle plates, baffle edge bolts and indirect effects of void swelling in former plates)	Visual examination (VT-3)	Core side surface as indicated.  See Figures 4-24, 4-25, 4-26 and 4-27 of MRP-227-A.	Inspection performed during U2C23 RFO during Fall 2016. Results provided in 2017.	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments:  <i>(Please reference or include the inspection report, if possible)</i>				
<b>Alignment and Interfacing Components</b> Internals hold down spring	Direct measurement of spring height	Measurements should be taken at several points around the circumference of the spring, with a statistically adequate number of measurements at each point to minimize uncertainty.  See Figure 4-28 of MRP-227-A.	Replacement planned for U2C25 RFO during Fall 2019	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments:  <i>(If hold down spring inspection is not required due to material type, state the material of fabrication and that the inspection is not required)</i> <i>(Please reference or include the inspection report, if possible)</i>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Thermal Shield Assembly</b> Thermal shield flexures	Visual examination (VT-3)	100% of thermal shield flexures.  See Figures 4-29 and 4-36 of MRP-227-A.	Inspection planned for U2C25 RFO during Fall 2019	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b>  (Please reference or include the inspection report, if possible)				

Notes to Westinghouse Primary Components Table:

1. Examination acceptance criteria and expansion criteria for the Westinghouse components are in Table 5-3 of MRP-227-A.
2. A minimum of 75% of the total identified sample population must be examined.
3. A minimum of 75% of the total population (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-3 of MRP-227-A, must be examined for inspection credit.
4. A minimum of 75% of the total weld length (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-3 of MRP-227-A, must be examined from either the inner or outer diameter for inspection credit.
5. The lower core barrel flange weld may be alternatively designated as the core barrel-to-support plate weld in some Westinghouse plant designs.



## Tables for Reporting MRP-227-A Inspection Results for Westinghouse Plants, Rev.3

(Please include only the results of the current inspection)

Plant Name: North Anna Unit 1 Utility: Dominion Generation

Date of Exams: September 18<sup>th</sup> – 24<sup>th</sup>, 2016 Plant Age: 38 (years) / 31.05 EFPY [PHASE 1]

Date of Exams: March 17<sup>th</sup> – 28<sup>th</sup>, 2018 Plant Age: 39.92 (years) / 32.44 EFPY [PHASE 2]

(Note this report is cumulative over the above two inspection outages)

### Primary Components

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)																
Control Rod Guide Tube Assembly Guide plates (cards)	Visual examination (VT-3)	Examination per WCAP-17451-P of CRGT assemblies, with all guide cards within each selected CRGT assembly examined.	100% of all guide cards for North Anna Unit 1 received VT-3 examinations per the recommendations of WCAP-17541-P.	Maximum % volume wear: Five (5) worst case CRGTs:																
		See MRP-2014-006 and WCAP-17451-P	NAPS-1 is a low flow plant IAW Table 4-2 of WCAP-17451-P (92,800 gpm).	<table><tr><td>Item</td><td>Location</td><td>% Wear</td></tr><tr><td>1</td><td>G-3-2-C</td><td>50.4</td></tr><tr><td>2</td><td>F-4-2-D</td><td>45.4</td></tr><tr><td>3</td><td>F-6-2-C</td><td>45.4</td></tr><tr><td>4</td><td>G-3-3-C</td><td>44.0</td></tr><tr><td>5</td><td>G-3-2-B</td><td>43.3</td></tr></table> (ref. Figures 3-5 through 3-7 of WCAP-17451-P for conversion of wear measurements to wear volume. Also specify high or low flow operation as defined in Table 4-2 of the WCAP)	Item	Location	% Wear	1	G-3-2-C	50.4	2	F-4-2-D	45.4	3	F-6-2-C	45.4	4	G-3-3-C	44.0	5
Item	Location	% Wear																		
1	G-3-2-C	50.4																		
2	F-4-2-D	45.4																		
3	F-6-2-C	45.4																		
4	G-3-3-C	44.0																		
5	G-3-2-B	43.3																		

Control Rodlet Surface Finish (circle each applicable):    Ion Nitride    Chrome Plated    No Surface Modification    Other (Specify)

Disposition of Indications (check each required):    ☐ Code Analysis    ☐ NRC Submittal    ☒ WCAP-17096 Criteria    ☐ Other (Specify)    ☐ N/A

#### Comments:

ETE-NA-2016-0078 is the station evaluation of the North Anna Unit 1 MRP-227 inspection – Phase 1. The two tubes with highest wear are for guide tubes F-6 and G-3. Three cards in guide tube G-3 are affected, and two cards in guide tube F-6 are affected. The worst case cards project to Yellow (per WCAP-17451-P) for G-3 at 12.24 EFPY from the current EFPY of 31.05. For F-6 the worst case card projects to Yell at 15.98 EFPY. It should be noted that guide tube F-4 has one guide card with an EFPY Projected to Yellow in 15.98 from the current EFPY of 31.05. The EFPY Projected to Yellow provides the station margin. The overall status of all guide tubes will remain Green until at least those times.

(Please reference or include the inspection report, if possible)

Item	Examination Method	Required Examination Coverage	Coverage Achieved <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1) <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Control Rod Guide Tube Assembly</b> Lower flange welds	Enhanced visual examination (EVT-1) to determine the presence of crack-like surface flaws in flange welds	100% of outer (accessible) CRGT lower flange weld surfaces and adjacent base metal on the individual periphery CRGT assemblies. (Note 2)  See Figure 4-21 of MRP-227-A.	95.7 % of the accessible welds received an EVT-1 examination. The difference from 100% coverage was that some welds did not have full EVT-1 standard coverage. 291 welds were assessed during this examination.	No relevant indications were noted.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input checked="" type="checkbox"/> WCAP-17096 Criteria <input checked="" type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b> ETE-NA-2016-0078 is the station evaluation of the North Anna Unit 1 MRP-227 inspection – Phase 1. WCAP-17451-P was also utilized for the data evaluation.  <i>(Please reference or include the inspection report, if possible)</i>				
<b>Core Barrel Assembly</b> Upper core barrel flange weld	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).  See Figure 4-22 of MRP-227-A.	100% of the Upper core barrel flange weld received a full EVT-1 examination. The upper core barrel flange weld was an ID examination.	No relevant indications were noted for the upper core barrel flange weld.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b> ETE-NA-2016-0078 is the station evaluation of the North Anna Unit 1 MRP-227 inspection – Phase 1.  <i>(Please reference or include the inspection report, if possible)</i>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Core Barrel Assembly</b> Upper and lower core barrel cylinder girth welds	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).  See Figure 4-22 of MRP-227-A	100% of the Upper core barrel cylinder girth weld received a full EVT-1 examination. The upper core barrel cylinder weld was an ID examination.  The Lower core barrel girth weld was inspected from the exterior of the core barrel; therefore, the weld inspection length is determined from the outer core barrel diameter. The total weld length is 433.348 inches. A total of 302.572 inches was examined resulting in 69.8% coverage. The coverage was limited by obstructions between the core barrel and the thermal shield. Other limitations occurred due to the narrow gap between the core barrel and reactor cavity wall. Total coverage requirements were satisfied as described below.	No relevant indications were noted for the upper core barrel cylinder girth weld.  No relevant indications were noted.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b> A minimum of 75% of the total weld length must be examined in accordance with Note 4 of the Table 4 – 3. The total combined length for the UGW and the LGW is 866.696 inches. A total of 735.921 inches was examined which results in 84.9% coverage. The requirements of MRP – 227 – A, Table 4-3, Note 4 have been met. ETE-NA-2016-0078 is the station evaluation of the North Anna Unit 1 MRP-227 inspection – Phase 1. ETE-NA-2018-0008 is the station evaluation of the North Anna Unit 1 MRP-227 inspection – Phase 2. (Please reference or include the inspection report, if possible)				



Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Core Barrel Assembly</b> Lower core barrel flange weld (Note 5)	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).	77.4% of this weld was examined. Coverage limitations occurred due to the narrow gap between the core barrel and reactor cavity wall.	No issues were identified.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b> Details are available in station engineering evaluation ETE-NA-2018-0008, Rev. 0. The Lower Flange Weld was inspected from the exterior of the core barrel; therefore, the weld inspection length is determined from the outer core barrel diameter. Cleaning of the weld was not required. The total weld length is 433.348 inches computed from the calculated outer diameter of 137.939 inches. A total of 335.411 inches were examined resulting in 77.4% coverage. Coverage limitations occurred due to the narrow gap between the core barrel and reactor cavity wall. No issues were identified. (Please reference or include the inspection report, if possible)				
<b>Baffle-Former Assembly</b> Baffle-edge bolts	Visual examination (VT-3)	Bolts and locking devices on high fluence seams. 100% of components accessible from core side (Note 3).  See Figure 4-23 of MRP-227-A.	100% of the 244 Baffle-edge bolts and locking devices received VT-3 inspections.	No relevant indications were noted for the baffle-edge bolts.  (Please include a map of the inspected bolts, if possible)
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b> ETE-NA-2016-0078 is the station evaluation of the North Anna Unit 1 MRP-227 inspection – Phase 1. All edge bolts are located within the top four former levels. The edge bolts are external slotted hex head design of type 316SS material with welded lock bars. (Please reference or include the inspection report, if possible)				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Baffle-Former Assembly</b> Baffle-former bolts	Volumetric examination (UT)	100% of accessible bolts (Note 3). Heads accessible from the core side. UT accessibility may be affected by complexity of head and locking device designs.  See Figures 4-23 and 4-24 of MRP-227-A.	1081 of 1088 baffle-former bolts received volumetric examination. Seven bolts were unable to receive volumetric examination because the locking bars were welded directly to the bolt surface – resulting in a surface for which the UT probe could not properly seat to achieve proper contact.  Three bolts had flaw indications: 23-69-B, 23-69-C, and 34-103-C	Seven bolts could not be volumetrically examined due to lock bar weld configuration. These bolts had no visual indications.  Three bolts had flaw indications:  Bolt 23-69-B - A high amplitude indication for the head to shank region was obtained for one of the UT channels with a reduction in back-wall response (some ligament intact).  Bolt 23-69-C - A high amplitude indication for the head to shank region was obtained for one of the UT channels with a reduction in back-wall response (some ligament intact).  Bolt 34-103-C – A back-wall response from several of the UT channels was unable to be obtained. In addition, a low amplitude signal for the head to shank region was present – potentially severed bolt.  (Please include a map of the inspected bolts, if possible)

Disposition of Indications (check each required): ☐ Code Analysis    ☐ NRC Submittal    ☒ WCAP-17096 Criteria    ☐ Other (Specify)    ☐ N/A

**Comments:**

ETE-NA-2016-0078 is the station evaluation of the North Anna Unit 1 MRP-227 inspection – Phase 1. WCAP-15042-P, Determination of Acceptable Baffle-Barrel-Bolting for Three-Loop Westinghouse 17x 17 Downflow and Converted Upflow Domestic Plants, was utilized for analysis. The baffle-former bolts are slotted round head design of type 316SS material with welded lock bars. The three bolts with indications are short bolts located at corner angle plate locations at lower former levels. North Anna Unit 1 was converted to upflow in February 1996.

(Please reference or include the inspection report, if possible)

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Baffle-Former Assembly</b> Assembly (Includes: Baffle plates, baffle edge bolts and indirect effects of void swelling in former plates)	Visual examination (VT-3)	Core side surface as indicated.  See Figures 4-24, 4-25, 4-26 and 4-27 of MRP-227-A.	100% of the baffle-former assembly received VT-3 inspections. These were inspected during 1R26 – Spring 2018.	No relevant indications were noted for the baffle-former assembly.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b> <b>ETE-NA-2018-0008 is the station evaluation of the North Anna Unit 1 MRP-227 inspection – Phase 2.</b> <i>(Please reference or include the inspection report, if possible)</i>				
<b>Alignment and Interfacing Components</b> Internals hold down spring	Direct measurement of spring height	Measurements should be taken at several points around the circumference of the spring, with a statistically adequate number of measurements at each point to minimize uncertainty.  See Figure 4-28 of MRP-227-A.	North Anna Unit 1's hold down spring was measured per the requirements of MRP-227-A at eight locations around the circumference with three measurements at each location.  The estimated average spring height was 3.622 inches	The measurement indicates margin of at least 21% for operation through 60 years. Therefore, no further measurements are required.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input checked="" type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b> <b>ETE-NA-2016-0078 is the station evaluation of the North Anna Unit 1 MRP-227 inspection – Phase 1. The hold down spring's minimum acceptable height for North Anna Unit 1 is found in Westinghouse Calc Note CN-RIDA-10-2.</b> <i>(If hold down spring inspection is not required due to material type, state the material of fabrication and that the inspection is not required)</i> <i>(Please reference or include the inspection report, if possible)</i>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1) <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Thermal Shield Assembly</b> Thermal shield flexures	Visual examination (VT-3)	100% of thermal shield flexures.  See Figures 4-29 and 4-36 of MRP-227-A.	All six of the thermal shield flexures were visually examined. All visual exams were satisfactory.	All visual exams were satisfactory.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b>  <b>ETE-NA-2018-0008 is the station engineering evaluation of the North Anna Unit 1 MRP-227 inspection – Phase 2.</b>  <i>(Please reference or include the inspection report, if possible)</i>				

## Notes to Westinghouse Primary Components Table:

- Examination acceptance criteria and expansion criteria for the Westinghouse components are in Table 5-3 of MRP-227-A.
- A minimum of 75% of the total identified sample population must be examined.
- A minimum of 75% of the total population (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-3 of MRP-227-A, must be examined for inspection credit.
- A minimum of 75% of the total weld length (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-3 of MRP-227-A, must be examined from either the inner or outer diameter for inspection credit.
- The lower core barrel flange weld may be alternatively designated as the core barrel-to-support plate weld in some Westinghouse plant designs.

## Expansion Components

**[X] Check here if NO Expansion Components were inspected this outage—DELETE this table if NO Expansion inspections were performed.**

## Existing Components

[ ] Check here if NO Existing Components were inspected this outage—DELETE this table if NO Existing inspections were performed.

Item	Examination Method	Required Examination Coverage	Coverage Achieved (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1) (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Core Barrel Assembly</b> Core barrel flange	Visual examination (VT-3) to determine general condition for excessive wear.	All accessible surfaces at specified frequency.	100% of the core barrel including the core barrel flange was examined. Four minor indications not related to MRP-227-A were noted. They were evaluated as acceptable per ETE-NA-2018-0013.	<p><u>Indication 1</u> – This indication was identified as an area of interest during a review of the 2009 B-N-1 RPV inspection video. This indication was located below the 55° irradiation specimen slot, and visual examination revealed an area of cladding degradation which exposed the underlying low alloy steel. This area of clad loss, its location and dimensions are presented in Attachment 1. No indications of cracking were visible in the area surrounding this indication.</p> <p><u>Indication 2</u> – During the RPV interior examination, this indication was identified adjacent to the 270° Radial (Clevis) Support Keyway as seen in Attachment 2 and Figure 4-8 in Attachment 4. Further investigation which included an EVT-1 examination revealed an area of cladding degradation which exposed the underlying low alloy carbon steel. No indication of cracking was visible in the area surrounding this indication.</p> <p><u>Indication 3</u> – During the examination of the Lower Internals Support Ledge, there were areas identified with materials deformation at the base of each of the following Irradiation Specimen Slots: 45°, 55°, and 65°. This was a total of three areas of deformation: one area per Specimen Slot. No indication of cracking was visible in the area surrounding each indication.</p>

Item	Examination Method	Required Examination Coverage	Coverage Achieved (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1) (Include Number and Location of Findings and a Brief Description of the Findings)
Disposition of Indications (check each required): <input checked="" type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b> ETE-NA-2018-0013 determined the following: <ol style="list-style-type: none"> <li>The vessel, as inspected in the B-N-1 exam, has two “relevant conditions that require corrective action” in comparison to the criteria of IWB-3520.2. The upper and lower indications are relevant indications. This ETE evaluates these two indications as acceptable for continued service through IWB-3142.4, Acceptance by Analytical Evaluation. The three indications found on the irradiation sample slots are not “relevant conditions” because the indication features did not display a breach in the cladding.</li> <li>There is no active degradation mechanism which will reduce the capability of the vessel to perform its intended design function or will require monitoring more frequently than as needed per IWB-2500.</li> <li>Since the maximum conservative estimate of corrosion loss 0.31 inches (40-yr) and 0.62 inches (80-yr) have been shown to be structurally acceptable, the vessel has structural margin for the probable depth of the indications and the extreme, worst-case corrosion even after an 80 year life.</li> </ol> Based on the analyses performed, a local corrosion feature up to 1.0 inches in depth at both locations continues to meet ASME Boiler and Pressure Vessel Code Section III criteria. Therefore, the subject cladding indications are concluded to be acceptable for operation until the end of an 80-year licensing period. Additional visual examinations of the cladding indications are considered appropriate when the core barrel is removed for a subsequent reactor vessel ISI examination and the areas in which each cladding indication is located become accessible.				
<b>Required Actions</b> <ol style="list-style-type: none"> <li>Schedule the collection of depth measurements on the two indications presented in CR1092975 and CR1092857.</li> <li>Schedule supplemental exam(s) in accordance with IWB-2420(b) and (c).</li> </ol>				
<i>(Please reference or include the inspection report, if possible)</i>				
<b>Upper Internals Assembly</b> Upper support ring or skirt	Visual examination (VT-3)	All accessible surfaces at specified frequency.	100% of accessible surfaces were examined.	No issues were noted.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				

Item	Examination Method	Required Examination Coverage	Coverage Achieved (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1) (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Comments:</b>  <b>ETE-NA-2018-0008 is the station evaluation of the North Anna Unit 1 MRP-227 inspection – Phase 2.</b>  <i>(Please reference or include the inspection report, if possible)</i>				
<b>Lower Internals Assembly</b> Lower core plate XL lower core plate (Note 1)	Visual (VT-3) examination of the lower core plates to detect evidence of distortion and/or loss of bolt integrity.	All accessible surfaces at specified frequency.		
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b>  <i>(Please reference or include the inspection report, if possible)</i>				
<b>Lower Internals Assembly</b> Lower core plate XL lower core plate (Note 1)	Visual examination (VT-3)	All accessible surfaces at specified frequency.	100% of the lower core plate accessible surface was visually examined.	No issues were noted.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				

Item	Examination Method	Required Examination Coverage	Coverage Achieved (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1) (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Comments:</b> <p>ETE-NA-2018-0008 is the station evaluation of the North Anna Unit 1 MRP-227 inspection – Phase 2.</p> <p>(Please reference or include the inspection report, if possible)</p>				
<b>Bottom Mounted Instrumentation System</b> Flux thimble tubes	Surface examination (ET)	Eddy current surface examination as defined in plant response to IEB 88-09.	Total Tubes – 50 Tubes Inspected – 50  100% Examined	Wall Losses: 70% to 89%                      0 50% to 69%                      0 30% to 49%                      7 Less than 30%                  10 No damage                        33 Restricted                         0
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b> <p>The following tubes were replaced using design change NA-DC-000-NA-15-00089 during 1R25: A9,C12,D3,D5,D10,D12,F6,F13,G9,H13,J3,J5,J15,L6,L9,N10,N12,R8.</p> <p>Eddy current inspection has inherent limitations that prevent precise duplication of the results from one inspection to the next. These slight differences lead to some imprecision in direct comparison of wall losses between inspections. Several tubes recorded slight changes in wall loss that are not indicative of active degradation.</p> <p>(Please reference or include the inspection report, if possible)</p>				



Item	Examination Method	Required Examination Coverage	Coverage Achieved (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1) (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Alignment and Interfacing Components</b> Clevis insert bolts	Visual examination (VT-3)	All accessible surfaces at specified frequency.	All 32 clevis insert bolts were examined with no issues noted. <b>Westinghouse Technical Bulletin 14-5 and PWROG-15034-P-0.</b>	No issues were noted with the clevis insert bolting. Wear was observed on the clevis inserts and radial key components; please see comments below.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input checked="" type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b>  Eight wear indications were found on the following Clevis Insert and Radial Key components (ETE-NA-2018-0008, Attachment 1): <ul style="list-style-type: none"> <li>1" wide x 7" long wear area on the 0° Core Barrel Radial Support Key on the 90° side and a similar wear area on the equivalent face of the mating clevis insert (0° Core Barrel Radial Support Clevis on the 90° side)</li> <li>1" wide x 7" long wear area on the 90° Core Barrel Radial Support Key on the 180° side and a similar wear area on the equivalent face of the mating clevis insert (90° Core Barrel Radial Support Clevis on the 180° side)</li> <li>1" wide x 7" long wear area on the 180° Core Barrel Radial Support Key on the 90° side and a similar wear area on the equivalent face of the mating clevis insert (180° Core Barrel Radial Support Clevis on the 90° side)</li> <li>1" wide x 7" long wear area on the 270° Core Barrel Radial Support Key on the 180° side and a similar wear area on the equivalent face of the mating clevis insert (270° Core Barrel Radial Support Clevis on the 180° side)</li> </ul> <p>In reference to the clevis cap screw degradation to be inspected for Westinghouse Technical Bulletin 14-5, no clevis cap screw degradation was observed in the 32 cap screws inspected in each clevis insert. Review of the clevis wear indications by Engineering determined there was no loss of function, so they were not relevant conditions requiring correction under Code rules.</p> <p><i>(Please reference or include the inspection report, if possible)</i></p>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1) (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Alignment and Interfacing Components</b> Upper core plate alignment pins	Visual examination (VT-3)	All accessible surfaces at specified frequency.	100% of the lower core plate accessible surface was visually examined.	No issues were noted.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b>  ETE-NA-2018-0008 is the station evaluation of the North Anna Unit 1 MRP-227 inspection – Phase 2.  (Please reference or include the inspection report, if possible)				

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## Tables for Reporting MRP-227-A Inspection Results for Westinghouse Plants, Rev.3

(Please include only the results of the current inspection)

Plant Name: Joseph Farley Unit 1

Utility: Southern Nuclear

Date of Exams: April 15-21 2018

Plant Age: 40.8 years as of April 2018 (years) / 33.89 EFPY

### Primary Components

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings (Note 1)
<b>Control Rod Guide Tube Assembly</b> Guide plates (cards)	Visual examination (VT-3)	Examination per WCAP-17451-P of CRGT assemblies, with all guide cards within each selected CRGT assembly examined.  See MRP-2014-006 and WCAP-17451-P	Measured the 6 lowest guide cards of 37 out of 48 CRGTs to achieve 95% confidence. VT-3 of all card levels and top of continuous section.	Maximum % volume wear: Five (5) worst case CRGTs:  Farley Unit 1 using aligned low flow curves per WCAP yielded 12.4 EFPY additional run time prior to reaching yellow zone at one location. Volume wear for 5 worst worn CRGTs: F6 – 55% to yellow F12 – 53% to yellow K10 – 48% to yellow G13 – 39% to yellow F4 – 38% to yellow These five were also in the top 11 worst worn from split pin video review used to help develop WCAP
<b>Control Rodlet Surface Finish (circle each applicable):</b> Ion Nitride <span style="border: 1px solid black; padding: 2px;">Chrome Plated</span> No Surface Modification    Other (Specify)				
<b>Disposition of Indications (check each required):</b> [ ] Code Analysis   [ ] NRC Submittal   [ ] WCAP-17096 Criteria   [ ] Other (Specify)   [ X ] N/A				
<b>Comments:</b>  (Please reference or include the inspection report, if possible)				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Control Rod Guide Tube Assembly</b> Lower flange welds	Enhanced visual examination (EVT-1) to determine the presence of crack-like surface flaws in flange welds	100% of outer (accessible) CRGT lower flange weld surfaces and adjacent base metal on the individual periphery CRGT assemblies. (Note 2)  See Figure 4-21 of MRP-227-A.	16 control rod guide tubes examined for cracking in lower flange welds.	No relevant conditions identified.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b> Upper and lower flange welds examined for a total of 128 locations. 104 locations were accessible with 26 achieving 100% EVT-1 coverage and 75 achieving partial EVT-1 coverage. 3 additional locations were best effort (no EVT-1 coverage achieved)				
(Please reference or include the inspection report, if possible)				
<b>Core Barrel Assembly</b> Upper core barrel flange weld	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).  See Figure 4-22 of MRP-227-A.		N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b> Examined and reported during the previous outage (fall 2016)				
(Please reference or include the inspection report, if possible)				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1)  <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Core Barrel Assembly</b> Upper and lower core barrel cylinder girth welds	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).  See Figure 4-22 of MRP-227-A		N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments: Examined and reported during the previous outage (fall 2016)				
<i>(Please reference or include the inspection report, if possible)</i>				
<b>Core Barrel Assembly</b> Lower core barrel flange weld (Note 5)	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).		N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments: Examined and reported during the previous outage (fall 2016)				
<i>(Please reference or include the inspection report, if possible)</i>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1) <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Baffle-Former Assembly</b> Baffle-edge bolts	Visual examination (VT-3)	Bolts and locking devices on high fluence seams. 100% of components accessible from core side (Note 3).  See Figure 4-23 of MRP-227-A.	All 244 edge bolts examined; three columns of 11 and two columns of 14 edge bolts per quadrant.	No relevant indications  <i>(Please include a map of the inspected bolts, if possible)</i>
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
Comments:				
<i>(Please reference or include the inspection report, if possible)</i>				
<b>Baffle-Former Assembly</b> Baffle-former bolts	Volumetric examination (UT)	100% of accessible bolts (Note 3). Heads accessible from the core side. UT accessibility may be affected by complexity of head and locking device designs.  See Figures 4-23 and 4-24 of MRP-227-A.		N/A  <i>(Please include a map of the inspected bolts, if possible)</i>
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments: No inspected this outage.				
<i>(Please reference or include the inspection report, if possible)</i>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1)  <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Baffle-Former Assembly</b> Assembly (Includes: Baffle plates, baffle edge bolts and indirect effects of void swelling in former plates)	Visual examination (VT-3)	Core side surface as indicated.  See Figures 4-24, 4-25, 4-26 and 4-27 of MRP-227-A.	20 high fluence seams examined for 100% coverage.	No relevant conditions.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b> Prior peening at seams noted, performed during F03 and F04 in attempt to minimize baffle jetting before upflow conversion. <i>(Please reference or include the inspection report, if possible)</i>				
<b>Alignment and Interfacing Components</b> Internals hold down spring	Direct measurement of spring height	Measurements should be taken at several points around the circumference of the spring, with a statistically adequate number of measurements at each point to minimize uncertainty.  See Figure 4-28 of MRP-227-A.	Direct measurement of the Reactor Vessel HDS was completed during 1R28 – measurements were taken at 8 locations distributed around the circumference.  . Unit 1's HDS is 304 – SS.	The average of spring height measurements were 3.602 inches. This result is greater than the minimum requirement of 3.60 inches; therefore, the final result is acceptable. This result confirms adequate hold down capability through at least 60 total years of reactor operation.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b> Because Farley Unit 1 has an austenitic (304 – SS) stainless steel hold down spring, measurements of its relaxation required per the MRP-227-A and Rev. 1 guidance. Per WEC supplied acceptance criteria Farley Unit 1 the required hold down force for design conditions giving a the minimum acceptable height for assuring a minimum for 60 year service life was 3.590" + measurement accuracy. Spring height measurements were taken at eight locations with three individual measurements taken at each location. The estimated average spring height was 3.6022" with a standard deviation of 0.00292 inches. This result is slightly greater than the minimum requirement; therefore, the final result is acceptable. This result confirms adequate hold down capability through at least 60 total years of reactor operation, and no further measurements are required. <i>(If hold down spring inspection is not required due to material type, state the material of fabrication and that the inspection is not required)</i> <i>(Please reference or include the inspection report, if possible)</i>				



Item	Examination Method	Required Examination Coverage	Coverage Achieved  <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1)  <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Thermal Shield Assembly</b> Thermal shield flexures	Visual examination (VT-3)	100% of thermal shield flexures.  See Figures 4-29 and 4-36 of MRP-227-A.	Farley-1 is a neutron panel plant.	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments:          <i>(Please reference or include the inspection report, if possible)</i>				

Notes to Westinghouse Primary Components Table:

1. Examination acceptance criteria and expansion criteria for the Westinghouse components are in Table 5-3 of MRP-227-A.
2. A minimum of 75% of the total identified sample population must be examined.
3. A minimum of 75% of the total population (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-3 of MRP-227-A, must be examined for inspection credit.
4. A minimum of 75% of the total weld length (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-3 of MRP-227-A, must be examined from either the inner or outer diameter for inspection credit.
5. The lower core barrel flange weld may be alternatively designated as the core barrel-to-support plate weld in some Westinghouse plant designs.

## Expansion Components

☒ Check here if NO Expansion Components were inspected this outage—DELETE this table if NO Expansion inspections were performed.

## Existing Components

☐ Check here if NO Existing Components were inspected this outage—DELETE this table if NO Existing inspections were performed.

Item	Examination Method	Required Examination Coverage	Coverage Achieved <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1) <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Core Barrel Assembly</b> Core barrel flange	Visual examination (VT-3) to determine general condition for excessive wear.	All accessible surfaces at specified frequency.		
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b>  <i>(Please reference or include the inspection report, if possible)</i>				
<b>Upper Internals Assembly</b> Upper support ring or skirt	Visual examination (VT-3)	All accessible surfaces at specified frequency.		
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b>  <i>(Please reference or include the inspection report, if possible)</i>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1) <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Lower Internals Assembly</b> Lower core plate XL lower core plate (Note 1)	Visual (VT-3) examination of the lower core plates to detect evidence of distortion and/or loss of bolt integrity.	All accessible surfaces at specified frequency.		
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments:				
<i>(Please reference or include the inspection report, if possible)</i>				
<b>Lower Internals Assembly</b> Lower core plate XL lower core plate (Note 1)	Visual examination (VT-3)	All accessible surfaces at specified frequency.	Lower core plate VT-3 with additional video through flow holes for best effort view of lower support columns.	No relevant conditions.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments:				
<i>(Please reference or include the inspection report, if possible)</i>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1) <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Bottom Mounted Instrumentation System</b> Flux thimble tubes	Surface examination (ET)	Eddy current surface examination as defined in plant response to IEB 88-09.		N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments: *** REPORT UPON THESE INSPECTIONS ONLY WHEN DONE IN CONJUNCTION WITH MRP-227-A RELATED EXAMS. ***				
(Please reference or include the inspection report, if possible)				
<b>Alignment and Interfacing Components</b> Clevis insert bolts	Visual examination (VT-3)	All accessible surfaces at specified frequency.		
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments:				
(Please reference or include the inspection report, if possible)				

Item	Examination Method	Required Examination Coverage	Coverage Achieved <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1) <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Alignment and Interfacing Components</b> Upper core plate alignment pins	Visual examination (VT-3)	All accessible surfaces at specified frequency.		
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b>  <i>(Please reference or include the inspection report, if possible)</i>				

Notes to Westinghouse Existing Programs Components Table:

1. XL = "Extra Long" referring to Westinghouse plants with 14-foot cores.

## Tables for Reporting MRP-227-A Inspection Results for Westinghouse Plants, Rev.3

(Please include only the results of the current inspection)

**Plant Name:** Beaver Valley Unit 1 **Utility:** First Energy

**Date of Exams:** April – May, 2018, 1R25 RFO **Plant Age:** 42.25 (years) / 30.71 EFPY

### Primary Components

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Control Rod Guide Tube Assembly</b> Guide plates (cards)	Visual examination (VT-3)	Examination per WCAP-17451-P of CRGT assemblies, with all guide cards within each selected CRGT assembly examined.  See MRP-2014-006 and WCAP-17451-P	N/A	This component was not inspected during 1R25.
<b>Control Rodlet Surface Finish (circle each applicable):</b> <u>Ion Nitride</u> <u>Chrome Plated</u> <u>No Surface Modification</u> <u>Other (Specify)</u>				
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b>  Guide card wear inspections currently scheduled for Spring 2024 (1R29) in accordance with WCAP-17451-P Revision 1 and PWROG letter OG-18-46.  (Please reference or include the inspection report, if possible)				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Control Rod Guide Tube Assembly</b> Lower flange welds	Enhanced visual examination (EVT-1) to determine the presence of crack-like surface flaws in flange welds	100% of outer (accessible) CRGT lower flange weld surfaces and adjacent base metal on the individual periphery CRGT assemblies. (Note 2)  See Figure 4-21 of MRP-227-A.	Examined 100% of the accessible CRGT lower flange weld surfaces and adjacent base metal on the periphery CRGT assemblies. This resulted in EVT-1 examination of 24 CRGT lower flange welds, and best effort visual examination of 46 CRGT lower flange welds.	No relevant indications.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b> In addition to CRGT lower flange welds, the accessible CRGT enclosure welds were also examined on the peripheral CRGT assemblies. EVT-1 examinations were performed on 81 CRGT enclosure welds, and best effort visual examinations were performed on 104 CRGT enclosure welds.  (Please reference or include the inspection report, if possible)				
<b>Core Barrel Assembly</b> Upper core barrel flange weld	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).  See Figure 4-22 of MRP-227-A.	Full coverage achieved. 100% of the weld and base metal ( $\frac{3}{4}$ " adjacent to both sides of the weld) was EVT-1 examined from the ID of the core barrel.	No relevant indications.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				





Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Core Barrel Assembly</b> Lower core barrel flange weld (Note 5)	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).	100% of the weld and base metal (¾" adjacent to both sides of the weld) was EVT-1 examined from the OD of the core barrel.	No relevant indications.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments:				
(Please reference or include the inspection report, if possible)				
<b>Baffle-Former Assembly</b> Baffle-edge bolts	Visual examination (VT-3)	Bolts and locking devices on high fluence seams. 100% of components accessible from core side (Note 3).  See Figure 4-23 of MRP-227-A.	N/A	This component was not inspected during 1R25.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments: In accordance with MRP-227-A, baffle edge bolts are scheduled to be examined in spring 2027 (1R31).				
(Please reference or include the inspection report, if possible)				

Item	Examination Method	Required Examination Coverage	Coverage Achieved <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1) <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Baffle-Former Assembly</b> Baffle-former bolts	Volumetric examination (UT)	100% of accessible bolts (Note 3). Heads accessible from the core side. UT accessibility may be affected by complexity of head and locking device designs.  See Figures 4-23 and 4-24 of MRP-227-A.	N/A	This component was not inspected during 1R25.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b> In accordance with MRP-227-A, baffle former bolts are scheduled to be examined in spring 2021 (1R27).				
<i>(Please reference or include the inspection report, if possible)</i>				
<b>Baffle-Former Assembly</b> Assembly (Includes: Baffle plates, baffle edge bolts and indirect effects of void swelling in former plates)	Visual examination (VT-3)	Core side surface as indicated.  See Figures 4-24, 4-25, 4-26 and 4-27 of MRP-227-A.	N/A	This component was not inspected during 1R25.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b> In accordance with MRP-227-A, the baffle former assembly is scheduled to be examined in spring 2027 (1R31).				
<i>(Please reference or include the inspection report, if possible)</i>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Alignment and Interfacing Components</b> Internals hold down spring	Direct measurement of spring height	Measurements should be taken at several points around the circumference of the spring, with a statistically adequate number of measurements at each point to minimize uncertainty.  See Figure 4-28 of MRP-227-A.	N/A	This component was not inspected during 1R25.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b> In accordance with MRP-227-A, the internals hold down spring is scheduled to be examined in fall 2019 (1R26).  (If hold down spring inspection is not required due to material type, state the material of fabrication and that the inspection is not required) (Please reference or include the inspection report, if possible)				
<b>Thermal Shield Assembly</b> Thermal shield flexures	Visual examination (VT-3)	100% of thermal shield flexures.  See Figures 4-29 and 4-36 of MRP-227-A.	All 6 thermal shield flexures were VT-3 examined (at 35, 90, 140, 210, 270, & 330 degrees).	No indications
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b> Coverage was limited to the part of the flexure located outside of the core barrel and the part that could be seen through the opening in the core barrel wall.				

Notes to Westinghouse Primary Components Table:

1. Examination acceptance criteria and expansion criteria for the Westinghouse components are in Table 5-3 of MRP-227-A.
2. A minimum of 75% of the total identified sample population must be examined.
3. A minimum of 75% of the total population (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-3 of MRP-227-A, must be examined for inspection credit.
4. A minimum of 75% of the total weld length (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-3 of MRP-227-A, must be examined from either the inner or outer diameter for inspection credit.
5. The lower core barrel flange weld may be alternatively designated as the core barrel-to-support plate weld in some Westinghouse plant designs.

## Expansion Components

**[X] Check here if NO Expansion Components were inspected this outage—DELETE this table if NO Expansion inspections were performed.**

## Existing Components

**[ ] Check here if NO Existing Components were inspected this outage—DELETE this table if NO Existing inspections were performed.**

Item	Examination Method	Required Examination Coverage	Coverage Achieved  <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1)  <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Core Barrel Assembly</b> Core barrel flange	Visual examination (VT-3) to determine general condition for excessive wear.	All accessible surfaces at specified frequency.	N/A – not inspected in 1R25	N/A
Disposition of Indications (check each required): [ ] Code Analysis [ ] NRC Submittal [ ] WCAP-17096 Criteria [ ] Other (Specify) [ ] N/A				
<b>Comments:</b>  <i>(Please reference or include the inspection report, if possible)</i>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Upper Internals Assembly</b> Upper support ring or skirt	Visual examination (VT-3)	All accessible surfaces at specified frequency.	VT-3 of the accessible surfaces of the upper support plate. Accessibility limited by cavity wall proximity to upper internals storage stand.	No recordable indications.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments:				
(Please reference or include the inspection report, if possible)				
<b>Lower Internals Assembly</b> Lower core plate XL lower core plate (Note 1)	Visual (VT-3) examination of the lower core plates to detect evidence of distortion and/or loss of bolt integrity.	All accessible surfaces at specified frequency.	N/A – not inspected in 1R25	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments:				
(Please reference or include the inspection report, if possible)				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Lower Internals Assembly</b> Lower core plate XL lower core plate (Note 1)	Visual examination (VT-3)	All accessible surfaces at specified frequency.	N/A – not inspected in 1R25	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments:				
(Please reference or include the inspection report, if possible)				
<b>Bottom Mounted Instrumentation System</b> Flux thimble tubes	Surface examination (ET)	Eddy current surface examination as defined in plant response to IEB 88-09.	N/A – not inspected in 1R25	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments: *** REPORT UPON THESE INSPECTIONS ONLY WHEN DONE IN CONJUNCTION WITH MRP-227-A RELATED EXAMS. ***				
(Please reference or include the inspection report, if possible)				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Alignment and Interfacing Components</b> Clevis insert bolts	Visual examination (VT-3)	All accessible surfaces at specified frequency.	N/A – not inspected in 1R25	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments:				
(Please reference or include the inspection report, if possible)				
<b>Alignment and Interfacing Components</b> Upper core plate alignment pins	Visual examination (VT-3)	All accessible surfaces at specified frequency.	N/A – not inspected in 1R25	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments:				
(Please reference or include the inspection report, if possible)				

Notes to Westinghouse Existing Programs Components Table:

1. XL = "Extra Long" referring to Westinghouse plants with 14-foot cores.



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## Tables for Reporting MRP-227-A Inspection Results for Westinghouse Plants, Rev.3

(Please include only the results of the current inspection)

Plant Name: McGuire Nuclear Station – Unit 2 Utility: Duke Energy Carolinas LLC

Date of Exams: September 2018 (M2R25) Plant Age: 35yrs (years) / 29.58 EFPY

Only CRGT guide cards were inspected in this outage at MNS2

Primary Components Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)																								
Control Rod Guide Tube Assembly Guide plates (cards)	Visual examination (VT-3)	Examination per WCAP-17451-P of CRGT assemblies, with all guide cards within each selected CRGT assembly examined.  See MRP-2014-006 and WCAP-17451-P	Examined 100% of all lower 8 guide cards and the continuous section on all 53 rodged CRGT assemblies (17x17A design) including wear measurements of cardinal holes in accordance with MRP-227-A/MRP-2014-006, WCAP-17451-P, Rev 1, and MRP 2018-007/OG-18-46.	Maximum % volume wear: Five (5) worst case CRGTs (per WCAP-17451-P, Rev 1):																								
				<table><tr><td>Location</td><td>Max. Wear Volume (%)</td><td>Remaining EFPY to Red Zone (Rev 1)</td><td>Remaining EFPY to Red Zone (Rev 2)*</td></tr><tr><td>B08, Card 6, Hole E4</td><td>94.12</td><td>0</td><td>2.7</td></tr><tr><td>B10, Card 7, Hole E4</td><td>95.65</td><td>0</td><td>5.9</td></tr><tr><td>H06, Card 6, Hole D3</td><td>97.73</td><td>0</td><td>3.8</td></tr><tr><td>P04, Card 7, Hole E4</td><td>88.48</td><td>3.3</td><td>6.2</td></tr><tr><td>H08, Card 9, Hole E4</td><td>71.52</td><td>4.8</td><td>9.3</td></tr></table>	Location	Max. Wear Volume (%)	Remaining EFPY to Red Zone (Rev 1)	Remaining EFPY to Red Zone (Rev 2)*	B08, Card 6, Hole E4	94.12	0	2.7	B10, Card 7, Hole E4	95.65	0	5.9	H06, Card 6, Hole D3	97.73	0	3.8	P04, Card 7, Hole E4	88.48	3.3	6.2	H08, Card 9, Hole E4	71.52	4.8	9.3
				Location	Max. Wear Volume (%)	Remaining EFPY to Red Zone (Rev 1)	Remaining EFPY to Red Zone (Rev 2)*																					
				B08, Card 6, Hole E4	94.12	0	2.7																					
				B10, Card 7, Hole E4	95.65	0	5.9																					
				H06, Card 6, Hole D3	97.73	0	3.8																					
				P04, Card 7, Hole E4	88.48	3.3	6.2																					
				H08, Card 9, Hole E4	71.52	4.8	9.3																					
*Remaining EFPY to Red Zone per WCAP-17451-P, Rev 2 values assume no RCCA changeout in the future.																												

Primary Components Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
Control Rodlet Surface Finish (circle each applicable): <input checked="" type="checkbox"/> Ion Nitride <input type="checkbox"/> Chrome Plated <input type="checkbox"/> No Surface Modification <input type="checkbox"/> Other (Specify)				
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input checked="" type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Next Inspection: (~2023)				
Comments:				
<ol style="list-style-type: none"> <li>MNS Unit 2 utilizes 17x17 Advanced style guide tubes with 96" lower guide tube length.</li> <li>Guide card wear was evaluated and dispositioned in accordance with WCAP-17451-P, Rev. 1 and WCAP-17451-P, Rev 2 and is documented in Westinghouse report WCAP-18412-P. At the time of inspection, WCAP-17451-P Rev. 2 was not issued. During the outage, results were analyzed to WCAP-17451-P, Rev 1. Following the outage, upon issuance and endorsement of WCAP-17451-P, Rev 2, the McGuire results were re-analyzed to WCAP-17451-P, Rev 2.</li> <li>Three guide tubes (locations B08, B10, and H06) were found to be in the Red Zone per WCAP-17451-P, Rev. 1. These three guide tubes required relocation during M2R25. One guide tube at core location P04 was in the yellow zone per WCAP-17451-P, Rev 1, and the remaining 49 guide tubes are in the green zone. Using WCAP-17451-P, Rev 2 criteria, no guide tubes were found to be in the red zone, two guide tubes (locations B08 and H06) were found to be in the yellow zone, and the remaining 51 guide tubes were found to be in the green zone.</li> <li>Excluding the three guide tubes relocated in M2R25, a total of 15 guide tubes are projected to reach the Red Zone per WCAP-17451-P Rev. 2 criteria within 20 EFPY (assuming continued operation with ion-nitrided RCCAs). Assuming RCCA replacement in 2020, a total of 11 additional guide tubes are projected to reach the Red Zone per WCAP-17451-P Rev. 2 criteria within 20 EFPY.</li> </ol>				
Control Rod Guide Tube Assembly Lower flange welds	Enhanced visual examination (EVT-1) to determine the presence of crack-like surface flaws in flange welds	100% of outer (accessible) CRGT lower flange weld surfaces and adjacent base metal on the individual periphery CRGT assemblies. (Note 2)  See Figure 4-21 of MRP-227-A.		<u>Not inspected this outage</u>

## Tables for Reporting MRP-227-A Inspection Results for Westinghouse Plants

**Plant Name:** Turkey Point Unit 3 **Utility:** NextEra Energy/FPL  
**Date of Exams:** October 2018, PTN3-30RFO **Plant Age:** 46 (years) / 34.45 EFPY

### Primary Components

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings (Note 1)
<b>Control Rod Guide Tube Assembly</b> Guide plates (cards)	Visual examination (VT-3)	20% examination of the number of CRGT assemblies, with all guide cards within each selected CRGT assembly examined.  See MRP 2014-006 and WCAP-17451-P	20% of the CRGT assemblies.	Results provided below.

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings (Note 1)																				
<b>Comments:</b> Inspection completed PTN3-RFO28 (fall 2015). VT-3 inspection and Guide Card Wear Measurements (GCWM) were completed on nine (9) guide tubes (i.e. 20% of the active locations in the upper internals).																								
	<table><tr><th>Location</th><th>Wear (%)</th></tr><tr><td>C-7</td><td>6</td></tr><tr><td>D-8</td><td>6</td></tr><tr><td>F-4</td><td>3</td></tr><tr><td>F-12</td><td>7</td></tr><tr><td>H-8</td><td>7</td></tr><tr><td>K-14</td><td>39</td></tr><tr><td>L-5</td><td>7</td></tr><tr><td>M-8</td><td>18</td></tr><tr><td>P-10</td><td>12</td></tr></table>	Location	Wear (%)	C-7	6	D-8	6	F-4	3	F-12	7	H-8	7	K-14	39	L-5	7	M-8	18	P-10	12			
Location	Wear (%)																							
C-7	6																							
D-8	6																							
F-4	3																							
F-12	7																							
H-8	7																							
K-14	39																							
L-5	7																							
M-8	18																							
P-10	12																							
Analyzed using WCAP-17451 and are within the allowable values.																								
<b>Control Rod Guide Tube Assembly</b> Lower flange welds	Enhanced visual examination (EVT-1) to determine the presence of crack-like surface flaws in flange welds	100% of outer (accessible) CRGT lower flange weld surfaces and adjacent base metal on the individual periphery CRGT assemblies. (Note 2)  See Figure 4-21 of MRP-227-A.	100% of weld length.	No Recordable Indications.																				
<b>Comments:</b> Inspection completed PTN3-RFO28 (fall 2015).																								

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings (Note 1)
<b>Core Barrel Assembly</b> Upper core barrel flange weld	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).  See Figure 4-22 of MRP-227-A.	100% of weld length.	No Recordable Indications
<b>Comments:</b> Inspection completed PTN3-RFO27 (spring 2014).				
<b>Core Barrel Assembly</b> Upper and lower core barrel cylinder girth welds	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).  See Figure 4-22 of MRP-227-A	100% of Upper Core Barrel Cylinder Girth Weld Length.  90.6% of Lower Core Barrel Cylinder Girth Weld Length.	No Recordable Indications
<b>Comments:</b> Inspection completed PTN3-RFO27 (spring 2014).				
<b>Core Barrel Assembly</b> Lower core barrel flange weld (Note 5)	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).	90.5% of Weld Length.	No Recordable Indications
<b>Comments:</b> Inspection completed PTN3-RFO27 (spring 2014).				
<b>Baffle-Former Assembly</b> Baffle-edge bolts	Visual examination (VT-3)	Bolts and locking devices on high fluence seams. 100% of components accessible from core side (Note 3).  See Figure 4-23 of MRP-227-A.	100% of Baffle Edge Bolts	No Recordable Indications
<b>Comments:</b> Inspection completed PTN3-RFO28 (fall 2015).				

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings (Note 1)
<b>Baffle-Former Assembly</b> Baffle-former bolts	Volumetric examination (UT)	100% of accessible bolts (Note 3). Heads accessible from the core side. UT accessibility may be affected by complexity of head and locking device designs.  See Figures 4-23 and 4-24 of MRP-227-A.	1087 of 1088 Baffle Former Bolts	1088 bolts total: -1 bolt with indication -1 uninspectable/blocked bolt
<b>Comments:</b> Exam results met site acceptance criteria, Acceptable Bolt Pattern Analysis.				
<b>Baffle-Former Assembly</b> Assembly (Includes: Baffle plates, baffle edge bolts and indirect effects of void swelling in former plates)	Visual examination (VT-3)	Core side surface as indicated.  See Figures 4-24, 4-25, 4-26 and 4-27 of MRP-227-A.	100%	No Recordable Indications
<b>Comments:</b> Inspection completed PTN3-RFO27 (spring 2014).				
<b>Alignment and Interfacing Components</b> Internals hold down spring	Direct measurement of spring height	Measurements should be taken at several points around the circumference of the spring, with a statistically adequate number of measurements at each point to minimize uncertainty.  See Figure 4-28 of MRP-227-A.	100%	SAT
<b>Comments:</b> Inspection completed PTN3-RFO27 (spring 2014).				
<b>Thermal Shield Assembly</b> Thermal shield flexures	Visual examination (VT-3)	100% of thermal shield flexures.  See Figures 4-29 and 4-36 of MRP-227-A.	100%	No Recordable Indications

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings (Note 1)
<b>Comments:</b> Inspection completed PTN3-RFO27 (spring 2014).				

**Notes to Westinghouse Primary Components Table:**

1. Examination acceptance criteria and expansion criteria for the Westinghouse components are in Table 5-3 of MRP-227-A.
2. A minimum of 75% of the total identified sample population must be examined.
3. A minimum of 75% of the total population (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-3 of MRP-227-A, must be examined for inspection credit.
4. A minimum of 75% of the total weld length (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-3 of MRP-227-A, must be examined from either the inner or outer diameter for inspection credit.
5. The lower core barrel flange weld may be alternatively designated as the core barrel-to-support plate weld in some Westinghouse plant designs.



**Expansion Components**

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings (Note 1)
<b>Upper Internals Assembly</b> Upper core plate	Enhanced visual examination (EVT-1)	100% of accessible surfaces (Note 2).	N/A	N/A
<b>Comments:</b> Not required to be examined.				
<b>Lower Internals Assembly</b> Lower support forging or castings	Enhanced visual examination (EVT-1)	100% of accessible surfaces (Note 2).  See Figure 4-33 of MRP-227-A.	N/A	N/A
<b>Comments:</b> Not required to be examined.				
<b>Core Barrel Assembly</b> Barrel-former bolts	Volumetric examination (UT)	100% of accessible bolts. Accessibility may be limited by presence of thermal shields or neutron pads (Note 2).  See Figure 4-23 of MRP-227-A.	N/A	N/A
<b>Comments:</b> Not required to be examined.				
<b>Lower Support Assembly</b> Lower support column bolts	Volumetric examination (UT)	100% of accessible bolts or as supported by plant-specific justification (Note 2).  See Figures 4-32 and 4-33 of MRP-227-A.	N/A	N/A
<b>Comments:</b> Not required to be examined.				

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings (Note 1)
<b>Core Barrel Assembly</b> Core barrel outlet nozzle welds	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 2).  See Figure 4-22 of MRP-227-A.	N/A	N/A
<b>Comments:</b> Not required to be examined.				
<b>Core Barrel Assembly</b> Upper and lower core barrel cylinder axial welds	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 2).  See Figure 4-22 of MRP-227-A.	N/A	N/A
<b>Comments:</b> Not required to be examined.				
<b>Lower Support Assembly</b> Lower support column bodies (non cast)	Enhanced visual examination (EVT-1)	100% of accessible surfaces (Note 2).  See Figure 4-34 of MRP-227-A.	N/A	N/A
<b>Comments:</b> Component not applicable to Turkey Point 3 &4				
<b>Lower Support Assembly</b> Lower support column bodies (cast)	Enhanced visual examination (EVT-1)	100% of accessible support columns (Note 2).  See Figure 4-34 of MRP-227-A.	N/A	N/A
<b>Comments:</b> Not required to be examined.				

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings (Note 1)
<b>Bottom Mounted Instrumentation System</b> Bottom-mounted instrumentation (BMI) column bodies	Visual examination (VT-3)	100% of BMI column bodies for which difficulty is detected during flux thimble insertion/withdrawal.  See Figure 4-35 of MRP-227-A.	N/A	N/A
<b>Comments:</b> Not required to be examined.				

**Notes to Westinghouse Expansion Component Table:**

1. Examination acceptance criteria and expansion criteria for the Westinghouse components are in Table 5-3 of MRP-227-A.
2. A minimum of 75% coverage of the entire examination area or volume, or a minimum sample size of 75% of the total population of like components of the examination is required (including both the accessible and inaccessible portions).

## Existing Programs Components

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings
<b>Core Barrel Assembly</b> Core barrel flange	Visual examination (VT-3) to determine general condition for excessive wear.	All accessible surfaces at specified frequency.	100%	The two impressions appear to have been caused by (FM) trapped between the two mating surfaces. The impressions are highly localized and not expected to affect the functionality and bearing area of these surfaces.
<b>Comments:</b> Inspection completed PTN3-RFO27 (spring 2014).				
<b>Upper Internals Assembly</b> Upper support ring or skirt	Visual examination (VT-3)	All accessible surfaces at specified frequency.	100%	No Recordable Indications
<b>Comments:</b> Inspection completed PTN3-RFO27 (spring 2014).				
<b>Lower Internals Assembly</b> Lower core plate XL lower core plate (Note 1)	Visual (VT-3) examination of the lower core plates to detect evidence of distortion and/or loss of bolt integrity.	All accessible surfaces at specified frequency.	100%	No Recordable Indications
<b>Comments:</b> Inspection completed PTN3-RFO27 (spring 2014).				
<b>Bottom Mounted Instrumentation System</b> Flux thimble tubes	Surface examination (ET)	Eddy current surface examination as defined in plant response to IEB 88-09.	100%	49 of 50 flux thimble tubes inspected via ET exam.
<b>Comments:</b> Light wear indications ranging from 12% to 19% through-wall (TW) thickness were found in six tubes. Moderate wear was identified ranging from 20% to 49% TW were found in 26 tubes. Wear ranging from 51% to 53% TW was found in three tubes. Results were within site acceptance criteria.				

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings
<b>Alignment and Interfacing Components</b> Clevis insert bolts	Visual examination (VT-3)	All accessible surfaces at specified frequency.	100%	Abrasive wear noted on bolts and lock bars at 270° key and clevis. Degradation attributed to foreign material, possibly an RCP diffuser adapter cap screw, retrieved during previous RFO.
<b>Comments:</b> Inspection completed PTN3-RFO27 (spring 2014).				
<b>Alignment and Interfacing Components</b> Upper core plate alignment pins	Visual examination (VT-3)	All accessible surfaces at specified frequency.	100%	No Recordable Indications
<b>Comments:</b> Inspection completed PTN3-RFO27 (spring 2014).				

**Notes to Westinghouse Existing Programs Components Table:**

1. XL = "Extra Long" referring to Westinghouse plants with 14-foot cores.

## Tables for Reporting MRP-227-A Inspection Results for CE Plants, Rev. 3

*(Please include only the results of the current inspection)*

**Plant Name:** Arkansas Nuclear One – Unit 2 **Utility:** Entergy Operations

**Date of Exams:** 10/10/2018 to 10/15/2018 **Plant Age:** 40 (years) / 31.630 **EFPY**

### Primary Components

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings (Note 2)
<b>Core Shroud Assembly (Welded)</b> Core shroud plate-former plate weld	Enhanced visual examination (EVT-1)	Axial and horizontal weld seams at the core shroud re-entrant corners as visible from the core side of the shroud, within six inches of central flange and horizontal stiffeners.  See Figures 4-12 and 4-14 of MRP 227-A.	100% EVT-1 examination coverage achieved of the axial and horizontal weld seams for the core shroud plate-former plate weld at the re-entrant corners within six inches of the central flange and horizontal stiffeners. This coverage requirement was exceeded by essentially examining the entire length of the axial and horizontal weld seams.	No relevant EVT-1 indications were noted.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <span style="float: right;"><input checked="" type="checkbox"/> N/A</span>				
<b>Next Inspection: 2028</b>				
Comments: Additional EVT-1 examination coverage achieved on the axial and horizontal weld seams for the core shroud plate-former plate weld as indicated above.				
<b>Core Shroud Assembly (Welded)</b> Assembly	Visual examination (VT-1)	If a gap exists, make three to five measurements of gap opening from the core side at the core shroud re-entrant corners. Then, evaluate the swelling on a plant-specific basis to determine frequency and method for additional examinations.  See Figures 4-12 and 4-14 of MRP-227-A.	100% VT-1 examination coverage achieved of the horizontal seam between the upper and lower core shroud segments.	No distortion (measurable separation) was observed during the VT-1 examination.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <span style="float: right;"><input checked="" type="checkbox"/> N/A</span>				
<b>Next Inspection: 2028</b>				
Comments: No physical separation between the upper and lower core shroud segments was identified by the VT-1 exam and thus gap measurements were not required.				

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings (Note 2)
<b>Core Support Barrel Assembly</b> Upper (core support barrel) flange weld	Enhanced visual examination (EVT-1)	100% of the accessible surfaces of the upper flange weld (Note 3). See Figure 4-15 of MRP-227-A.	100% EVT-1 examination coverage achieved of the upper flange ID weld length.	No relevant EVT-1 indications were noted.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A <b>Next Inspection: 2028</b>				
<b>Comments:</b> None.				
<b>Core Support Barrel Assembly</b> Lower cylinder girth welds 1) Upper girth weld – UGW 2) Middle girth weld – MGW 3) Lower girth weld – LGW	Enhanced visual examination (EVT-1)	100% of the accessible surfaces of the lower cylinder welds (Note 3). See Figure 4-15 of MRP-227-A.	1) UGW – 100% EVT-1 examination coverage achieved of the OD weld length. 2) MGW – 100% EVT-1 examination coverage achieved of the OD weld length. 3) LGW – 100% EVT-1 examination coverage achieved of the OD weld length.	1) UGW – No relevant EVT-1 indications were noted. 2) MGW – No relevant EVT-1 indications were noted. 3) LGW – No relevant EVT-1 indications were noted.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A <b>Next Inspection: 2028</b>				
<b>Comments:</b> EVT-1 exams were planned and performed on the Expansion component CSB axial welds (prior to issuance of any industry guidance) during the Fall 2018 outage irrespective of the EVT-1 inspection findings for the Primary component CSB girth welds based on the St. Lucie CSB OE from Spring 2018. See the table below for the Expansion component CSB axial welds examination results.				
<b>Lower Support Structure</b> Core support column welds	Visual examination (VT-3)	100% of the accessible surfaces of the core support column welds (Note 4). See Figures 4-16 and 4-31 of MRP-227-A.	100% VT-3 examination coverage achieved of the core support column welds from the top side of the core support plate.	No relevant VT-3 indications were noted.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A <b>Next Inspection: 2028</b>				
<b>Comments:</b> None.				
<b>Core Barrel Assembly</b> Lower flange weld	If fatigue life cannot be demonstrated by time-limited aging analysis (TLAA), enhanced visual (EVT-1) examination	Examination coverage to be defined by evaluation to determine the potential location and extent of fatigue cracking. See Figures 4-15 and 4-16 of MRP-227-A.	Excluded from the MRP-227-A examination scope per time-limited aging analysis (TLAA) that demonstrated acceptable fatigue usage for 60 years.	N/A

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings (Note 2)
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A <b>Next Inspection: 2028</b>				
<b>Comments:</b> This flexure weld on the underside of the core support barrel was observed during the ASME Section XI B-N-3 VT-3 examination with no recordable indications. This was performed prior to setting the core support barrel on its stand in the refuel cavity.				
<b>Lower Support Structure</b> Core support plate	If fatigue life cannot be demonstrated by time-limited aging analysis (TLAA), enhanced visual (EVT-1) examination	Examination coverage to be defined by evaluation to determine the potential location and extent of fatigue cracking. See Figure 4-16 of MRP-227-A.	Excluded from the MRP-227-A examination scope per time-limited aging analysis (TLAA) that demonstrated acceptable fatigue usage for 60 years.	N/A
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A <b>Next Inspection: 2028</b>				
<b>Comments:</b> Not in the exam scope for MRP-227-A, however included in the ASME Section XI B-N-3 VT-3 examination scope and overlap coverage from the core support column weld examinations from the top side of the core support plate. Foreign material (fragmented thermal sleeve debris – see discussion below for CSB axial welds) was found at various locations on top of the core support plate during the VT-3 examination and was subsequently removed.				
<b>Control Element Assembly</b> Instrument guide tubes	Visual examination (VT-3)	100% of tubes in peripheral CEA shroud assemblies (i.e., those adjacent to the perimeter of the fuel alignment plate). See Figure 4-18 of MRP-227-A.	100% VT-3 examination coverage achieved of the 10 peripheral CEA instrument guide tubes and associated supports/attachment welds on upper guide structure periphery.	No relevant VT-3 indications were noted.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A <b>Next Inspection: 2028</b>				
<b>Comments:</b> None.				

## Notes to CE Primary Components Table

1. Examination acceptance criteria and expansion criteria for the CE components are in Table 5-2 of MRP-227-A.
2. Examination acceptance criteria and expansion criteria for the B&W components are in Table 5-1 of MRP-227-A.
3. A minimum of 75% of the total population (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-1, must be examined for inspection credit.
4. A minimum of 75% of the total population of core support column welds.



## Expansion Components

☐ Check here if NO Expansion Components were inspected this outage—DELETE this table if NO Expansion inspections were performed.

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings (Note 1)
<b>Core Support Barrel Assembly</b> Core barrel assembly axial welds 1) Upper axial welds – UAW @90°/270° 2) Middle axial weld – MAW @180° 3) Lower axial weld – LAW @0°	Enhanced visual examination (EVT-1)	100% of one side of the accessible weld and adjacent base metal surfaces for the weld with the highest calculated operating stress. See Figure 4-15 of MRP-227-A.	1) UAW – 100% EVT-1 examination coverage achieved of the OD weld lengths @90°/270°. 2) MAW – 100% EVT-1 examination coverage achieved of the OD weld length @180°. 3) LAW – 100% EVT-1 examination coverage achieved of the OD weld length @0°.	1) UAW – No relevant EVT-1 indications were noted @90° or 270°. 2) MAW – No relevant EVT-1 indications were noted @180°. 3) LAW – No relevant EVT-1 indications were noted @0°.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input checked="" type="checkbox"/> Other (Engineering Judgment) <input type="checkbox"/> N/A <b>Next Inspection: 2028</b>				
<b>Comments:</b> Scrapes and abrasions were identified on the OD of the CSB during the EVT-1 exam of the UAW at 270° running down and across the weld. The abrasions were observed approximately 98 inches from the CSB flange extending down to approximately 124.25 inches (approximately 26.25 inches long). These scrapes and abrasions were likely caused by a dislodged safety injection nozzle thermal sleeve in the 300° cold leg during its path to the bottom of the vessel. The thermal sleeve fragmented into two large pieces found in the bottom of the vessel near the flow skirt and several very small pieces found on the top of the core support plate that were subsequently removed. In addition to the non-relevant condition (scrapes/abrasions) found on the CSB OD during the MRP-227-A EVT-1 exam of the UAW at 270°, other findings included a cladding anomaly found on the bottom head of the vessel, damage to the core stop lug at the 205° location, and fretting on the vessel cladding and flow skirt. An operability evaluation was performed that included a loose parts assessment, an evaluation of the thermal effects due to a missing thermal sleeve, hydraulic evaluation for dislodged/rotated thermal sleeves, and structural assessment of any reactor vessel cladding, core support barrel, or other reactor coolant system damage. This evaluation supports continued operation for another cycle for all of the above identified conditions. Further evaluation is ongoing to extend the re-inspection interval until 2028.				

Notes to CE Expansion Components Table:

- Examination acceptance criteria and expansion criteria for the CE components are in Table 5-2 of MRP-227-A.
- A minimum of 75% coverage of the entire examination area or volume, or a minimum sample size of 75% of the total population of like components of the examination is required (including both the accessible and inaccessible portions).

## Existing Components

☐ Check here if NO Existing Components were inspected this outage—DELETE this table if NO Existing inspections were performed.

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings (Note 1)
<b>Core Shroud Assembly</b> Guide lugs Guide lug inserts and bolts	Visual examination (VT-3) general condition exam for detection of excessive or asymmetrical wear.	Accessible surfaces at specified frequency.	100% VT-3 examination coverage achieved of bolting, inserts, and guide lugs (4 guide lug locations).	No relevant VT-3 indications were noted.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A <b>Next Inspection: 2028</b>				
<b>Comments:</b> Note that the guide lugs are attached to the top of the core shroud assembly and the guide lug insert and bolts are attached to the fuel alignment plate which is part of the upper guide structure.				
<b>Lower Support Structure</b> Fuel alignment pins (plants with core shrouds assembled in two vertical sections)	Visual examination (VT-3)	Accessible surfaces at specified frequency.	100% VT-3 examination coverage achieved of fuel alignment pins.	No relevant VT-3 indications were noted.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A <b>Next Inspection: 2028</b>				
<b>Comments:</b> Performed in conjunction with core support column weld examinations.				
<b>Core Barrel Assembly</b> Upper flange	Visual examination (VT-3)	Area of the upper flange potentially susceptible to wear.	100% VT-3 examination coverage achieved of upper flange.	Several VT-3 indications were identified on the upper surface of the flange including a foreign material item, a round impression of a washer, a gouge/indentation that had the appearance of threads from a bolt, a circular indentation/anomaly, and other abrasion/indentation anomalies. Several indentations were additionally noted on the underside of the flange.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input checked="" type="checkbox"/> Other (Engineering Judgment) <input type="checkbox"/> N/A <b>Next Inspection: 2028</b>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved	Examination Findings (Note 1)
<b>Comments:</b> Some of the identified findings are latent conditions observed in prior inspections that were previously evaluated and accepted as-is. The foreign material found on the upper flange is a new condition that was subsequently removed. The gouge/indentation with the appearance of threads from a bolt located at ~60° was not previously specifically identified and the indentations on the underside of the upper flange were not previously recorded as that area was inaccessible in the previous examinations. These newly identified conditions were evaluated and accepted as-is.				
<b>Alignment and Interfacing Components</b> Core Stabilizing Lugs and Shims	Visual examination (VT-1)	Accessible surfaces at specified frequency.	100% VT-1 examination coverage achieved of the core stabilizing lugs and shims. The ASME Section XI B-N-2 examination of the accessible surfaces included all details of the shim configuration; including the bolting and bolt lock pins (6 locations).	No relevant VT-1 indications were noted.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Next Inspection: 2028</b>				
<b>Comments:</b> Guidance taken from Table 4-8 (Item C17) of MRP-227 Revision 1. The core stabilizing lugs and shims were examined per ASME Section XI and Westinghouse TB 14-5. VT-1 examination (per ASME Section XI B-N-2) performed in lieu of VT-3. The VT-1 is a more detailed examination and meets resolution requirements of 0.044 inches at a maximum viewing distance of 2 feet, whereas the VT-3 resolution requirement is 0.105 inches at a viewing distance up to 4 feet.				

## Tables for Reporting MRP-227-A Inspection Results for Westinghouse Plants, Rev.3

(Please include only the results of the current inspection)

Plant Name: Catawba Nuclear Station, Unit 1 Utility: Duke Energy

Date of Exams: November 2018 (C1R24) Plant Age: 33.4 (years) / 28.47 EFPY

### Primary Components (only guide cards were inspected this outage)

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)														
Control Rod Guide Tube Assembly Guide plates (cards)	Visual examination (VT-3)	Examination per WCAP-17451-P of CRGT assemblies, with all guide cards within each selected CRGT assembly examined.  See MRP-2014-006 and WCAP-17451-P	Examined 100% of all lower 8 guide cards and the continuous section on all 53 rodged CRGT assemblies (17x17A design) including wear measurements of cardinal holes in accordance with MRP-227-A/MRP-2014-006 and WCAP-17451-P, Rev 2.	Five (5) worst case CRGTs:														
				<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Location</th> <th style="width: 20%;">Max. Wear Volume (%)</th> <th style="width: 50%;">Remaining EFPY to Red Zone</th> </tr> </thead> <tbody> <tr> <td>H08, Card 7, Hole C4</td> <td style="text-align: center;">88</td> <td style="text-align: center;">3.6</td> </tr> <tr> <td>F10, Card 5, Hole D5</td> <td style="text-align: center;">93</td> <td style="text-align: center;">4.8</td> </tr> <tr> <td>P06, Card 8, Hole C4</td> <td style="text-align: center;">90</td> <td style="text-align: center;">6.2</td> </tr> <tr> <td>K06, Card 8, Hole C4</td> <td style="text-align: center;">81</td> <td style="text-align: center;">6.7</td> </tr> <tr> <td>H10, Card 8, Hole D5</td> <td style="text-align: center;">81</td> <td style="text-align: center;">7.9</td> </tr> </tbody> </table>	Location	Max. Wear Volume (%)	Remaining EFPY to Red Zone	H08, Card 7, Hole C4	88	3.6	F10, Card 5, Hole D5	93	4.8	P06, Card 8, Hole C4	90	6.2	K06, Card 8, Hole C4	81
Location	Max. Wear Volume (%)	Remaining EFPY to Red Zone																
H08, Card 7, Hole C4	88	3.6																
F10, Card 5, Hole D5	93	4.8																
P06, Card 8, Hole C4	90	6.2																
K06, Card 8, Hole C4	81	6.7																
H10, Card 8, Hole D5	81	7.9																
Control Rodlet Surface Finish (circle each applicable): <span style="border: 1px solid black; padding: 2px;">Ion Nitride</span> Chrome Plated    No Surface Modification    Other (Specify)																		
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input checked="" type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A																		
Next Inspection: (TBD)																		

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Comments:</b>  1. CNS Unit 1 utilizes 17x17 Advanced style guide tubes with 96" lower guide tube length. 2. Guide card wear was evaluated and dispositioned in accordance with WCAP-17451-P, Rev. 2 and is being documented in Westinghouse report WCAP-18432-P. 3. Wear indications were noted at holes other than cardinal inner hole locations during the visual inspection – all indications were dispositioned as acceptable for continued operation. 4. Two guide tubes (locations H08 and F10) were found to be in the Yellow Zone per WCAP-17451-P, Rev. 2. These two guide tubes were proactively relocated during C1R24. 5. Excluding the two guide tubes relocated in C1R24, a total of 18 guide tubes are projected to reach the Red Zone per WCAP-17451-P Rev. 2 criteria within 20 EFPY.				
<b>Control Rod Guide Tube Assembly</b> Lower flange welds	Enhanced visual examination (EVT-1) to determine the presence of crack-like surface flaws in flange welds	100% of outer (accessible) CRGT lower flange weld surfaces and adjacent base metal on the individual periphery CRGT assemblies. (Note 2)  See Figure 4-21 of MRP-227-A.	N/A	N/A
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A <b>Next Inspection: (year)</b>				
<b>Comments:</b> Not inspected this outage.				
(Please reference or include the inspection report, if possible)				

## Tables for Reporting MRP-227-A Inspection Results for Westinghouse Plants, Rev.3

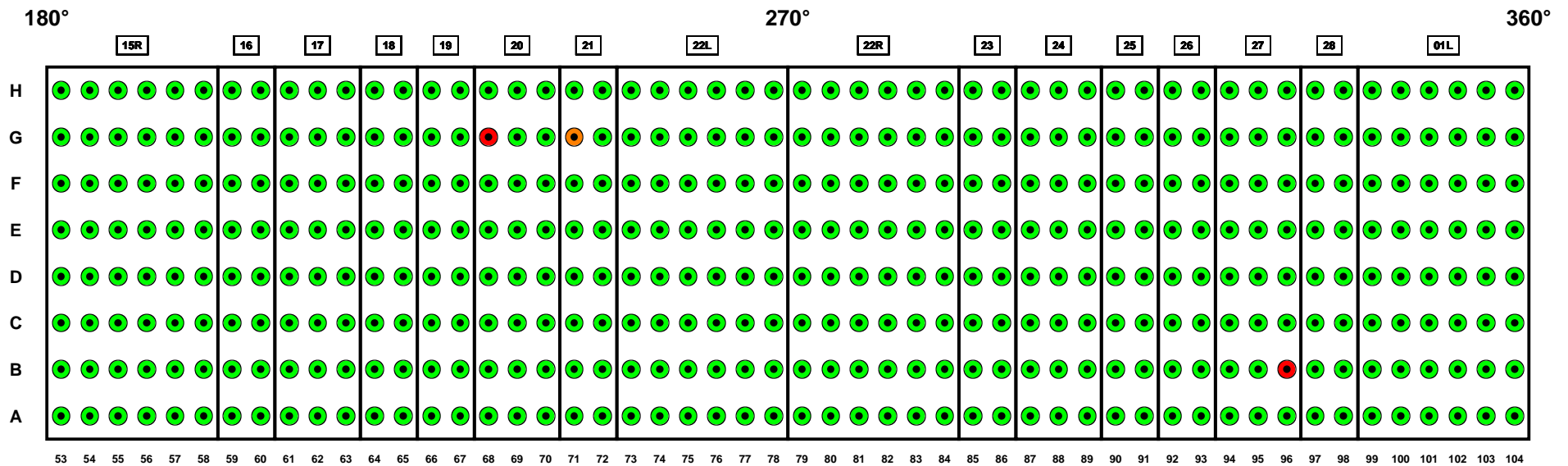
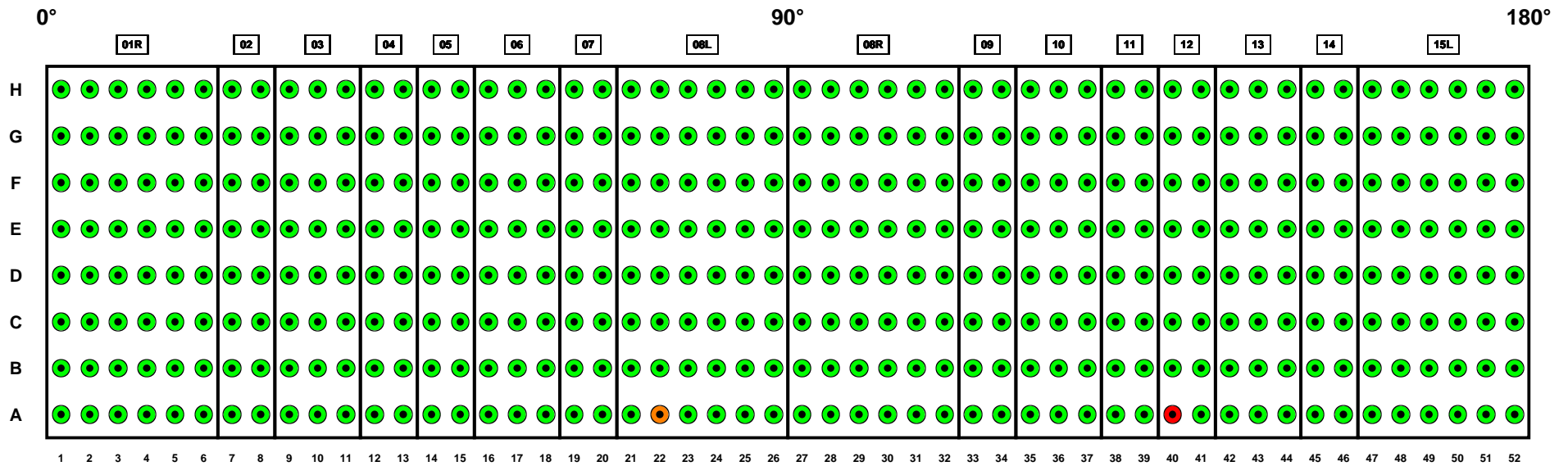
*(Please include only the results of the current inspection)*

Plant Name: Sequoyah unit 2 Utility: TVA

Date of Exams: Nov.2018 Plant Age: ~36.4 years (years) / 28.3 EFPY

### Primary Components

Item	Examination Method	Required Examination Coverage	Coverage Achieved  <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1)  <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Baffle-Former Assembly</b> Baffle-former bolts	Volumetric examination (UT)	100% of accessible bolts (Note 3). Heads accessible from the core side. UT accessibility may be affected by complexity of head and locking device designs.  See Figures 4-23 and 4-24 of MRP-227-A.	100% UT of BFBs per MRP 2016-014 and NSAL 16-1	3 BFBs identified with UT indications (A40, G68, B96) 2 BFBs that were uninspectable (A22, G71)  <i>(Please include a map of the inspected bolts, if possible)</i>
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input checked="" type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Next Inspection: (~2028)				
<b>Comments:</b>  UT Inspection performed due to OE at NSAL 16-1 Tier 1 units and interim guidance in MRP 2016-014. Acceptable per WCAP-17096-NP-A. SQN2 is a Tier 1b PWR unit per NSAL 16-1.  <i>(Please reference or include the inspection report, if possible)</i>				



● original bolt

○ acquisition to do

● no acquisition

● acquisition ok

● retest

● without indication

● with indication

● not testable (UT)

## Tables for Reporting MRP-227-A Inspection Results for Westinghouse Plants, Rev.3

(Please include only the results of the current inspection)

Plant Name: Indian Point 3 Utility: Entergy

Date of Exams: Spring 2019 Plant Age: 43 (years) / 30.3 EFPY

### Primary Components

Item	Examination Method	Required Examination Coverage	Coverage Achieved  <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1)  <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Control Rod Guide Tube Assembly</b> Guide plates (cards)	Visual examination (VT-3)	Examination per WCAP-17451-P of CRGT assemblies, with all guide cards within each selected CRGT assembly examined.  See MRP-2014-006 and WCAP-17451-P	Not Inspected.	Not Inspected.
<b>Control Rodlet Surface Finish (circle each applicable):</b> Ion Nitride            Chrome Plated            No Surface Modification            Other (Specify)				
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b>  <i>(Please reference or include the inspection report, if possible)</i>				



Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Control Rod Guide Tube Assembly</b> Lower flange welds	Enhanced visual examination (EVT-1) to determine the presence of crack-like surface flaws in flange welds	100% of outer (accessible) CRGT lower flange weld surfaces and adjacent base metal on the individual periphery CRGT assemblies. (Note 2)  See Figure 4-21 of MRP-227-A.	Not Inspected.	Not Inspected.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments: (Please reference or include the inspection report, if possible)				
<b>Core Barrel Assembly</b> Upper core barrel flange weld	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).  See Figure 4-22 of MRP-227-A.	Not Inspected.	Not Inspected.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments: (Please reference or include the inspection report, if possible)				
<b>Core Barrel Assembly</b> Upper and lower core barrel cylinder girth welds	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).  See Figure 4-22 of MRP-227-A.	Not Inspected.	Not Inspected.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
Comments: (Please reference or include the inspection report, if possible)				

Item	Examination Method	Required Examination Coverage	Coverage Achieved <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1) <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Core Barrel Assembly</b> Lower core barrel flange weld (Note 5)	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).	Not Inspected.	Not Inspected.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b>  <i>(Please reference or include the inspection report, if possible)</i>				
<b>Baffle-Former Assembly</b> Baffle-edge bolts	Visual examination (VT-3)	Bolts and locking devices on high fluence seams. 100% of components accessible from core side (Note 3).  See Figure 4-23 of MRP-227-A.	Obtained 100% coverage from core side.  1232 baffle-edge bolts were inspected.	No indications detected.  <i>(Please include a map of the inspected bolts, if possible)</i>
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b> Inspection results reported in Westinghouse Report WDI-PJF-1321503-FSR-001.  These inspections were performed as a result of the inspection findings discovered during 3R19 and were performed on an interval established by a plant-specific evaluation as documented and dispositioned in the IPEC corrective action program. These inspections were also required by the IPEC PWR Vessel Internals Program, SEP-PVI-IPEC-001. Although these inspections are not required by MRP-227-A, these results are being reported utilizing the MRP-227-A Reporting template, for convenience in keeping the industry apprised of our findings.  <i>(Please reference or include the inspection report, if possible)</i>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Baffle-Former Assembly</b> Baffle-former bolts	Volumetric examination (UT)	100% of accessible bolts (Note 3). Heads accessible from the core side. UT accessibility may be affected by complexity of head and locking device designs.  See Figures 4-23 and 4-24 of MRP-227-A.	Total number of baffle-former bolts 832 Number of bolts visually inspected 832 Number with visual indications 0 Number of original baffle bolts 562 Number of bolts inspected UT 562 Number with no UT indications 550 Number of bolts with UT indications 12 Number with head-shank indications 11 Number with shank indications 1 Number with thread indications 0	12 baffle former bolts were unacceptable due to UT indications.  A Real Time Analysis was performed and the 12 baffle former bolts with UT indications were not repaired.  (Please include a map of the inspected bolts, if possible)
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input checked="" type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b> Inspection results reported in Westinghouse Report WDI-PJF-1321503-FSR-001.  Due to the small number of unacceptable bolts, a Real Time Analysis (RTA) was performed in accordance with WCAP-15030-NP-A, with the exception that the analysis utilized elastic plastic methods and allowable stresses consistent with WCAP-18048-P. The RTA is documented in Westinghouse Letter LTR-AMLR-19-22. The RTA showed that the remaining baffle former bolts ensure structural integrity of the baffle former assembly during all design conditions. Therefore, the 12 baffle former bolts with UT indications were not repaired.  These inspections were performed as a result of the inspection findings discovered during 3R19 and were performed on an interval established by a plant-specific evaluation as documented and dispositioned in the IPEC corrective action program. These inspections were also required by the IPEC PWR Vessel Internals Program, SEP-PVI-IPEC-001. Although these inspections are not required by MRP-227-A, these results are being reported utilizing the MRP-227-A Reporting template, for convenience in keeping the industry apprised of our findings.  (Please reference or include the inspection report, if possible)				
<b>Baffle-Former Assembly</b> Assembly (Includes: Baffle plates, baffle edge bolts and indirect effects of void swelling in former plates)	Visual examination (VT-3)	Core side surface as indicated.  See Figures 4-24, 4-25, 4-26 and 4-27 of MRP-227-A.	100% of baffle edge bolts (1232) and all (28) baffle plates examined.	No indications detected on Baffle-Edge Bolts or Baffle Plates.

Item	Examination Method	Required Examination Coverage	Coverage Achieved <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1) <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b> Inspection results reported in Westinghouse Report WDI-PJF-1321503-FSR-001.  These inspections were performed as a result of the inspection findings discovered during 3R19 and were performed on an interval established by a plant-specific evaluation as documented and dispositioned in the IPEC corrective action program. These inspections were also required by the IPEC PWR Vessel Internals Program, SEP-PVI-IPEC-001. Although these inspections are not required by MRP-227-A, these results are being reported utilizing the MRP-227-A Reporting template, for convenience in keeping the industry apprised of our findings.  <i>(Please reference or include the inspection report, if possible)</i>				
<b>Alignment and Interfacing Components</b> Internals hold down spring	Direct measurement of spring height	Measurements should be taken at several points around the circumference of the spring, with a statistically adequate number of measurements at each point to minimize uncertainty.  See Figure 4-28 of MRP-227-A.	Not Inspected.	Not Inspected.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b> <i>(If hold down spring inspection is not required due to material type, state the material of fabrication and that the inspection is not required)</i> <i>(Please reference or include the inspection report, if possible)</i>				
<b>Thermal Shield Assembly</b> Thermal shield flexures	Visual examination (VT-3)	100% of thermal shield flexures.  See Figures 4-29 and 4-36 of MRP-227-A.	Not Inspected.	Not Inspected.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b> <i>(Please reference or include the inspection report, if possible)</i>				

Notes to Westinghouse Primary Components Table:

1. Examination acceptance criteria and expansion criteria for the Westinghouse components are in Table 5-3 of MRP-227-A.
2. A minimum of 75% of the total identified sample population must be examined.
3. A minimum of 75% of the total population (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-3 of MRP-227-A, must be examined for inspection credit.
4. A minimum of 75% of the total weld length (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-3 of MRP-227-A, must be examined from either the inner or outer diameter for inspection credit.
5. The lower core barrel flange weld may be alternatively designated as the core barrel-to-support plate weld in some Westinghouse plant designs.

## Tables for Reporting MRP-227-A Inspection Results for CE Plants, Rev. 3

*(Please include only the results of the current inspection)*

Plant Name: Calvert Cliffs Unit 2 Utility: Exelon

Date of Exams: Feb 28 – Mar 4, 2019 Plant Age: 42 (years) / 35 EFPY

Inspection results documented in reports WDI-PJF-1319624-EPP-001 and WDI-PJF-1319624-FSR-001

### Primary Components

Item	Examination Method	Required Examination Coverage	Coverage Achieved  <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1)  <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Core Shroud Assembly (Welded)</b> Core shroud plate-former plate weld	Enhanced visual examination (EVT-1)	Axial and horizontal weld seams at the core shroud re-entrant corners as visible from the core side of the shroud, within six inches of central flange and horizontal stiffeners.  See Figures 4-12 and 4-14 of MRP 227-A.	100% of required scope	NRI
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
Next Inspection: 2029				
Comments: None				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Core Shroud Assembly (Welded)</b> Assembly	Visual examination (VT-1)	If a gap exists, make three to five measurements of gap opening from the core side at the core shroud re-entrant corners. Then, evaluate the swelling on a plant-specific basis to determine frequency and method for additional examinations.  See Figures 4-12 and 4-14 of MRP-227-A.	100% of required scope.	NRI  (no gap measurements required)
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A <b>Next Inspection: 2029</b>				
<b>Comments:</b> <b>No gap was identified by the VT-1 exam and thus measurements were not required.</b> <b>A concurrent ASME Section XI, B-N-3, VT-3 examination of the eight (8) core shroud tie rods, nuts, locking bars and locking bar welds was conducted.</b> <b>A top down view and side view for thread engagement were obtained at each tie rod nut in response to operating experience from the CCNPP Unit 1 examination in 2018. All tie rods were found to be intact with no abnormal indications noted. Next Unit 2 tie rod inspection: 2021.</b>				
<b>Core Support Barrel Assembly</b> Upper (core support barrel) flange weld	Enhanced visual examination (EVT-1)	100% of the accessible surfaces of the upper flange weld (Note 3).  See Figure 4-15 of MRP-227-A.	100% of required scope	NRI
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A <b>Next Inspection: 2029</b>				
<b>Comments: None</b>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Core Support Barrel Assembly</b> Lower cylinder girth welds	Enhanced visual examination (EVT-1)	100% of the accessible surfaces of the lower cylinder welds (Note 3).  See Figure 4-15 of MRP-227-A	1. Upper: 100% of the OD weld length 2. Middle: 100% of the OD weld length	NRI NRI
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A Next Inspection: 2029				
<b>Comments:</b> Adopted MRP-227, Revision 1, corrected core support barrel weld nomenclature. The examination scope also included EVT-1 examinations of the middle axial weld and the upper 21 inches (within the beltline region) of the lower axial weld in response to recent industry operating experience, from a Spring 2018 St. Lucie Unit 1 event (Reference ICES Event Report Number 440395), with no recordable indications observed.				
<b>Lower Support Structure</b> Core support column welds	Visual examination (VT-3)	100% of the accessible surfaces of the core support column welds (Note 4). See Figures 4-16 and 4-31 of MRP-227-A	100% coverage	NRI
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A Next Inspection: 2029				
<b>Comments:</b> None				



Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Core Support Barrel Assembly</b> Lower flange weld	If fatigue life cannot be demonstrated by time-limited aging analysis (TLAA), enhanced visual (EVT-1) examination	Examination coverage to be defined by evaluation to determine the potential location and extent of fatigue cracking.  See Figures 4-15 and 4-16 of MRP-227-A.	Excluded from MRP-227 scope per fatigue evaluation (Calvert Cliffs engineering package ECP-19-000134).	NA
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A <b>Next Inspection: 2029</b>				
<b>Comments:</b> The Core Support Barrel lower flange (lower girth) weld and flexure weld were examined to meet the ASME Section XI, B-N-3, VT-3 requirements with 100% coverage attained and no recordable indications.				
<b>Lower Support Structure</b> Core support plate	If fatigue life cannot be demonstrated by time-limited aging analysis (TLAA), enhanced visual (EVT-1) examination	Examination coverage to be defined by evaluation to determine the potential location and extent of fatigue cracking.  See Figure 4-16 of MRP-227-A.	Excluded from MRP-227 scope per fatigue evaluation (Calvert Cliffs engineering package ECP-19-000134).	NA
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A <b>Next Inspection: 2029</b>				
<b>Comments:</b> The Core Support Plate was included in ASME Section XI, B-N-3, VT-3 examination scope. 100% coverage was achieved, and no recordable indications were noted in these examinations.				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Control Element Assembly</b> Instrument guide tubes	Visual examination (VT-3)	100% of tubes in peripheral CEA shroud assemblies (i.e., those adjacent to the perimeter of the fuel alignment plate).  See Figure 4-18 of MRP-227-A.	All accessible guide tubes and supports attached to CEA shrouds on upper guide structure periphery.	NRI
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A Next Inspection: 2029				
Comments: The examination scope also included the two (2) reactor vessel level monitoring system heated junction thermocouple probe holders' attachment welds to CEA shrouds. No recordable indications were discovered.				

## Notes to CE Primary Components Table:

1. Examination acceptance criteria and expansion criteria for the CE components are in Table 5-2 of MRP-227-A.
2. A minimum of 75% of the total population (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-2 of MRP-227-A, must be examined for inspection credit.
3. A minimum of 75% of the total weld length (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-2 of MRP-227-A, must be examined from either the inner or outer diameter for inspection credit.
4. A minimum of 75% of the total population of core support column welds.

## Expansion Components

**[X]** Check here if NO Expansion Components were inspected this outage—DELETE this table if NO Expansion inspections were performed.

## Existing Components

**[ ]** Check here if NO Existing Components were inspected this outage—DELETE this table if NO Existing inspections were performed.

Item	Examination Method	Required Examination Coverage	Coverage Achieved  <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings  <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Core Shroud Assembly</b> Guide lugs Guide lug inserts and bolts	Visual examination (VT-3), general condition examination for detection of excessive or asymmetrical wear.	Accessible surfaces at specified frequency.	100% of bolting, inserts and guide lugs were accessed for inspection, 4 locations	NRI See comments for indication found outside of MRP-227A inspection scope.
<b>Disposition of Indications (check each required):</b> [ ] Code Analysis    [ ] NRC Submittal    [ ] WCAP-17096 Criteria    [ ] Other (Specify)    [X] N/A <b>Next Inspection: 2029</b>				
<b>Comments:</b> <p>Note that the guide lugs are attached to the top of the core shroud assembly, while the guide lug inserts are attached to the Upper Guide Structure fuel alignment plate and thus are examined in separate evolutions.</p> <p>The core stabilizing lugs and shims were also examined per ASME Section XI and Westinghouse TB 14-5. During this examination, several core stabilizing lug shim bolt pins were found to be protruding (3 at 0-degrees, 2 at 120-degrees, 1 at 180 degrees and 2 at 300-degrees), with one of the protruding pins at the 120-degree location bent. The bent portion of the 120-degree pin was later broken off and retrieved and the other protruding pins were pushed back into the shims. (See Calvert Cliffs engineering evaluation ECP-19-000129.)</p>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Lower Support Structure</b> Fuel alignment pins (plants with core shrouds assembled in two vertical sections)	Visual examination (VT-3)	Accessible surfaces at specified frequency.	100% of fuel alignment pins accessed for inspection.	NRI
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A Next Inspection: 2029				
Comments: None				
<b>Core Barrel Assembly</b> Upper flange	Visual examination (VT-3)	Area of the upper flange potentially susceptible to wear.	100% of accessible surfaces.	NRI See comments for indication found outside of MRP-227A inspection scope.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A Next Inspection: 2029				
Comments: During the core support barrel upper flange inspection, the core support barrel alignment key and retaining pin at the 180-degree location were observed to be slightly backed out from their normal position. The acceptability of this condition was evaluated in Calvert Cliffs engineering package ECP-19-000134.				

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## Tables for Reporting MRP-227-A Inspection Results for Westinghouse Plants, Rev.3

(Please include only the results of the current inspection)

Plant Name: North Anna Unit 2 Utility: Dominion Energy

Date of Exams: March 2019 Plant Age: 38.75 years from initial criticality (years) / 32.50 EFPY

### Primary Components

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Control Rod Guide Tube Assembly</b> Guide plates (cards)	Visual examination (VT-3)	Examination per WCAP-17451-P of CRGT assemblies, with all guide cards within each selected CRGT assembly examined.  See MRP-2014-006 and WCAP-17451-P	<b>100% of the CRGT guide cards were examined. 384 guide cards were examined.</b>	<i>Maximum % volume wear:</i> <b>Five (5) worst case CRGTs: The following Guide Cards slots displayed dimensional loss: K-10-2-B, J-9-2-B, F-6-2-C, F-6-1-D, F-6-2-D, F-6-3-D, and F-6-4-D.</b>  (ref. Figures 3-5 through 3-7 of WCAP-17451-P for conversion of wear measurements to wear volume. Also specify high or low flow operation as defined in Table 4-2 of WCAP)

Control Rodlet Surface Finish (circle each applicable):    Ion Nitride    Chrome Plated    No Surface Modification    Other (Specify)

Disposition of Indications (check each required):    ☐ Code Analysis    ☐ NRC Submittal    ☐ WCAP-17096 Criteria    ☒ Other (Specify)    ☐ N/A

Next Inspection: (year) **2029**

**Comments:**  
 All 48 CRGT assemblies were examined (48 CRGTs x 8 guide cards/CRGT = 384 guide cards). The following Guide Cards displayed dimensional loss: K-10-2-B, J-9-2-B, F-6-2-C, F-6-1-D, F-6-2-D, F-6-3-D, and F-6-4-D.  
  
 The guide cards that displayed dimensional loss were evaluated per WCAP-17451-P R2, Appendix C. Using the steps described in WCAP-17451-P R2, Appendix C, it was determined that Guide Tube K-10 will reach the RED zone in 536.23 EFPY. This is the first guide card that will reach the RED zone. The time to reach the RED zone was not calculated for other guide tubes based on these results.  
  
 ETE-NA-2019-0003 is the Engineering evaluation performed for these examinations.  
 (Please reference or include the inspection report, if possible)

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Control Rod Guide Tube Assembly</b> Lower flange welds	Enhanced visual examination (EVT-1) to determine the presence of crack-like surface flaws in flange welds	100% of outer (accessible) CRGT lower flange weld surfaces and adjacent base metal on the individual periphery CRGT assemblies. (Note 2)  See Figure 4-21 of MRP-227-A.	24 CRGT assemblies had their respective Lower Flange Welds (Upper and Lower) visually examined during the N2R26 outage.  The achieved scope meets the MRP-227-A requirement to examine the “periphery” guide tubes.	100% of the accessible welds were examined and the MRP – 227-A inspection requirement was satisfied. No relevant indications were noted.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A <b>Next Inspection: (year)</b> 2029 <b>Comments:</b>  The following Upper & Lower CRGT Flange Welds were examined on Unit 2: B-6, B-8, B-10, C-11, D-4, D-6, D-12, E-3, F-2, F-12, F-14, H-2, H-14, KK-2, K-4, K-14, L-13, M-4, M-10, M-12, N-5, P-6, P-8, and P-10.  ETE-NA-2019-0003 is the Engineering evaluation performed for these examinations.  (Please reference or include the inspection report, if possible)				
<b>Core Barrel Assembly</b> Upper core barrel flange weld	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).  See Figure 4-22 of MRP-227-A.	An EVT – 1 examination was completed from the ID surface of the upper core barrel flange weld as required by MRP – 227 – A guidance  Achieved coverage on this weld was 100%.	There were no relevant indications for this weld.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A <b>Next Inspection: (year)</b> 2029 <b>Comments:</b>  No additional comments  ETE-NA-2019-0003 is the Engineering evaluation performed for these examinations.  (Please reference or include the inspection report, if possible)				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Core Barrel Assembly</b> Upper and lower core barrel cylinder girth welds	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).  See Figure 4-22 of MRP-227-A	An EVT – 1 examination was completed from the ID surface of the upper core barrel girth weld as required by MRP – 227 – A guidance  Achieved coverage on this weld was 100%  Lower girth weld to be examined during 2R27 (Fall 2020) when the core barrel is removed from the reactor vessel.	There were no relevant indications for the upper core barrel girth weld.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A <b>Next Inspection: (year) 2029</b> <b>Comments:</b> Lower girth weld to be examined during 2R27 (Fall 2020) when the core barrel is removed from the reactor vessel. ETE-NA-2019-0003 is the Engineering evaluation performed for these examinations. (Please reference or include the inspection report, if possible)				
<b>Core Barrel Assembly</b> Lower core barrel flange weld (Note 5)	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).	Lower core barrel flange weld to be examined during 2R27 (Fall 2020) when the core barrel is removed from the reactor vessel.	N/A - Lower core barrel flange weld to be examined during 2R27 (Fall 2020) when the core barrel is removed from the reactor vessel.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A <b>Next Inspection: (year) 2029</b> <b>Comments:</b> N/A – inspection has not been completed yet. Scheduled for Fall 2020 (N2R27). ETE-NA-2019-0003 is the Engineering evaluation performed for these examinations. (Please reference or include the inspection report, if possible)				



Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Baffle-Former Assembly</b> Baffle-edge bolts	Visual examination (VT-3)	Bolts and locking devices on high fluence seams. 100% of components accessible from core side (Note 3).  See Figure 4-23 of MRP-227-A.	The NAPS Unit 2 baffle-former assembly contains 708 edge bolts; there were 4 unknown bolts. The planned inspection scope for N2R26 was VT-3 on all accessible edge bolts located on "high fluence" plate edges as identified in MRP-227-A Figure 4-25.  No visual indications were noted for the 708 baffle – edge bolts examined during 2R26.	No visual indications were noted for the 708 baffle – edge bolts examined during 2R26.  (Please include a map of the inspected bolts, if possible)
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A Next Inspection: (year) 2029				
Comments:  Two edge columns were identified with 39 bolts total instead of the expected 37 in each, located at edge column #5 (baffle plate #11) and edge column #11 (baffle plate #35). The four additional baffle-edge bolts brought the total number of bolts to 708 instead of the expected 704.  Westinghouse was contacted for disposition of this condition. Results of their evaluation are included in ETE-NA-2019-0003, Attachment 2.  (Please reference or include the inspection report, if possible)				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Baffle-Former Assembly</b> Baffle-former bolts	Volumetric examination (UT)	100% of accessible bolts (Note 3). Heads accessible from the core side. UT accessibility may be affected by complexity of head and locking device designs.  See Figures 4-23 and 4-24 of MRP-227-A.	The NAPS Unit 2 baffle-former assembly contains 1088 baffle-former bolts. 1088 baffle-former bolts were visually examined (VT-3).  1082 baffle-bolts were volumetrically examined satisfactory.  6 baffle-bolts were unable to be examined due to not being able to acquire proper UT signals.  13 baffle-bolts have confirmed rejectable indications.  A visual examination (VT-3) was performed of these nineteen bolts with a focus on the condition of the locking bar and tack welds. No evidence of degradation was identified.	1082 baffle-bolts were volumetrically inspected satisfactory.  6 baffle-bolts were unable to be examined due to not being able to acquire proper UT signals.  13 baffle-bolts have confirmed rejectable indications.  A visual examination was performed of these nineteen bolts with a focus on the condition of the locking bar and tack welds. No evidence of degradation was identified.  Evaluation utilized WCAP-15042-P. (Please include a map of the inspected bolts, if possible)
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input checked="" type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A <b>Next Inspection: (year) 2029</b>				
<b>Comments:</b> During the examination, a total of 128 baffle-former long bolts were discovered of the 5/8" hex head configuration, 2.12 inches in length, located at the following columns: 10, 11, 32, 33, 44, 45, 66, 67, 78, 79, 100, 101, 112, 113, 134, and 135. Short bolt lengths were expected; long bolt were found.  Westinghouse was contacted for disposition of this condition. Results of their evaluation are included in ETE-NA-2019-0003, Attachment 2.  (Please reference or include the inspection report, if possible)				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Baffle-Former Assembly</b> Assembly (Includes: Baffle plates, baffle edge bolts and indirect effects of void swelling in former plates)	Visual examination (VT-3)	Core side surface as indicated.  See Figures 4-24, 4-25, 4-26 and 4-27 of MRP-227-A.	VT-3 visual exams were completed this outage during the baffle-bolt examinations.	No issues were observed.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A <b>Next Inspection: (year) 2029</b> <b>Comments:</b> <p>None – ETE-NA-2019-0003 is the Engineering evaluation performed for these examinations.</p> <p>(Please reference or include the inspection report, if possible)</p>				
<b>Alignment and Interfacing Components</b> Internals hold down spring	Direct measurement of spring height	Measurements should be taken at several points around the circumference of the spring, with a statistically adequate number of measurements at each point to minimize uncertainty.  See Figure 4-28 of MRP-227-A.	Because North Anna Unit 2 has an austenitic (304 – SS) stainless steel hold – down spring, measurements of its relaxation was required per the MRP – 227 – A guidance.  Per CN-RIDA-10-2, the minimum acceptable height is 3.600 inches + 0.005 inches yielding a value of 3.605 inches.	The estimated average spring height was 3.614 with a standard deviation of 0.0004 inches. This result is greater than the minimum requirement of 3.605 inches established in the acceptance criteria for 60 years of operation; therefore, the final result is acceptable.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input checked="" type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A <b>Next Inspection: (year)</b> <b>Comments:</b> <p>Hold Down Spring guidance is in Westinghouse Calc Note CN-RIDA-10-2. ETE-NA-2019-0003 is the Engineering evaluation performed for these examinations.</p> <p>(If hold down spring inspection is not required due to material type, state the material of fabrication and that the inspection is not required)</p> <p>(Please reference or include the inspection report, if possible)</p>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Thermal Shield Assembly</b> Thermal shield flexures	Visual examination (VT-3)	100% of thermal shield flexures.  See Figures 4-29 and 4-36 of MRP-227-A.	Thermal shield assembly to be inspected during 2R27 (Fall 2020) when the core barrel is removed from the reactor vessel.	Thermal shield assembly to be inspected during 2R27 (Fall 2020) when the core barrel is removed from the reactor vessel.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A <b>Next Inspection: (year)</b> <b>Comments:</b>  <b>Thermal shield assembly to be inspected during 2R27 (Fall 2020) when the core barrel is removed from the reactor vessel.</b>  <i>(Please reference or include the inspection report, if possible)</i>				

## Notes to Westinghouse Primary Components Table:

- Examination acceptance criteria and expansion criteria for the Westinghouse components are in Table 5-3 of MRP-227-A.
- A minimum of 75% of the total identified sample population must be examined.
- A minimum of 75% of the total population (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-3 of MRP-227-A, must be examined for inspection credit.
- A minimum of 75% of the total weld length (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-3 of MRP-227-A, must be examined from either the inner or outer diameter for inspection credit.
- The lower core barrel flange weld may be alternatively designated as the core barrel-to-support plate weld in some Westinghouse plant designs.

## Existing Components

☐ Check here if NO Existing Components were inspected this outage—DELETE this table if NO Existing inspections were performed.

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Core Barrel Assembly</b> Core barrel flange	Visual examination (VT-3) to determine general condition for excessive wear.	All accessible surfaces at specified frequency.	To be completed during 2R27 (Fall 2020)	To be completed during 2R27 (Fall 2020)
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A <b>Next Inspection: (year)</b> <b>Comments:</b> To be completed during 2R27 (Fall 2020)  <i>(Please reference or include the inspection report, if possible)</i>				
<b>Upper Internals Assembly</b> Upper support ring or skirt	Visual examination (VT-3)	All accessible surfaces at specified frequency.	To be completed during 2R27 (Fall 2020)	To be completed during 2R27 (Fall 2020)
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A <b>Next Inspection: (year)</b> <b>Comments:</b> To be completed during 2R27 (Fall 2020)  <i>(Please reference or include the inspection report, if possible)</i>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Lower Internals Assembly</b> Lower core plate XL lower core plate (Note 1)	Visual (VT-3) examination of the lower core plates to detect evidence of distortion and/or loss of bolt integrity.	All accessible surfaces at specified frequency.	To be completed during 2R27 (Fall 2020)	To be completed during 2R27 (Fall 2020)
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A <b>Next Inspection: (year)</b> <b>Comments:</b> To be completed during 2R27 (Fall 2020)  (Please reference or include the inspection report, if possible)				
<b>Lower Internals Assembly</b> Lower core plate XL lower core plate (Note 1)	Visual examination (VT-3)	All accessible surfaces at specified frequency.	To be completed during 2R27 (Fall 2020)	To be completed during 2R27 (Fall 2020)
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A <b>Next Inspection: (year)</b> <b>Comments:</b> To be completed during 2R27 (Fall 2020)  (Please reference or include the inspection report, if possible)				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Bottom Mounted Instrumentation System</b> Flux thimble tubes	Surface examination (ET)	Eddy current surface examination as defined in plant response to IEB 88-09.	100% of the flux thimble tubes received surface examination. There are 50 tubes.	1 flux thimble tube with wall loss 50% - 59% 8 flux thimble tube with wall loss 40% - 49% 5 flux thimble tube with wall loss 30% - 39% 10 flux thimble tube with wall loss 20% - 29% 26 flux thimble tube with no damage
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input checked="" type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A <b>Next Inspection: (year)</b> <b>Comments:</b>  <b>Disposition per Station procedure 2-PT-210.4, Eddy Current Examination of Incore Detector Thimble Tubes</b>  <i>(Please reference or include the inspection report, if possible)</i>				
<b>Alignment and Interfacing Components</b> Clevis insert bolts	Visual examination (VT-3)	All accessible surfaces at specified frequency.	To be completed during 2R27 (Fall 2020)	To be completed during 2R27 (Fall 2020)
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A <b>Next Inspection: (year)</b> <b>Comments:</b>  To be completed during 2R27 (Fall 2020)  <i>(Please reference or include the inspection report, if possible)</i>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Alignment and Interfacing Components</b> Upper core plate alignment pins	Visual examination (VT-3)	All accessible surfaces at specified frequency.	To be completed during 2R27 (Fall 2020)	To be completed during 2R27 (Fall 2020)
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A <b>Next Inspection: (year)</b> <b>Comments:</b>  To be completed during 2R27 (Fall 2020)  <i>(Please reference or include the inspection report, if possible)</i>				

Notes to Westinghouse Existing Programs Components Table:

1. XL = "Extra Long" referring to Westinghouse plants with 14-foot cores.



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## Tables for Reporting MRP-227-A Inspection Results for Westinghouse Plants, Rev.3

(Please include only the results of the current inspection)

**Plant Name:** D. C. Cook Unit 1 **Utility:** American Electric Power

**Date of Exams:** March 2019 **Plant Age:** 44 years / 29.097 EFPY

### Primary Components

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Control Rod Guide Tube Assembly</b> Guide plates (cards)	Visual examination (VT-3)	Examination per WCAP-17451-P of CRGT assemblies, with all guide cards within each selected CRGT assembly examined.  See MRP-2014-006 and WCAP-17451-P	Inspection performed during U1C28 RFO during Fall 2017. Results provided in 2018.	Maximum % volume wear:  N/A
<b>Control Rodlet Surface Finish (circle each applicable):</b> <u>Ion Nitride</u> <u>Chrome Plated</u> <u>No Surface Modification</u> <u>Other (Specify)</u>				
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b>  (Please reference or include the inspection report, if possible)				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Control Rod Guide Tube Assembly</b> Lower flange welds	Enhanced visual examination (EVT-1) to determine the presence of crack-like surface flaws in flange welds	100% of outer (accessible) CRGT lower flange weld surfaces and adjacent base metal on the individual periphery CRGT assemblies. (Note 2)  See Figure 4-21 of MRP-227-A.	Inspection performed during U1C28 RFO during Fall 2017. Results provided in 2018.	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
Comments:  (Please reference or include the inspection report, if possible)				
<b>Core Barrel Assembly</b> Upper core barrel flange weld	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).  See Figure 4-22 of MRP-227-A.	Inspection performed during U1C28 RFO during Fall 2017. Results provided in 2018.	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
Comments:  (Please reference or include the inspection report, if possible)				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Core Barrel Assembly</b> Upper and lower core barrel cylinder girth welds	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).  See Figure 4-22 of MRP-227-A	Inspection performed during U1C28 RFO during Fall 2017. Results provided in 2018.	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b>  (Please reference or include the inspection report, if possible)				
<b>Core Barrel Assembly</b> Lower core barrel flange weld (Note 5)	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).	Inspection performed during U1C28 RFO during Fall 2017. Results provided in 2018.	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b>  (Please reference or include the inspection report, if possible)				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Baffle-Former Assembly</b> Baffle-edge bolts	Visual examination (VT-3)	Bolts and locking devices on high fluence seams. 100% of components accessible from core side (Note 3).  See Figure 4-23 of MRP-227-A.	Inspection performed during U1C28 RFO during Fall 2017. Results provided in 2018.	N/A  (Please include a map of the inspected bolts, if possible)
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b> (Please reference or include the inspection report, if possible)				

Item	Examination Method	Required Examination Coverage	Coverage Achieved <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1) <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Baffle-Former Assembly</b> Baffle-former bolts	Volumetric examination (UT)	100% of accessible bolts (Note 3). Heads accessible from the core side. UT accessibility may be affected by complexity of head and locking device designs.  See Figures 4-23 and 4-24 of MRP-227-A.	74.5% of baffle-former bolts (620) were inspected. Bolts replaced during U1C28 were not inspected.	13 bolts with indications: -6 head-shank indications -5 indications in shank -2 indication in threaded region -0 non-testable  See attached map <i>(Please include a map of the inspected bolts, if possible)</i>
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input checked="" type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<p><b>Comments:</b> Inspection results contained in Westinghouse report WDI-PJF-1319881-FSR-001.</p> <p>A total of 188 bolts were replaced during the U1C29 RFO which included:</p> <ul style="list-style-type: none"> <li>- 13 BFBs that exhibited UT indications</li> <li>- 175 BFBs that did not exhibit UT indications were replaced at various locations throughout the baffle-former assembly to complete implementation of an "Upflow Replacement Pattern"</li> </ul> <p><i>(Please reference or include the inspection report, if possible)</i></p>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Baffle-Former Assembly</b> Assembly (Includes: Baffle plates, baffle edge bolts and indirect effects of void swelling in former plates)	Visual examination (VT-3)	Core side surface as indicated.  See Figures 4-24, 4-25, 4-26 and 4-27 of MRP-227-A.	Inspection performed during U1C28 RFO during Fall 2017. Results provided in 2018.	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
Comments:  (Please reference or include the inspection report, if possible)				
<b>Alignment and Interfacing Components</b> Internals hold down spring	Direct measurement of spring height	Measurements should be taken at several points around the circumference of the spring, with a statistically adequate number of measurements at each point to minimize uncertainty.  See Figure 4-28 of MRP-227-A.	Replacement of the hold down spring was performed during U1C29 in March 2019.	In lieu of performing measurements of the hold down spring during U1C29 (Spring 2019), Cook Nuclear Plant chose to proactively replace the 304SS spring with a 403SS spring. Replacement of the original hold down spring was completed in March 2019.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
Comments:  (If hold down spring inspection is not required due to material type, state the material of fabrication and that the inspection is not required) (Please reference or include the inspection report, if possible)				

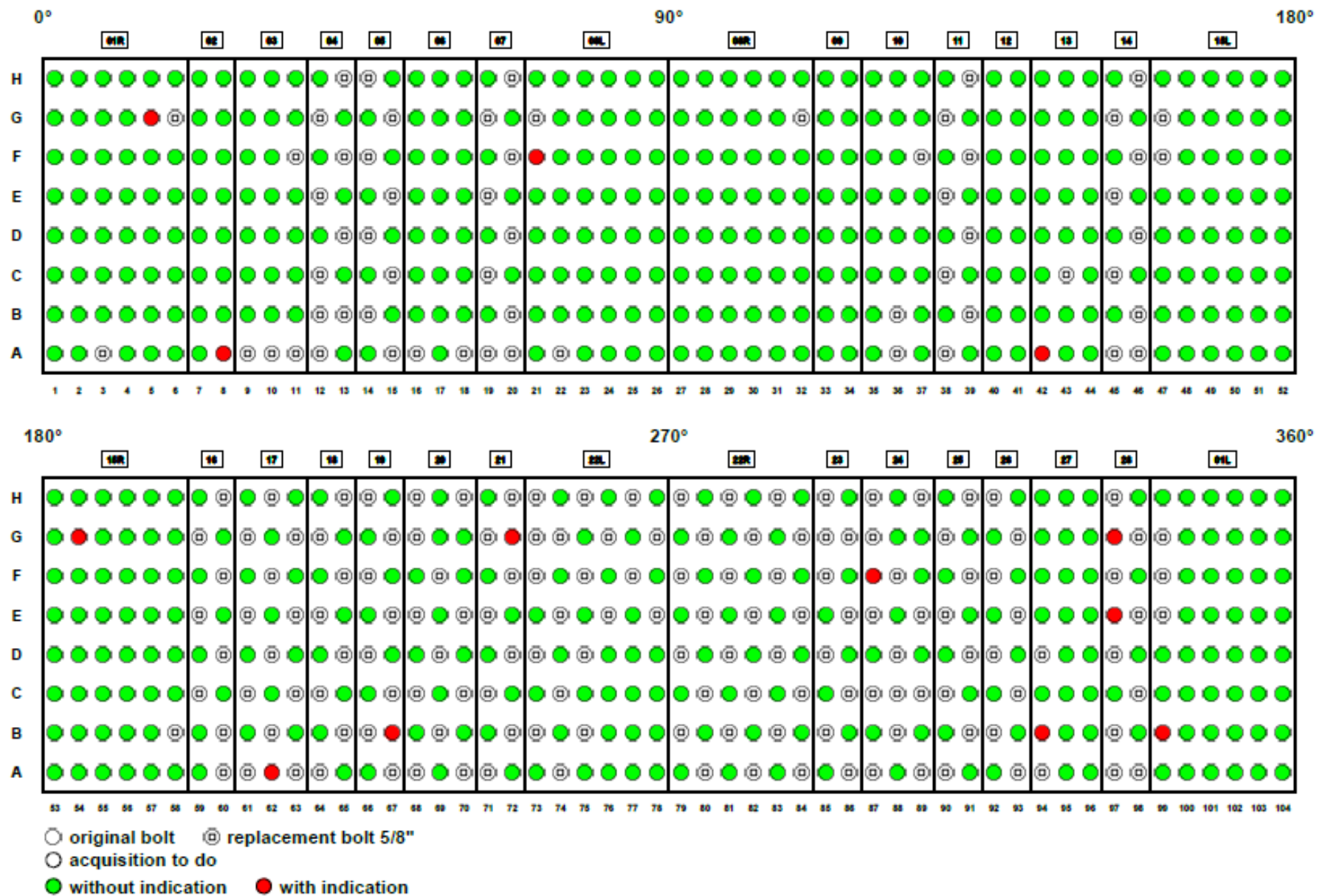
Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Thermal Shield Assembly</b> Thermal shield flexures	Visual examination (VT-3)	100% of thermal shield flexures.  See Figures 4-29 and 4-36 of MRP-227-A.	Inspection performed during U1C28 RFO during Fall 2017. Results provided in 2018.	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
Comments:  (Please reference or include the inspection report, if possible)				

## Notes to Westinghouse Primary Components Table:

1. Examination acceptance criteria and expansion criteria for the Westinghouse components are in Table 5-3 of MRP-227-A.
2. A minimum of 75% of the total identified sample population must be examined.
3. A minimum of 75% of the total population (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-3 of MRP-227-A, must be examined for inspection credit.
4. A minimum of 75% of the total weld length (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-3 of MRP-227-A, must be examined from either the inner or outer diameter for inspection credit.
5. The lower core barrel flange weld may be alternatively designated as the core barrel-to-support plate weld in some Westinghouse plant designs.



BFB UT indication map



## Expansion Components

☒ Check here if NO Expansion Components were inspected this outage

## Existing Components

☐ Check here if NO Existing Components were inspected this outage

Item	Examination Method	Required Examination Coverage	Coverage Achieved  <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1)  <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Core Barrel Assembly</b> Core barrel flange	Visual examination (VT-3) to determine general condition for excessive wear.	All accessible surfaces at specified frequency.	All accessible locations.	N/A
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A <b>Next Inspection: (year)</b>				
<b>Comments:</b>  <i>(Please reference or include the inspection report, if possible)</i>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Upper Internals Assembly</b> Upper support ring or skirt	Visual examination (VT-3)	All accessible surfaces at specified frequency.	All accessible locations.	N/A
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A <b>Next Inspection: (year)</b> <b>Comments:</b>  (Please reference or include the inspection report, if possible)				
<b>Lower Internals Assembly</b> Lower core plate XL lower core plate (Note 1)	Visual (VT-3) examination of the lower core plates to detect evidence of distortion and/or loss of bolt integrity.	All accessible surfaces at specified frequency.	All accessible locations.	N/A
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A <b>Next Inspection: (year)</b> <b>Comments:</b>  (Please reference or include the inspection report, if possible)				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Lower Internals Assembly</b> Lower core plate XL lower core plate (Note 1)	Visual examination (VT-3)	All accessible surfaces at specified frequency.	All accessible locations.	N/A
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A <b>Next Inspection: (year)</b> <b>Comments:</b>  (Please reference or include the inspection report, if possible)				
<b>Bottom Mounted Instrumentation System</b> Flux thimble tubes	Surface examination (ET)	Eddy current surface examination as defined in plant response to IEB 88-09.	All accessible locations.	N/A
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A <b>Next Inspection: (year)</b> <b>Comments:</b> *** REPORT UPON THESE INSPECTIONS ONLY WHEN DONE IN CONJUNCTION WITH MRP-227-A RELATED EXAMS. ***  (Please reference or include the inspection report, if possible)				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Alignment and Interfacing Components</b> Clevis insert bolts	Visual examination (VT-3)	All accessible surfaces at specified frequency.	All accessible locations. All bolts inspected.	No new relevant conditions were identified. 28 of 48 bolt replaced in 2013.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A <b>Next Inspection: (year)</b> <b>Comments:</b>  (Please reference or include the inspection report, if possible)				
<b>Alignment and Interfacing Components</b> Upper core plate alignment pins	Visual examination (VT-3)	All accessible surfaces at specified frequency.	All accessible locations.	N/A
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A <b>Next Inspection: (year)</b> <b>Comments:</b>  (Please reference or include the inspection report, if possible)				

## Tables for Reporting MRP-227-A Inspection Results for Westinghouse Plants, Rev.3

(Please include only the results of the current inspection)

Plant Name: Joseph M. Farley Unit 2 Utility: Southern Nuclear

Date of Exams: April 2019 Plant Age: 39 (years) / 32.83 EFPY

### Primary Components

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Control Rod Guide Tube Assembly</b> Guide plates (cards)	Visual examination (VT-3)	Examination per WCAP-17451-P of CRGT assemblies, with all guide cards within each selected CRGT assembly examined.  See MRP-2014-006 and WCAP-17451-P	37 of 48 CRGTs, lowest 7 cards. Worst CRGT measured top of continuous section. VT-3 of all cards in 37 CRGT scope	<i>Maximum % volume wear:</i>  54.7% total volume wear 53.9% 50.3% 46.6% 2 locations tied  <i>Five (5) worst case CRGTs:</i> F6, G3, F10, D6, B6  High/Low no longer applicable. (ref. Figures 3-5 through 3-7 of WCAP-17451-P for conversion of wear measurements to wear volume. Also specify high or low flow operation as defined in Table 4-2 of WCAP)
Control Rodlet Surface Finish (circle each applicable):    Ion Nitride <span style="border: 1px solid black; padding: 2px;">Chrome Plated</span> No Surface Modification    Other (Specify)				
Disposition of Indications (check each required): [ ] Code Analysis    [ ] NRC Submittal    [ ] WCAP-17096 Criteria    [ ] Other (Specify)    [ X ] N/A				
Next Inspection: 2029 or later				
<b>Comments:</b>  Predicted time to wear to W4 dimension for worst location was 16.4 EFPY. WCAP-17451-P rev. 2 used for disposition.  (Please reference or include the inspection report, if possible)				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Control Rod Guide Tube Assembly</b> Lower flange welds	Enhanced visual examination (EVT-1) to determine the presence of crack-like surface flaws in flange welds	100% of outer (accessible) CRGT lower flange weld surfaces and adjacent base metal on the individual periphery CRGT assemblies. (Note 2)  See Figure 4-21 of MRP-227-A.	EVT-1 completed on 16 peripheral CRGTs.	No indications recorded.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A <b>Next Inspection: (estimated 2029)</b>				
<b>Comments:.</b>   (Please reference or include the inspection report, if possible)				
<b>Baffle-Former Assembly</b> Baffle-edge bolts	Visual examination (VT-3)	Bolts and locking devices on high fluence seams. 100% of components accessible from core side (Note 3).  See Figure 4-23 of MRP-227-A.	All 704 bolts examined.	No indications recorded.  (Please include a map of the inspected bolts, if possible)
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A <b>Next Inspection: (estimated 2029)</b>				
<b>Comments:</b>  FNP Unit 1 has 244 baffle-edge bolts consigned to the top 1/3 of edge joint. FNP Unit 2 has 704 edge bolts for the full length of the baffle-edge joint.  (Please reference or include the inspection report, if possible)				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Baffle-Former Assembly</b> Assembly (Includes: Baffle plates, baffle edge bolts and indirect effects of void swelling in former plates)	Visual examination (VT-3)	Core side surface as indicated.  See Figures 4-24, 4-25, 4-26 and 4-27 of MRP-227-A.	20 baffle joints examined	No indications recorded.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A <b>Next Inspection: (estimated 2029)</b> <b>Comments:</b>  (Please reference or include the inspection report, if possible)				
<b>Alignment and Interfacing Components</b> Internals hold down spring	Direct measurement of spring height	Measurements should be taken at several points around the circumference of the spring, with a statistically adequate number of measurements at each point to minimize uncertainty.  See Figure 4-28 of MRP-227-A.	Measurements taken at 8 azimuths.	Exceeded 60 year plant-specific acceptance criteria.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A <b>Next Inspection: (no earlier than 2038)</b> <b>Comments:</b>  (If hold down spring inspection is not required due to material type, state the material of fabrication and that the inspection is not required) (Please reference or include the inspection report, if possible)				



## Existing Components

☐ Check here if NO Existing Components were inspected this outage—DELETE this table if NO Existing inspections were performed.

Item	Examination Method	Required Examination Coverage	Coverage Achieved  <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1)  <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Bottom Mounted Instrumentation System</b> Flux thimble tubes	Surface examination (ET)	Eddy current surface examination as defined in plant response to IEB 88-09.	43 locations completed.	No issues or corrective actions required.
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A <b>Next Inspection: (2022)</b>				
<b>Comments:</b>          <i>(Please reference or include the inspection report, if possible)</i>				

## Tables for Reporting MRP-227-A Inspection Results for Westinghouse Plants, Rev.3

(Please include only the results of the current inspection)

Plant Name: McGuire Nuclear Station – Unit 1 Utility: Duke Energy Carolinas LLC

Date of Exams: April 2019 (M1R26) Plant Age: 38yrs (years) / 30.15 EFPY

Primary Components Item	Examination Method	Required Examination Coverage	Coverage Achieved <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1) <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Control Rod Guide Tube Assembly</b> Guide plates (cards)	Visual examination (VT-3)	Examination per WCAP-17451-P of CRGT assemblies, with all guide cards within each selected CRGT assembly examined.  See MRP-2014-006 and WCAP-17451-P	Examined 100% of all lower 8 guide cards and the continuous section on all 53 rodged CRGT assemblies (17x17 design) including wear measurements of cardinal holes in accordance with MRP-227-A/MRP-2014-006, WCAP-17451-P, Rev 2, and MRP 2018-007/OG-18-46.	<i>Guide Card Wear for MNS1 is low. There are no guide tubes projected to reach the 'red zone' in less than 20 EFPY regardless of RCCA material changes (ion nitride switch with chrome plated).</i>  <i>The limiting Guide Tube for MNS1 is associated with core location J13. The predicted EFPY to 'red zone' for location J13 is <b>87.04 EFPY</b>. If the RCCA for this guide tube is not changed to chrome plated 304 SS, the EFPY to red drops to 44.48 EFPY.</i>
Control Rodlet Surface Finish (circle each applicable): <span style="border: 1px solid black; padding: 2px;">Ion Nitride</span> Chrome Plated    No Surface Modification    Other (Specify)				
Disposition of Indications (check each required): [ ] Code Analysis    [ ] NRC Submittal    [ X ] WCAP-17096 Criteria    [ ] Other (Specify)    [ ] N/A				
Next Inspection: 2040 (approx.)				
<b>Comments:</b> <ol style="list-style-type: none"> <li>1. MNS Unit 1 utilizes 17x17 Standard style guide tubes with 96" lower guide tube length.</li> <li>2. Guide card wear was evaluated and dispositioned in accordance with WCAP-17451-P, Rev 2 and is documented in the Westinghouse report WCAP-18454-P.</li> <li>3. Guide Card Wear for MNS1 is low. There are no guide tubes projected to reach the 'red zone' in less than 20 EFPY regardless of RCCA material changes (ion nitride switch with chrome plated). The limiting location had a predicted remaining EFPY of 87.04. Next inspection of the MNS1 guide cards will occur in 20 EFPY (approx.) to confirm the predicted wear rates.</li> </ol>				

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## Tables for Reporting MRP-227-A Inspection Results for Westinghouse Plants, Rev.3

*(Please include only the results of the current inspection)*

Plant Name: Salem Unit 1 Utility: PSEG Nuclear LLC

Date of Exams: April 2019 Plant Age: 43 (years) / 29.5 EFPY

### Primary Components

<b>Control Rod Guide Tube Assembly</b> Lower flange welds	Enhanced visual examination (EVT-1) to determine the presence of crack-like surface flaws in flange welds	100% of outer (accessible) CRGT lower flange weld surfaces and adjacent base metal on the individual periphery CRGT assemblies. (Note 2)  See Figure 4-21 of MRP-227-A.	100% of accessible CRGT lower flange welds and adjacent base metal	No recordable indications
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A Next Inspection: (year)				
Comments:				
<b>Core Barrel Assembly</b> Upper core barrel flange weld	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).  See Figure 4-22 of MRP-227-A.	100% of Upper core barrel flange weld inside surfaces	No recordable indications
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A Next Inspection: (year)				
Comments:				

<b>Core Barrel Assembly</b> Upper and lower core barrel cylinder girth welds	Enhanced visual examination (EVT-1)	100% of one side of the accessible surfaces of the selected weld and adjacent base metal (Note 4).  See Figure 4-22 of MRP-227-A	100% of Upper Core Barrel Cylinder Girth Weld inside surfaces  Lower Core Barrel Cylinder Girth Weld not inspected (see comment)	No recordable indications
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A <b>Next Inspection: (year)</b> <b>Comments:</b> PSEG deviation 70201108 provides justification to postpone lower core barrel cylinder girth weld, lower core barrel flange weld, and flexure inspections 1 cycle until 1R27.				
<b>Baffle-Former Assembly</b> Baffle-former bolts	Volumetric examination (UT)	100% of accessible bolts (Note 3). Heads accessible from the core side. UT accessibility may be affected by complexity of head and locking device designs.  See Figures 4-23 and 4-24 of MRP-227-A.	UT - 612 original BFBs UT - 42 replacement BFBs	31 BFB Failed (Visual) 197 Original BFBs Failed UT 3 Original BFBs non-Testable (considered Failed) 1 Replacement BFB Failed UT
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input checked="" type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A <b>Next Inspection: (year)</b> <b>Comments:</b> Baffle-Former Bolt (BFB) inspections were not planned during the spring 2019 refueling outage (1R26). However, defueling complications and visual evidence of failed BFBs required emergent Visual and UT inspections. UT inspection was completed on 612 intact original BFB, and 42 BFBs replaced in spring 2016 (1R24). The UT inspection criteria for the BFB replaced in spring 2016 was developed with Westinghouse based on proximity and quantity of failed original bolts identified in 1R26. 232 baffle-former bolts that failed visual inspection or UT were replaced during 1R26. 1 replacement bolt from 1R24 failed UT in 1R26, and was replaced. An additional 40 bolts not failed, were pro-actively replaced to provide additional operating margin. In total, 271 original BFBs and 1 replacement BFB was replaced during 1R26 (272 total). In 1R24, 189 original BFB were replaced, and with the the additional 271 original BFBs replaced in 1R26; Salem Unit 1 has 372 of 832 original BFBs currently installed (replaced 460 of 832). PSEG currently plans to replace all 372 remaining original BFBs in 1R27 (Fall 2020). See PSEG Root Cause Report 70207205 for further details, available in INPO OE Report #455142.				

<b>Thermal Shield Assembly</b> Thermal shield flexures	Visual examination (VT-3)	100% of thermal shield flexures.  See Figures 4-29 and 4-36 of MRP-227-A.	See Comments	2 Flexures with Recordable Indications
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input checked="" type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A <b>Next Inspection: (year)</b>				
<b>Comments:</b> PSEG deviation 70201108 provides justification to postpone lower core barrel cylinder girth weld, lower core barrel flange weld, and flexure inspections 1 cycle until 1R27. Therefore the core barrel was not planned to be removed from the reactor vessel during 1R26 (Spring 2019). Identification of failed Thermal Shield Support Block Bolts (TSSBBs) provided the need to investigate the thermal shield flexures. Emergent core barrel removal and visual inspections of all eight flexures were completed. The results of the flexure inspections identified crack indications on 2 flexures and inconclusive anomalies on 4 flexures (2 of which are the same flexures with crack indications). In total, all 4 flexures with either crack indication or inconclusive anomaly were considered a failed flexure. Visual inspections consistent with MRP-227-A are planned for 1R27 (Fall 2020). Justification for past operation and continued operation for Salem Unit 1 and Salem Unit 2 is documented in Westinghouse letter LTR-RIDA-19-104 and LTR-RIDA-19-94 (PSEG order 70207358 and 70207420). See PSEG Equipment Reliability Evaluation (ERE) 70207236 available in INPO OE Report #455142 and EPRI MRP 2019-017 (Dated May 31, 2019) for further details.				

## Notes to Westinghouse Primary Components Table:

1. Examination acceptance criteria and expansion criteria for the Westinghouse components are in Table 5-3 of MRP-227-A.
2. A minimum of 75% of the total identified sample population must be examined.
3. A minimum of 75% of the total population (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-3 of MRP-227-A, must be examined for inspection credit.
4. A minimum of 75% of the total weld length (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-3 of MRP-227-A, must be examined from either the inner or outer diameter for inspection credit.
5. The lower core barrel flange weld may be alternatively designated as the core barrel-to-support plate weld in some Westinghouse plant designs.

## Expansion Components

**[ X ] Check here if NO Expansion Components were inspected this outage—DELETE this table if NO Expansion inspections were performed.**

## Existing Components

**[ ] Check here if NO Existing Components were inspected this outage—DELETE this table if NO Existing inspections were performed.**

<b>Alignment and Interfacing Components</b> Clevis insert bolts	Visual examination (VT-3)	All accessible surfaces at specified frequency.	100%	No recordable indications
<b>Disposition of Indications (check each required):</b> [ ] Code Analysis    [ ] NRC Submittal    [ ] WCAP-17096 Criteria    [ ] Other (Specify)    [ X ] N/A <b>Next Inspection: (year)</b> <b>Comments:</b>				

## Tables for Reporting MRP-227-A Inspection Results for Westinghouse Plants, Rev.3

*(Please include only the results of the current inspection)*

**Plant Name:** Millstone Power Station Unit 3 (MPS3) **Utility:** Dominion Energy

**Date of Exams:** April 2019      **Plant Age:** 33.2 (years) / 26.3 EFPY

## Primary Components

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Control Rod Guide Tube Assembly</b> Guide plates (cards)	Visual examination (VT-3)	Examination per WCAP-17451-P of CRGT assemblies, with all guide cards within each selected CRGT assembly examined.  See MRP-2014-006 and WCAP-17451-P	Full scope: 61 CRGT, 8 cards out of 10 for each + continuous section	Maximum % volume wear: Five (5) worst case CRGTs: GT-59 (P-10) 57% GT-49 (M-8) 56% GT-8 (C-7) 54% GT-55 (N-11) 53% GT-5 (B-10) 52%
<b>Control Rodlet Surface Finish (circle each applicable):</b> <input checked="" type="checkbox"/> Ion Nitride <input checked="" type="checkbox"/> Chrome Plated <input type="checkbox"/> No Surface Modification <input type="checkbox"/> Other (Specify)				
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input checked="" type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b> Evaluated to WCAP-17451 Rev. 2 criteria.				
(Please reference or include the inspection report, if possible)				



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## Tables for Reporting MRP-227-A Inspection Results for Westinghouse Plants, Rev.3

(Please include only the results of the current inspection)

Plant Name: Beaver Valley Unit 1 Utility: Energy Harbor, formerly First Energy Nuclear Operating Company

Date of Exams: 10/22/2019 Plant Age: 43.75 (years) / 32.12 EFPY

Only the BV1 hold-down spring was inspected during this refueling outage.

### Primary Components

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Alignment and Interfacing Components</b> Internals hold down spring	Direct measurement of spring height	Measurements should be taken at several points around the circumference of the spring, with a statistically adequate number of measurements at each point to minimize uncertainty.  See Figure 4-28 of MRP-227-A.	A direct measurement of the spring height was performed at 8 different locations around the circumference of the spring. 3 measurements were taken at each location.	No "sheen" was noted on the hold down spring. It was concluded that the upper internals rests on the spring evenly at all points. All of the spring height measurements were greater than the 60 year acceptance criteria. The minimum spring height measurement was 0.031 inches greater than the minimum height criterion for the 60-year design life of the plant.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b> The BV-1 hold down spring is fabricated from 304 material.          (If hold down spring inspection is not required due to material type, state the material of fabrication and that the inspection is not required) (Please reference or include the inspection report, if possible)				

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## Tables for Reporting MRP-227-A Inspection Results for CE Plants, Rev. 3

Plant Name: St. Lucie Unit 1 (PSL-1) Utility: Florida Power & Light (FPL)

Date of Exams: 10/23/2019 to 10/27/2019 Plant Age: ~44 (years) / 34.95 EFPY

### Primary Components

Item	Examination Method	Required Examination Coverage	Coverage Achieved  <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1)  <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Core Shroud Assembly (Welded)</b> Core shroud plate-former plate weld	Enhanced visual examination (EVT-1)	Axial and horizontal weld seams at the core shroud re-entrant corners as visible from the core side of the shroud, within six inches of central flange and horizontal stiffeners.  See Figures 4-12 and 4-14 of MRP 227-A.	<i>Re-inspection of existing indication from last outage to confirm crack growth rate.</i>	<i>Re-inspected indication identified on a lower horizontal weld seam, 0.375" flaw length (2018 reported length). Flaw is parallel to the horizontal weld in the Heat Affected Zone (HAZ). EVT-1 exam only.</i>
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input checked="" type="checkbox"/> NRC Submittal <input checked="" type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b> <i>The inspection in 2019 confirmed the existing flaw. The change of length noted was attributed to differences in measurements between 2018 and 2019; the flaw shape and orientation did not change, and no evidence of growth was noted. Acceptance criteria in accordance with WCAP-17096-NP-A was performed prior to the outage. During the outage, the as-found condition was evaluated, and the evaluation supports a 10-year re-inspection interval from the baseline inspection (spring 2018). The NRC ISI inspector reviewed the flaw evaluation completed prior to exiting outage. Submittal to the NRC of a detailed flaw evaluation in accordance with WCAP-17096-NP-A is planned in 2<sup>nd</sup> quarter of 2020.</i>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Core Shroud Assembly (Welded) Assembly</b>	Visual examination (VT-1)	If a gap exists, make three to five measurements of gap opening from the core side at the core shroud re-entrant corners. Then, evaluate the swelling on a plant-specific basis to determine frequency and method for additional examinations.  See Figures 4-12 and 4-14 of MRP-227-A.	N/A	Exam performed spring 2018; next exam planned spring 2027.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
Comments: N/A				
<b>Core Support Barrel Assembly</b> Upper (core support barrel) flange weld	Enhanced visual examination (EVT-1)	100% of the accessible surfaces of the upper flange weld (Note 3).  See Figure 4-15 of MRP-227-A.	N/A	Exam performed spring 2018; next exam planned spring 2027.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
Comments: N/A				
<b>Core Support Barrel Assembly</b> Lower cylinder girth welds	Enhanced visual examination (EVT-1)	100% of the accessible surfaces of the lower cylinder welds (Note 3).  See Figure 4-15 of MRP-227-A	Re-inspection of existing indication from last outage to confirm crack growth rate.	Re-inspected indication identified perpendicular to the lower girth weld (girth weld between lower and middle cylinder of core support barrel), 1.3" flaw length (2018 reported length). EVT-1 exam performed and supplemental UT performed to characterize flaws and support flaw evaluation.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input checked="" type="checkbox"/> NRC Submittal <input checked="" type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1)  <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>Comments:</b> <i>Confirmed existing flaws in 2019. The comparison of the flaw characteristics between the 2018 and 2019 exams, shows no flaw growth within the capabilities of the demonstrated examination technique. Acceptance criteria in accordance with WCAP-17096-NP-A was performed prior to the outage. During the outage, the as-found condition was evaluated, and the evaluation supports a 10-year re-inspection interval from the baseline inspection (spring 2018). The NRC ISI inspector reviewed the flaw evaluation completed prior to exiting the outage. Submittal to the NRC of a detailed flaw evaluation in accordance with WCAP-17096-NP-A is planned in 2<sup>nd</sup> quarter of 2020.</i> <i>Note: Indications identified near the Middle Axial Weld were also re-inspected and discussed below in the Expansion Exam section below.</i>				
<b>Lower Support Structure</b> Core support column welds	Visual examination (VT-3)	100% of the accessible surfaces of the core support column welds (Note 4). See Figures 4-16 and 4-31 of MRP-227-A	N/A	Exam performed spring 2018; next exam planned spring 2027.
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b> <i>N/A</i>				
<b>Core Support Barrel Assembly</b> Lower flange weld	If fatigue life cannot be demonstrated by time-limited aging analysis (TLAA), enhanced visual (EVT-1) examination	Examination coverage to be defined by evaluation to determine the potential location and extent of fatigue cracking.  See Figures 4-15 and 4-16 of MRP-227-A.	<i>Excluded from MRP-227-A scope per time-limited aging analysis (TLAA).</i>	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
<b>Comments:</b> <i>N/A</i>				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Lower Support Structure</b> Core support plate	If fatigue life cannot be demonstrated by time-limited aging analysis (TLAA), enhanced visual (EVT-1) examination	Examination coverage to be defined by evaluation to determine the potential location and extent of fatigue cracking.  See Figure 4-16 of MRP-227-A.	<i>Excluded from MRP-227-A scope per time-limited aging analysis (TLAA).</i>	N/A
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
Comments: N/A				
<b>Control Element Assembly</b> Instrument guide tubes	Visual examination (VT-3)	100% of tubes in peripheral CEA shroud assemblies (i.e., those adjacent to the perimeter of the fuel alignment plate).  See Figure 4-18 of MRP-227-A.	N/A	<i>Exam performed spring 2018; next exam planned spring 2027.</i>
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> N/A				
Comments: N/A				
<b>Core Support Barrel</b> Expandable Plugs and Patches (PSL-1 only)	Enhanced visual examination (EVT-1)	Examine repair region of core support barrel.	<i>Re-inspection of existing indications from last outage to confirm crack growth rate.</i>	<i>Re-inspected indications near two repair areas. EVT-1 exam only.</i>
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input checked="" type="checkbox"/> NRC Submittal <input checked="" type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Comments:</b> <i>This component is applicable to PSL-1 only due to past repairs on the core support barrel from thermal shield removal (mid 1980s). Indications at thermal shield welded overlay (pads) adjacent to repair areas on the core support barrel. Confirmed existing flaws in 2019. The change in length noted was attributed to differences in measurements between 2018 and 2019, and no overall indication of flaw growth was identified. Acceptance criteria in accordance with WCAP-17096-NP-A was performed prior to the outage. During the outage, the as-found condition was evaluated, and the evaluation supports a 10-year re-inspection interval from the baseline inspection (spring 2018). The NRC ISI inspector reviewed the flaw evaluation completed prior to exiting the outage. Submittal to the NRC of a detailed flaw evaluation in accordance with WCAP-17096-NP-A is planned in 2<sup>nd</sup> quarter of 2020</i>				

Note to CE Primary Components Table:

1. Examination acceptance criteria and expansion criteria for the CE components are in Table 5-2 of MRP-227-A.
2. A minimum of 75% of the total population (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-2 of MRP-227-A, must be examined for inspection credit.
3. A minimum of 75% of the total weld length (examined + unexamined), including coverage consistent with the Expansion criteria in Table 5-2 of MRP-227-A, must be examined from either the inner or outer diameter for inspection credit.
4. A minimum of 75% of the total population of core support column welds.



## Expansion Components

☐ Check here if NO Expansion Components were inspected this outage—DELETE this table if NO Expansion inspections were performed.

Item	Examination Method	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>Core Support Barrel Assembly</b> Core barrel assembly axial welds	Enhanced visual examination (EVT-1)	100% of one side of the accessible weld and adjacent base metal surfaces for the weld with the highest calculated operating stress.  See Figure 4-15 of MRP-227-A.	<i>Re-inspection of existing indications from last outage to confirm crack growth rate on the middle axial weld OD.</i>	<i>Re-inspected indications identified near and primarily perpendicular to the middle axial weld (long seam for the middle cylinder of the core support barrel). Maximum length detected visually was 1.88 inches (2018 reported length). EVT-1 exam performed and supplemental UT performed to characterize flaws and support flaw evaluation.</i>
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input checked="" type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A				
<b>Comments:</b> <i>Confirmed existing flaws in 2019. The comparison of the flaw characteristics between the 2018 and 2019 exams, shows no flaw growth within the capabilities of the demonstrated examination technique. Acceptance criteria in accordance with WCAP-17096-NP-A was performed prior to the outage. During the outage, the as-found condition was evaluated, and the evaluation supports a 10-year re-inspection interval from the baseline inspection (spring 2018). The NRC ISI inspector reviewed the flaw evaluation completed prior to exiting the outage. Submittal to the NRC of a detailed flaw evaluation in accordance with WCAP-17096-NP-A is planned in 2<sup>nd</sup> quarter of 2020.</i>				

Notes to CE Expansion Components Table:

- Examination acceptance criteria and expansion criteria for the CE components are in Table 5-2 of MRP-227-A.
- A minimum of 75% coverage of the entire examination area or volume, or a minimum sample size of 75% of the total population of like components of the examination is required (including both the accessible and inaccessible portions).

## Tables for Reporting MRP-227, Rev. 1-A Inspection Results for B&W Plants, Rev. 0

Plant Name: Oconee Nuclear Station Utility: Duke Energy  
 Date of Exams: April, 2020 (3R29) Plant Age: 45.75 (years) / 37.4 EFPY

### Primary Components

Item	Examination Method (Note 1, 2)	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 2)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>B15. Incore Monitoring Instrumentation (IMI) Guide Tube Assembly</b> IMI guide tube spiders IMI guide tube spider-to-lower grid rib section welds	Visual examination (VT-3)	Spiders: 100% of the accessible top surfaces and 100% of the accessible spider surfaces adjacent to the spider casting welds.  Spider Welds: 100% of the accessible welds to the adjacent lower grid rib section.  See Figures 4-3 and 4-6 of MRP-227, Rev. 1-A.	N/A – See Comments	N/A – See Comments
Disposition of Indications (check each required): <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A Next Planned Inspection: (year)				
<b>Comments:</b> In 2014 (O3R27), two IMI Guide Tube Spider Casting locations were reported in the MRP template as having linear indications (Locations B8-YL and G11-WR). As a clarification the indication reported at IMI Guide Tube Spider Casting Weld B8-YL was NOT considered to be associated with a MRP-227-A Primary item. The indication was in the base material of the lower grid rib section near IMI Guide Tube Spider Casting Weld B8-YL. The lower grid rib section is considered to be an ASME Section XI, Examination Category B-N-3 component (and is now also listed as Expansion item B10.3. Lower grid rib section in MRP-227, Rev 1-A). See B10.3 for further information.				

## Expansion Components

Oconee unit 3, spring 2020

Item	Examination Method (Note 1)	Required Examination Coverage	Coverage Achieved  (Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)	Examination Findings (Note 1)  (Include Number and Location of Findings and a Brief Description of the Findings)
<b>B10.3. Lower Grid Assembly</b> Lower grid rib section	Visual examination (VT-3)	100% of accessible surfaces of the lower grid rib section heat-affected zone (HAZ) adjacent to the spider-to-lower grid rib section welds.  See Figures 4-3 and 4-6 of MRP-227, Rev. 1-A.	See Comments	See Comments
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input type="checkbox"/> WCAP-17096 Criteria <input type="checkbox"/> Other (Specify) <input type="checkbox"/> N/A <b>Next Planned Inspection: (year)</b>				
<b>Comments:</b> <p>In 2014 (O3R27), two IMI Guide Tube Spider Casting locations were reported in the MRP template as having linear indications (Locations B8-YL and G11-WR). As a clarification the indication reported at IMI Guide Tube Spider Casting Weld B8-YL was NOT considered to be associated with a MRP-227-A Primary item. The indication was in the base material of the lower grid rib section near IMI Guide Tube Spider Casting Weld B8-YL. The lower grid rib section is considered to be an ASME Section XI, Examination Category B-N-3 component, and is now also listed as Expansion item B10.3 in MRP-227, Rev 1-A. Per ASME Section XI IWB-2420, re-examination of the area containing the relevant condition is required during the next three inspection periods. The first of the three re-examinations was performed during O3R29 (Spring, 2018) and the indication was documented to have "no apparent changes" from the previous examination using the same techniques and equipment used in 2014. The second of the three re-examinations was performed during O3R30 (Spring, 2020) and the indication was documented to have "no apparent changes" from the previous examinations using the same techniques and equipment used in 2014. This component will be examined again during the next period. [Framatome Report 180-9312732-000]</p> <p><b>NOTE: Expansion to this line item was not triggered. Exams were performed in accordance with ASME Section XI, not MRP-227.</b></p>				

**Tables for Reporting MRP-227, Rev. 1-A Inspection Results for Westinghouse Plants, Rev. 0**  
*(Please include only the results of the current inspection)*

Plant Name: Vogtle Unit 1 Utility: Southern Nuclear

Date of Exams: 3/20/2020 Plant Age: 33 years 3 months (years) / 29.6 EFPY

**Primary Components**

Item	Examination Method (Note 1)	Required Examination Coverage	Coverage Achieved  <i>(Include Number, Length, or Area of Items Examined and Percent of Total Population/Length/Area Examined)</i>	Examination Findings (Note 1)  <i>(Include Number and Location of Findings and a Brief Description of the Findings)</i>
<b>W1. Control Rod Guide Tube Assembly</b> Guide plates (cards)	Per the requirements of WCAP-17451-P, including subsequent examinations. (Note 5)	Examination coverage per the requirements of WCAP-17451-P, Revision 1 (Note 5)  See Figure 4-11 of MRP-227, Rev. 1-A.	CRGT design is 17X17AS. 44 of 53 measured w/ lower 8 cards (3-10) and continuous section measured. VT-3 also performed for above scope.	Maximum % volume wear: Five (5) worst case CRGTs: 5 worst CRGTs range from 77% to 91% (GC) and 51.6 to 61.6% (CS) 6 CRGTs in yellow zone per rev. 2 of WCAP. 6 worst CRGT locations: C11, B08, C09, P06, N11, L03 All lifetime wear is with Chrome RCCAs. 2020 RCCA replacement was ion-nitrided rods Considered high flow per rev. 1 of WCAP but rev. 1 wear projection results less conservative; i.e. only 1 yellow CRGT. (ref. Figures 3-5 thru 3-7 of WCAP-17451-P for conversion of wear measurements to wear volume. Also specify high or low flow operation as defined in Table 4-2 of WCAP)
<b>Control Rodlet Surface Finish (circle each applicable):</b> Ion Nitride <u>Chrome Plated</u> No Surface Modification    Other (Specify)				
<b>Disposition of Indications (check each required):</b> <input type="checkbox"/> Code Analysis <input type="checkbox"/> NRC Submittal <input checked="" type="checkbox"/> WCAP-17096 Criteria <input checked="" type="checkbox"/> WCAP-17451-P R2 <input type="checkbox"/> N/A				
<b>Next Planned Inspection: (2021)</b> <i>Based on current evaluation at least a partial re-inspection in the next refueling outage; Fall 2021.</i>				
<b>Comments:</b> Ion-nitride penalty factor plays a large part in the short re-inspection period, but wear is high even without penalty. Continuous section is limiting on re-inspection/corrective action when evaluated to WCAP-17451-P Revision 2.  <i>(Please reference or include the inspection report, if possible)</i>				