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April 6, 2011

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U.S. Nuclear Regulatory Commission
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Watts Bar Nuclear Plant, Unit 2
NRC Docket No. 50-391

Subject: WATTS BAR NUCLEAR PLANT UNIT 2 - LIST OF DESIGN DIFFERENCES, REVISION 1

- References:
1. TVA letter to NRC dated February 8, 2008, "Watts Bar Nuclear Plant (WBN) - Unit 2 - Final Safety Analysis Report (FSAR) Red-Line for Unit 2"
 2. TVA letter to NRC dated August 27, 2010, "Watts Bar Nuclear Plant, Units 1 and 2 Multi-Unit Operator Training and Certification Program and Request for Review"
 3. TVA letter to NRC dated October 28, 2010, "Watts Bar Nuclear Plant Unit 2 - List of Design Differences"

The purpose of this submittal is to provide an updated list to capture the remaining design differences between Units 1 and 2 identified after October 28, 2010. The initial commitment to submit a list of design differences for WBN stems from TVA letter dated February 8, 2008 (Reference 1). Part of this original commitment was satisfied by the following subsequent TVA letters: Reference 2 dated August 27, 2010, supplied a list of design differences that affected multi-unit operator training; and Reference 3 dated October 28, 2010, excluded the differences identified in Reference 2, but provided a list of design differences that, although transparent to operators in the control room, may have been of interest during Unit 2 NRC Staff review. When Reference 3 was submitted, there were some remaining designs where still further differences could be identified. Thus, this submittal provides an update to the list provided in Reference 3.

Enclosure 1 provides the updated list of design differences. Changes to this list have been denoted by gray shading. With the submission of this letter, TVA considers this commitment satisfied, with no further revisions to the list required. However, additional unit differences could emerge through field implementation. If significant unit differences emerge, then TVA will provide another updated list, if necessary, when field implementation is complete.

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Enclosure 2 provides the list of new commitments made in this submittal. If you have any questions, please contact William Crouch at (423) 365-2004.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 6th day of April, 2011.

Sincerely,

A handwritten signature in black ink, appearing to read 'D Stinson', with a stylized flourish at the end.

David Stinson
Watts Bar Unit 2 Vice President

Enclosures:

1. Updated List of Design Differences
2. List of Commitments

cc (Enclosures):

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Enclosure 1
Watts Bar Nuclear Plant
Updated List of Design Differences

**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
1.	52322	Integrated Computer System (ICS)	<p>The scope of this EDCR is to design, procure and construct an Integrated Computer System (ICS) for Watts Bar Nuclear Plant Unit 2. The Unit 2 ICS design is intended to implement identical Unit 1 functions as closely as possible.</p> <p>Unit differences are as follows:</p> <p>Differences include a star topology network rather than a Fiber Distributed Data Interface (FDDI) Ring which is similar but with more modem equipment with same or better capabilities. Additional network equipment provides increased Cyber Security non safety-related monitoring and protection capabilities by providing multiple layers of communications throughout the ICS network to isolate ICS from internal plant control systems and human-machine-interfaces as well as isolation from outside sources.</p>
2.	52323	ICS Interfaces	<p>The scope of this EDCR is to replace the existing Analog Rod Position Indicating system with Computer Enhanced Rod Position Indicating (CERPI) system supplied by Westinghouse Electric Company. This EDCR is incorporating for Unit 2 the modifications implemented on Unit 1.</p> <p>Unit differences are as follows:</p> <p>The Unit 2 ICS interface to CERPI system will utilize Cat 5 cable from Maintenance and Test Panels in 2-R-41 and 2-R-43 for connection to 2-R-23, Unit 1 used Fiber optic cable for connection to Computer Room ICS panels. The Unit 2 fiber cable run from the Maintenance and Test Panel 2-R-41 to Control Room Panel 2-M-4 will be a dedicated run without intermediate light guides. The quantity of intermediate connections was determined to be an issue for Unit 1 and recommendations were made to eliminate intermediate points.</p>
3.	52324	Rod Control System Card Replacement	<p>The scope of this EDCR is to authorize Westinghouse to refurbish WBN U2 Solid State Rod Control System cabinets.</p> <p>Unit differences are as follows:</p> <p>Westinghouse has replaced obsolete cards in the Rod Control System with direct replacements (i.e., card function of new replacements is the same as old cards). The system function will be identical to Unit 1.</p>

**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
4.	52327	Polar Crane Modification	<p>The scope of this EDCR is to provide engineering evaluation and upgrades services for the existing Unit 2 Polar Crane.</p> <p>Unit differences are as follows:</p> <p>The Unit 1 hoist drive uses an ABB silicon-controlled rectifier (SCR) drive and its support equipment for DC motors; whereas, Unit 2 hoist drive will use a Magnetek Variable Frequency Drive (VFD) and its support equipment for AC motors.</p>
5.	52350	Pressurizer Heater Controller	<p>The scope of this EDCR is to install the Unit 2 control bank D pressurizer heater controller, 2-SCR -068-0341F. The equipment will be installed in the Unit 1 Auxiliary Building.</p> <p>Unit differences are as follows:</p> <p>The Watts Bar Unit 1 Pressurizer Heater Controller manufactured by Robicon is obsolete and can no longer be purchased. For this reason, Watts Bar Unit 2 will use an Ametek HDR Power Systems pressurizer heater controller series 3Z to replace the obsolete model. The new controller will (provided by Westinghouse) use zero firing SCR technology which will reduce the electrical interference generated by the controller which differs from the phase angle firing SCR system used by Unit 1.</p>
6.	52352	Power Range Detectors	<p>The scope of this EDCR is to authorize refurbishment/ replacement of Westinghouse equipment in the Nuclear Instrumentation Cabinet.</p> <p>Unit differences are as follows:</p> <p>For Unit 2, TVA will install new power range detectors supplied by Westinghouse. The Unit 2 detector model number WL-24154 is a variation of the standard IST WL-23686 Uncompensated Ionization Chamber installed for Unit 1. The Unit 2 detector has a similar neutron response and similar electrical characteristics. Unit 2 will use crimp-on triax connectors which differ from Unit 1 which has compression type installed.</p>

**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
7.	52384	Unit 2 Annunciation Upgrade	<p>The EDCR authorizes an upgrade to Unit 2 Trip Status Light Boxes 2-XX-55-5, 2-XX-55-6A, 2-XX-55-6B consists of the following construction work as part of Unit 2 completion:</p> <ol style="list-style-type: none"> 1. Re-wiring terminal blocks TB-1, TB-2, and TB-3 in 2-M-21 cabinet V (with internal intra-panel wiring from there to cabinet IV and panel 2-M-22) to illuminate the correct lamp window when an alarm occurs, 2. Replacing window tiles (lenses) with new text engravings that match Unit 1. <p>Unit differences are as follows:</p> <p>This EDCR upgrades Unit 2 Trip Status Light Boxes 2-XX-55-5, 2-XX-55-6A, 2-XX-55-6B. The wiring configuration is the same for both Unit 2 and Unit 1 except for Trip Status Lamp box XX-55-5 windows 18, 38, 58, 78, 19, 39, 59, and 79. The Ronan Annunciator system for Unit 1 contains output points numbered in the 1700s and 1800s for activating these lights. The Ronan Annunciator system for Unit 2 does not contain points numbered in the 1700's and 1800's. Output points 1101 thru 1108 on 2-M-21 were chosen to activate the status lights.</p> <p>Unit 1 Annunciation system is a DOS based system where as the Unit 2 is a Windows base system</p>
8.	52409	Acoustic Monitoring System	<p>The scope of this EDCR is to authorize replacement of equipment required for the Unit 2 Acoustic Monitoring System.</p> <p>Unit differences are as follows:</p> <p>For Unit 2, different accelerometers will be installed which are different from ones used-in Unit 1. These different accelerometers are being installed because the vendor no longer supplies the original ones. Because these accelerometers are incompatible with the original charge converters, new charge converters are also being installed. The new equipment operates identically to the original equipment which allows it to fill the necessary role.</p>

**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
9.	52424	Cold Leg Accumulator Level Transmitters	<p>This EDCR installs new sensing lines, isolation valves, level transmitters, and local panels for the Safety Injection System (SIS) Cold Leg Accumulator (CLA) Tanks 1 thru 4. Two level transmitters will be installed per tank for a total of eight. The level transmitters are used to verify Technical Specification compliance through their respective level indicators (LIs) mounted on Main Control Panel 2-M-6. The original transmitters were to be ITT Barton Model No. 752/352 with fluid-filled capillary lines from the diaphragms mounted on the tanks instrument stand-pipe flanges.</p> <p>Unit differences are as follows:</p> <p>This EDCR installs two Rosemount model 1153DD3RB transmitters per tank to monitor the level in each of the four safety injection cold leg accumulators located in the Unit 2 reactor building. This configuration will differ from Unit 1 which uses an FCI thermal dispersion probe as one of the transmitters on each tank and a Rosemount model no.1152DP as the other transmitter.</p>
10.	52446	Transmitter Replacements	<p>The scope of this EDCR is to install verify the installation of instrument panels (2-L-287 and 2-L-288) and their associated instruments and instrument lines are installed per drawings and the applicable procedures.</p> <p>Unit differences are as follows:</p> <p>Unit 2 flow transmitters are being replaced with Rosemount model 1154DH which will differ from Unit 1 transmitters. No system logic or function features will be affected. Root valves 2-RTV-72-201A and 2-RTV-72-202A are being replaced with Anchor Darling, model 1878 series.</p>
11.	52447	Transmitter Replacements	<p>The scope of this EDCR is to reroute the Main Feed water Flow Transmitter sense lines to achieve proper slope, interface movement qualification. The applicable flow transmitters are 2-FT-003-0035A, 2-FT-003-00358, 2-FT-003-0048A, 2-FT-003-0048B, 2-FT-003-0090A, 2-FT-003-0090B, 2-FT-003-103A, and 2-FT-003-103B. This change is part of the Instrument Line CAP and was implemented on unit 1.</p> <p>Unit differences are as follows:</p> <p>Unit 2 feedwater transmitters are being replaced with Rosemount 1152 transmitters (4-20 mA) which will differ from the Unit 1 Rosemount 1152-series (10-50 mA) transmitters. This EDCR does not affect system functional or logic features.</p>

**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference						
12.	52449	Transmitter Replacements	<p>This EDCR completes instrumentation panels inside the reactor building required for U2 operation.</p> <p>Unit differences are as follows:</p> <p>Transmitters are being replaced with Rosemount series transmitters which differ from Unit 1. Although the transmitters will differ from Unit 1, this EDCR does not affect system logic or function features. The replacement instrumentation will function as the original. However, the replacement reactor protection level transmitters will be supplied by Barton which are identical to Unit 1.</p>						
13.	52453	Unit 2 Containment Isolation Status Panel/Main Isolation Signal Status Panel Changes	<p>The scope of this EDCR is to procure, install and wire Unit 2 Containment Isolation Status Panel (CISP) and Main Isolation Signal Status Panel (MISSP) on Main Control Room Panel 2-M-6 (Engineered Safeguards & Auxiliary Systems).</p> <p>Differences between Unit 1 and Unit 2 are listed in the table below:</p> <table border="1" data-bbox="743 352 1174 1587"> <thead> <tr> <th data-bbox="743 961 776 1587">Unit 1</th> <th data-bbox="743 352 776 961">Unit 2</th> </tr> </thead> <tbody> <tr> <td data-bbox="776 961 963 1587"> Window No. 12 1-FCV-32-80 (Train "A", Phase "B") 1-FCV-32-102 (Train "B", Phase "B") CISP Window No. 13 1-FCV-32-110 (Train "A", Phase "B") Blank (Train "B") CISP Window No. 80 1-FCV-65-52 (Train "A", Phase "A") 1-FCV-65-53 (Train "B", Phase "A") </td> <td data-bbox="776 352 963 961"> Window No. 12 2-FCV-32-81 (Train "A", Phase "B") 2-FCV-32-103 (Train "B", Phase "B") CISP Window No. 13 Blank (Train "A") 2-FCV-32-111 (Train "B, Phase "B) CISP Window No. 80 2-FCV-65-5 (Train "A", Phase "A") 2-FCV-65-4 (Train "B", Phase "A") </td> </tr> <tr> <td data-bbox="963 961 1174 1587"> Power Supplies 1-PX-55-6C-A (Train "A") and 1-PX-55-6D-B (Train "B") are rated as 250W </td> <td data-bbox="963 352 1174 961"> Power Supplies 2-PX-55-6C-A (Train "A") and 2-PX-55-6D-B (Train "B") are rated as 500W due to discontinuation of identical Power Supply that was used on Unit 1 by the vendor. </td> </tr> </tbody> </table>	Unit 1	Unit 2	Window No. 12 1-FCV-32-80 (Train "A", Phase "B") 1-FCV-32-102 (Train "B", Phase "B") CISP Window No. 13 1-FCV-32-110 (Train "A", Phase "B") Blank (Train "B") CISP Window No. 80 1-FCV-65-52 (Train "A", Phase "A") 1-FCV-65-53 (Train "B", Phase "A")	Window No. 12 2-FCV-32-81 (Train "A", Phase "B") 2-FCV-32-103 (Train "B", Phase "B") CISP Window No. 13 Blank (Train "A") 2-FCV-32-111 (Train "B, Phase "B) CISP Window No. 80 2-FCV-65-5 (Train "A", Phase "A") 2-FCV-65-4 (Train "B", Phase "A")	Power Supplies 1-PX-55-6C-A (Train "A") and 1-PX-55-6D-B (Train "B") are rated as 250W	Power Supplies 2-PX-55-6C-A (Train "A") and 2-PX-55-6D-B (Train "B") are rated as 500W due to discontinuation of identical Power Supply that was used on Unit 1 by the vendor.
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**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
14.	52577	<p style="text-align: center;">Makeup Water Flow Measuring Instrumentation</p>	<p>This EDCR authorizes the removal of existing make up water flow measuring instrumentation 2-FE-062-142 and FIT-062-142 which are being replaced with Micro Motion CMF 200 Flow Tube and matching transmitter.</p> <p>Unit differences are as follows:</p> <p>Unit 2 loop provides 4-20 mA to the Foxboro I/A System while the Unit 1 loop provides a frequency pulse to a discrete controller. While the Unit 1 equipment will be replaced with Micro motion equipment, a difference will still exist due to a difference in the output configuration.</p> <p>This change represents an engineering difference between Unit 1 and Unit 2 when DCN 51828 is implemented for Unit 1 because existing instrumentation is being replaced with Micro Motion equipment with different output configuration.</p>
15.	52601	<p style="text-align: center;">Reactor Vessel Level Indication System (RVLIS)</p>	<p>This EDCR installs the unistrut, capillary, density compensating resistance thermal devices (RTDs), and piping for the Reactor Vessel Level Indication System (RVLIS).</p> <p>Unit differences are as follows:</p> <ol style="list-style-type: none"> 1. The Unit 2 routing of the capillary will be different from Unit 1. Approximately 80% of the Unistrut is already installed and will be used. Since RVLIS is a filled system, the route (including slope) will have no effect on the functioning of the system. 2. The difference in route causes the location of the RTDs to be different. These different elevations are factored into Common Q with addressable constants in its reactor vessel level calculation. 3. The mounting of the capillary to the 3/4" pipe as part of the steel containment penetration (SCV) sleeve assembly will be different from Unit 1. There will be no piece of machined barstock as in Unit 1. 4. New Unistrut will be the nuclear grade version versus Unit 1 generic (the company Unistrut did not make nuclear grade version at the time of install into unit 1). The nuclear grade Unistrut (N1000) is essentially the same as the non nuclear grade (P1000) except it has better material traceability. 5. One of the RTDs on each train will be in a Unistrut containing both a head and seal table capillary lines. Since no differential pressure is taken across these two taps, vertical sections must be temperature compensated. A single RTD will be used (versus two on Unit 1), and fed into Common Q which is sophisticated enough to use a single RTD for both compensation calculations. 6. A crane wall sleeve used for train A will change from a 20" sleeve used in unit 1 to a 4" sleeve to be used in unit 2. <p>There will be other unit differences with the remainder of the RVLIS system installed under EDCR 55385. This is installing the local panels, sensor bellows, and hi volume vents.</p>

**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
16.	52613	Non Quality Related Level Instrumentation	<p>This EDCR will replace the non-quality related (NQR) level instrumentation for the low pressure (LP), high pressure (HP), and moisture separator reheater (MSR) belly drain tanks located on each of the six MSRs in the Turbine building.</p> <p>Unit differences are as follows:</p> <p>Vent valves are added above the level controllers for the low pressure, high pressure, and belly drain tanks to allow for safe maintenance. Flanges for the caged sensors located on the high pressure drain tanks will be replaced with 1500# flanges instead 600# flanges to meet the ASME code class standards and accommodate manufacturer part obsolescence. Level controllers will have anti-reset windup features to modulate valve position and maintain normal condensate levels in the low pressure, high pressure, high pressure, and bell.</p>
17.	52637	Residual Heat Removal System Valves	<p>The scope of this EDCR is to incorporate Unit 1 historic-changes into the Unit 2 Residual Heat Removal System, as well as install various components identified to be missing during residual heat removal system plant walkdowns.</p> <p>Unit differences are as follows:</p> <p>The following valves are being replaced with a different manufacturer than what may be installed on Unit 1. Kerotest valves were originally purchased for both Unit 1 and Unit 2 and are now obsolete and have been replaced with a different manufacturer: 2-VTV-074-0010, 2-VTV-074-0020, 2-VTV-074-0041, 2-VTV-074-0042, 2-VTV-074-0517, 2-VTV-074-0538</p> <p>Unit differences are as follows:</p> <p>The C_v for the replacement valves is different than the original valves installed. No negative impacts on-the RHR-system-results from the different C_v since the-function of-these-valves is for venting/draining purposes only.</p> <p>The Seating surface has been procured with the elimination of stellite as a hard seating surface. Due to the function of these valves seat leakage is not a concern on system function but, the seat leakage has been specified to the standard allowable rate of 10 cc/hr/in.</p> <p>Weight - The replacement valves will be heavier than the original valves installed in Unit 1. Stress and hanger analyses are to be performed and verified by Plant Design. Valves 74-0041, 74-42, 74-10, 74-20 will be approximately 5.5 lbs. The original Unit 1 valves were 3.3 lbs). Valves 74-0538 and 74-0517 will be approximately 21 lbs. The original Unit 1 valves were 13 lbs.</p>

**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
18.	52639	Residual Heat Removal Local Handswitch Deletion	<p>This EDCR replaces Square D hand switches 2-HS-074-3B-A with environmentally qualified Cutler Hammer model to incorporate Unit 1 historic change.</p> <p>Unit differences are as follows:</p> <p>This EDCR physically removes local control hand switch 2-HS-074-3B-A from valve 2-FCV-74-3-A control circuit for Appendix R reasons. This eliminates local control of the valve which differs from Unit 1. However, operation of valve 2-FCV-74-3-A is still controlled from the control room as well as at the MCC and the valve will still function as designed.</p>
19.	52640		<p>The scope of this EDCR is to install an oil drain line and appropriate fittings on each of the Unit 2 RHR pump motors (2-MTR-074-0101-A and 2-MTR-074-0020-B).</p> <p>Unit differences are as follows:</p> <p>Unit 1 transitions immediately from pipe to tubing on the oil drain line. Unit 2 has a pipe nipple and elbow before transitioning to tubing. There is no functional difference.</p>
20.	52684	Flow Transmitter Relocation	<p>The scope of this EDCR replaces flow transmitters (2-FT-62-93A and 2-FT-62-93C) with 1152-series transmitters with 4-20mA output which differs from Unit 1 which utilizes transmitters with a 10-50mA output. The replacement transmitter will be of the same design and function as the original instruments. This EDCR does not affect system functional or logic features. Root valves 2-RTV-62-342A and 2-RTV-62-343A are replaced with Anchor Darling model 1878-series.</p>
21.	52764	Essential Raw Cooling Water System Changes (Auxiliary Building)	<p>The scope of this EDCR is to incorporate Unit 1 historic design changes into Unit 2 for the essential raw cooling water system in the Auxiliary Building.</p> <p>Unit differences are as follows:</p> <p>Six 1.5" ball valves (used as flushing connections for six essential safety feature (ESF) pump room coolers) that were supplied for Unit 1 are the Anchor Darling D-series ball valves. The valves for Unit 2 are being procured as the upgraded E-series ball valves. The two models are similar in form, fit, and function. The affected valves are as follows: 2-ISV-067-0620-A, 2-ISV-067-0621-A, 2-ISV-067-0622-B, 2-ISV-067-0623-B, 2-ISV-067-0624-A, and 2-ISV-067-0625-B</p>

**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
22.	52796	Essential Raw Cooling Water System Changes (Reactor Building)	<p>The scope of this EDCR is to incorporate Unit 1 historic design changes into Unit 2 for the essential raw cooling water system in the Reactor Building.</p> <p>Unit differences are as follows:</p> <ol style="list-style-type: none"> 1. Valves WBN-2-FCV-067-0087, WBN-2-FCV-067-0089, WBN-2-FCV-067-0095, WBN-2-FCV-067-0097, WBN-2-FCV-067-0103, WBN-2-FCV-067-0105, WBN-2-FCV-067-0111, and WBN-2-FCV-067-0113 will have a 5 ft-lb motor instead of the 2 ft-lb motor supplied on the Unit 1 MOVs. This change has been evaluated and determined to be acceptable based on the issued calculations performed by the Generic Letter (GL) 89-10 MOV Program group. Additional inputs to the GL 89-10 calculations were provided by the Electrical group on the 5 ft-lb motor parameters. 2. The operator for WBN-2-TCV-067-0092 will consist of some upgraded accessories. The change in the solenoid valve model and the positioner model was a result of obsolescence. It has been evaluated by engineering and determined to be equivalent and acceptable replacements. This is a minor change and there are no calculations or technical evaluation updates required to be performed as a result of the change.
23.	52831	Control Rods Reactivation	<p>This EDCR is to activate 4 previously inactive Unit 2 control rods in Control Bank "A" to increase the rapid negativity insertion in the core upon a reactor protection trip signal.</p> <p>Unit differences are as follows:</p> <p>There will be 3 cable splice boxes on Unit 2 that are not on Unit 1. There are unused spare plugs on Panels 842, 843, 2025, and 2026 on Unit 1 which differs from Unit 2 where the spare plugs were removed from the Panels 842, 843, 2025, and 2026.</p>
24.	52869	Siemens Wrap	<p>This EDCR's scope is the replacement of the existing gland steam condenser (GSC) which upgrades the Stainless tube bundle (Same as Unit 1). The new Vapor Exhausters and Motors are made by a different manufacturer than the existing Unit 2 equipment due to obsolescence, but they perform a like for like function compared to Unit 1.</p>

**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
25.	52918	Insulation Installation in Main Steam Valve Vault Rooms	<p>The scope of this EDCR is to install insulation and seal plates on the Unit 2 Main Steam Flued Heads in the Valve Vault Rooms.</p> <p>Unit differences are as follows:</p> <p>Unit 1 used molded microtherm insulation (now obsolete) with a thermal conductivity of 0.0229 W/(m-K) at 166°C. Unit 2 will use flexible quilted microtherm insulation with a thermal conductivity of 0.0275 W/(m-K) at 166°C. This accounts for a 20% difference in thermal conductivity (0.0229-0.0275/0.0229) x 100. Due to the relatively short distance and inaccessibility after installation, this difference is not a concern.</p>
26.	52943	Piping Changes for the Chemical Volume and Control System	<p>The scope of this EDCR includes piping changes for the chemical volume and control system.</p> <p>Unit differences are as follows:</p> <p>Drain valve, 2-DRV-062-1235 will be replaced with Anchor Darling 1878 series or equal valve instead of the Kerotest model that was used on Unit 1. This will cause a difference between Unit 1 and Unit 2. These Kerotest valves have become obsolete.</p>
27.	52945	Chemical Volume and Control System Charging Pumps 2A-A and 2B-B Modifications	<p>The scope of this EDCR authorizes changes to the Chemical Volume and Control System Charging Pumps 2A-A and 2B-B.</p> <p>Unit differences are as follows:</p> <p>Flow Control Valves 2-FCV-062-0089 and 2-FCV-062-0093 will be replaced, with Copes-Vulcan (or equal), valves in Unit 2. In Unit 1, these valves are Fisher Control valves with Copes-Vulcan internals.</p> <p>The Kerotest valves 2-DRV-062-0521, 2-DRV-062-0528., 2-ISV-06-0549, and 2-ISV-062-0691 are obsolete and will be replaced with Anchor Darling 1878 series or equal valves. Kerotest valves are obsolete.</p> <p>Valve remote operator 47W406-9A assembly to be replaced with Elliot Manufacturing equivalent parts. Unit 1 used Stow Manufacturing which is now Elliot Manufacturing.</p>

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Item No.	EDCR No.	Title	Design Difference
28.	52974	Condenser Circulating Water Flow Transmitters	<p>This EDCR allows for the complete installation/inspection of the specified local panel and associated equipment located in the Condenser Circulating Water (CCW) Pumping Station Building.</p> <p>Unit differences are as follows:</p> <p>Flow transmitters (2-PT-27-10, 2PT-27-20, 2-PT-27-30, 2-PT-27-40) are being replaced with 3051-series transmitters with 4-20 mA output which differs from Unit 1 which utilizes transmitters with a 10-50 mA output. The replacement transmitters will be of the same design and function as the original instruments which will not affect system functional or logic features.</p>
29.	52987	Reactor Coolant System Hot and Cold Leg Thermowell Locations	<p>This EDCR installs new thermowells and RTDs for the Reactor Coolant System (RCS) hot and cold legs on Unit 2. Originally, Unit 1 and 2 were equipped with a bypass line around the steam generators and RCPs to measure temperature. This was modified in Unit 1 into the current configuration.</p> <p>Unit difference are as follows:</p> <p>In unit 1, loops 2, 3, and 4's narrow range (NR) T_{cold} thermowells/RTDs are installed at the 12 o'clock and 10 o'clock positions while looking into the core. Loop 1's are at the 12 o'clock and 2 o'clock positions. In unit 2, Westinghouse modifies this to make loop 1 and 3 the same (12 and 10 o'clock) and loops 2 and 4 the same (12 and 2 o'clock).</p> <p>Due to the difference in orientation of the thermowells in Unit 1, loop-1 which is different than the rest has the lowest of the loop temperatures for the "B" RTD, or the RTD at 60° from the vertical. However, this difference is minimal. Using TVA's DataWare historical data program and examining the temperatures and different times in plant life (September 2009, August 2005, and August 2002 were examined and plotted), loop 1's "B" RTD is always the coldest, but sometimes by 0.1°F, sometimes 0.5°F, but never greater than 1°F from the next coldest.</p>
30.	52994	Unit 2 Condenser Dump Valves	<p>This EDCR work scope utilizes Unit 1 DCNs as a guideline in order to perform the same work on Unit 2 for the Unit 2 Condenser Dump Valves.</p> <p>Unit differences are as follows:</p> <p>This EDCR abandons in place flow elements 2-FE-1-34 & 2-FE-1-41 and deletes the associated components. The above mentioned components being deleted/abandoned are still functional in Unit 1 but provide no essential information to the operation of Unit 1.</p>

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Item No.	EDCR No.	Title	Design Difference
31.	53056	Chemical and Volume Control System/ Reactor Coolant System Work	<p>This EDCR involves work scope for Chemical and Volume Control System, and Reactor Coolant System.</p> <p>Unit differences are as follows:</p> <p>Pressure regulators 2-PREG-062-0119 and 2-PREG-062-0120 will be a different model for Unit 2. Unit 2 will have 67CFR while Unit 1 is 67HR. The different pressure regulator is preferred over the original design and is an equivalent replacement. The controllers 2-PIC-062-0119 and 2-PIC-062-0120 for Unit 2 will also be a different model than Unit 1. The Unit 1 model is obsolete while the Unit 2 model is an equivalent replacement.</p> <p>Several Kerotest valves will be replaced with Anchor Darling 1878 series or equal which will differ from Unit 1. Unit 1 Kerotest valves have become obsolete. The Unit 1 Kerotest valves specify a flow coefficient of 5.6 while the Anchor Darling valves for Unit 2 specify a flow coefficient of 9. The difference in the flow coefficient is very small and considered negligible for affecting system function. The valves being replaced are vent valves which means the difference will not affect the function of the valves.</p>
32.	53062	Turbine Building Motor Control Center Component Replacements	<p>This EDCR involves Motor Control Centers (MCC) (2-MCC-209-A, 2-MCC-209-B, 2-MCC-209-C) in the Turbine Building.</p> <p>Unit differences are as follows:</p> <p>The MCC replacement buckets contain components that are different from Unit 1 due to obsolescence. The replacement components including starters, overload relays, overload heaters, fuses, (and also including the circuit breakers are the same types used on Unit 1) are sized and/or set per existing standards and calculations to ensure compatibility with the load served. Components, including control pilot devices, such as indicating lights are considered equivalent in form, fit, and function as their Unit 1 counterparts.</p>
33.	53066	480V Shutdown Board 2A1-A Changes	<p>This EDCR performs internal changes to 480V Shutdown Board 2-BD-212-A1-A cubicles which include adding/modifying/deleting fuses, switches, relays and cables.</p> <p>Unit differences are as follows:</p> <p>Modified/installed equipment on Unit 2 480V Shutdown Board 2A1-A is identical to previous modifications/ installations as performed on Unit 1 480V Shutdown Board 1A1-A except for Relays 2-RLY-030-2A2114-A and 2-02-030-0038-A. These relays will be a Struthers-Dunn which replaces the obsolete Potter Brumfield and an Agastat electronic relay which replaces the obsolete pneumatic Agastat, respectively. The operating functions are identical.</p>

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Item No.	EDCR No.	Title	Design Difference
34.	53069	480V Shutdown Board 2B2-B Changes	<p>This EDCR performs internal changes to 480V Shutdown Board 2-BD-212-B2-B cubicles which include adding/modifying/deleting fuses, switches, relays and cables.</p> <p>Unit differences are as follows:</p> <p>Equipment modified/installed on 480V Shutdown Board 2B2-B is identical to previous modification/ installations as performed on 480V Shutdown Board 1B2-B except for Relays 2-RLY-030-2B2114-B and 2-02-030-0039-B. These relays will be a Struthers-Dunn which replaces the obsolete Potter Brumfield and an Agastat electronic relay which replaces the obsolete pneumatic Agastat, respectively. The operating functions are identical.</p>
35.	53072	Turbine Building Motor Control Center Component Replacements	<p>This EDCR involves Motor Control Center (MCC) (2-MCC-209-A) in the Turbine Building.</p> <p>Unit differences are as follows:</p> <p>The MCC replacement buckets contain components that are different from their Unit 1 counterparts due to obsolescence of the Unit 1 models by the original manufacturer. The replacement components including starters, contactors, thermal overload relays, circuit breakers, auxiliary relays, and fuses are sized, set and specified per existing design standards. The following is a list of the major components being replaced in MCC compartments:</p> <ol style="list-style-type: none"> 1. EF3 type molded case circuit breakers are being replaced with Siemens ED63 molded case circuit breakers because the EF3 model is obsolete and no longer manufactured. 2. The starters and contactors are being replaced by Square D Type series starters and contactors. 3. The control power transformers are being replaced by Micron IMPERVITRAN control power transformers. 4. The ITE type J10 auxiliary relays are being replaced by Cutler-Hammer type AR440A auxiliary relays. <p>The above components will function the same as their Unit 1 counterparts.</p>

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Item No.	EDCR No.	Title	Design Difference
36.	53073	Turbine Building Motor Control Center Component Replacements	<p>This EDCR involves Motor Control Center (MCC) (2-MCC-209-B) in the Turbine Building.</p> <p>Unit differences are as follows:</p> <p>The MCC replacement buckets contain components that are different from their Unit 1 counterparts due to obsolescence of the Unit 1 models by the original manufacturer. The replacement components include starters, contactors, thermal overload relays, circuit breakers, current transducer, current transformer, auxiliary relays, and fuses are sized, set and specified per existing design standards. The following is a list of the major components being replaced in MCC compartments:</p> <ol style="list-style-type: none"> 1. EF3 type molded case circuit breakers are being replaced with Siemens ED83 molded case circuit breakers because the EF3 model is obsolete and no longer manufactured. 2. The starters and contactors are being replaced by Square D Type S series starters and contactors. 3. The control power transformers are being replaced by Micron IMPERVITRAN control power transformers. 4. The ITE type J10 auxiliary relays are being replaced by Cutler-Hammer type AR440A auxiliary relays. 5. The current transducer is replaced by Ametek type transducer. <p>The above components will function the same as their Unit 1 counterparts.</p>
37.	53074	Turbine Building Motor Control Center Component Replacements	<p>This EDCR involves Motor Control Center (MCC) (2-MCC-209-C) in the Turbine Building.</p> <p>Unit differences are as follows:</p> <p>The MCC replacement buckets contain components that are different from their Unit 1 counterparts due to obsolescence of the Unit 1 models by the original manufacturer. The replacement components including starters, contactors, thermal overload relays, circuit breakers, control power transformer, auxiliary relays, and fuses are sized, set and specified per existing design standards. The following is a list of the major components being replaced in MCC compartments:</p> <ol style="list-style-type: none"> 1. EF3 type molded case circuit breakers are being replaced with Siemens ED63 molded case circuit breakers because the EF3 model is obsolete and no longer manufactured. 2. The starters and contactors are being replaced by Square 0 Type S series starters and contactors. 3. The control power transformers are being replaced by Micron IMPERVITRAN control power transformers. 4. The ITE type J10 auxiliary relays are being replaced by butler-Hammer type AR440A auxiliary relays. <p>The above components will function the same as their Unit 1 counterparts.</p>

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Item No.	EDCR No.	Title	Design Difference
38.	53075	Turbine Building Motor Control Center Component Replacements	<p>This EDCR involves Motor Control Center (MCC) (2-MCC-210-A) in the Turbine Building.</p> <p>Unit differences are as follows:</p> <p>The MCC replacement buckets contain components that are different from their Unit 1 counterparts due to obsolescence of the Unit 1 models by the original manufacturer. The replacement components including starters, contactors, thermal overload relays, circuit breakers, auxiliary relays, and fuses are sized, set and specified per existing design standards. The following is a list of the major components being replaced in MCC compartments:</p> <ol style="list-style-type: none"> 1. EF3 type molded case circuit breakers are being replaced with Siemens ED63 molded case circuit breakers because the EF3 model is obsolete and no longer manufactured. 2. The starters and contactors are being replaced by Square D Type S series starters and contactors. 3. The Control of power transformers are being replaced by Micron IMPERVITRAN control power transformers. 4. The ITE type J10 auxiliary relays are being replaced by Cutler-Hammer type AR440A auxiliary relays. <p>The above components will function the same as their Unit 1 counterparts.</p>
39.	53076	Turbine Building Motor Control Center Component Replacements	<p>This EDCR involves Motor Control Center (MCC) (2-MCC-210-B) in the Turbine Building.</p> <p>Unit differences are as follows:</p> <p>The MCC replacement buckets contain components that are different from their Unit 1 counterparts due to obsolescence of the Unit 1 models by the original manufacturer. The replacement components including starters, contactors, thermal overload relays, circuit breakers, auxiliary relays, and fuses are sized set and specified per existing design standards. The following is a list of the major components being replaced in MCC compartments:</p> <ol style="list-style-type: none"> 1. EF3 type molded case circuit breakers are being replaced with Siemens ED63 molded case circuit breakers because the EF3 model is obsolete and no longer manufactured. 2. The starters and contactors are being replaced by Square D Type series starters and contactors. 3. The control power transformers are being replaced by Micron IMPERVITRAN control power transformers. 4. The ITE type J10 auxiliary relays are being replaced by Cutler Hammer type AR440A auxiliary relays. <p>The above components will function the same as their Unit 1 counterparts.</p>

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Item No.	EDCR No.	Title	Design Difference
40.	53077	Condenser Circulating Water Pump Station Motor Control Center Component Replacements	<p>This EDCR involves the Condenser Circulating Water (CCW) Pump Station MCC B (0-MCC-22S-B). Unit differences are as follows:</p> <p>The MCC replacement buckets contain components that are different from Unit 1 due to obsolescence. The replacement components including starters, overload relays, overload heaters, fuses, (and including the circuit breakers which are the same types used on Unit 1) are sized and/or set per existing standards and calculations to ensure compatibility with the load served. Components, including control pilot devices, such as indicating lights are considered equivalent in form, fit and function as their Unit 1 counterparts.</p>
41.	53091	Turbine Building Instrumentation Panel Installations	<p>The EDCR authorizes the completion of local panels 2-L-65 and 2-L-482 installations located in the Turbine Building and the replacement of missing/damaged instrumentation.</p> <p>Unit differences are as follows:</p> <p>The replacement instrumentation will be of the same design and function as the original. Specifically, 2-PT-1-33 is being replaced with a (4-20mA) Rosemount 3051-series transmitter which differs from the Unit 1 transmitter, 1-PT-1-33, which uses a (10-50mA) Foxboro transmitter. 2-FM-1-103 is being replaced with a Conoflow GT-25 series I/P converter which differs from the Unit 1, 1-FM-1-103 which uses a Fisher I/P converter. This EDCR does not affect system functional or logic features.</p>
42.	53121	Reactor Building Valve Replacements	<p>This EDCR replaces missing valves and their associated piping in the Reactor Building for the Chemical and Volume Control System. Unit differences will be as follows:</p> <p>Unit differences are as follows:</p> <p>The Kerotest valves will be replaced with an Anchor Darling 1878 series or equal valve.</p>

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Item No.	EDCR No.	Title	Design Difference
43.	53122	Chemical and Volume Control System Changes	<p>This EDCR will replace missing valves and associated piping in the Auxiliary Building for the Chemical and Volume Control Systems</p> <p>Unit differences are as follows:</p> <p>Several Kerotest valves will be replaced with Anchor Darling 1878 series or equal valves which will cause a difference between Unit 1 and Unit 2. These Kerotest valves have become obsolete. The set of flanges added by Revision B of this EDCR differs from what Unit 1 currently has installed (1-ISV-062-0520).</p>
44.	53123	Reactor Coolant System Changes	<p>The scope of this EDCR includes various changes to the Unit 2 Reactor Coolant System including the installation of valve 2-VTV-068-0004, replacing various Kerotest valves, as well as replacing missing piping and equipment.</p> <p>Unit differences are as follows:</p> <p>Drain valve, 2-DRV-062-1235 will be replaced with Anchor Darling 1878 series or equal valve instead of the Kerotest model that was used on Unit 1. This will cause an engineering design difference between Unit 1 and Unit 2. These Kerotest valves have become obsolete.</p>
45.	53125	Reactor Vessel Changes	<p>The scope of this EDCR is to cut and cap the Upper Head Injection and core Exit thermocouple penetrations on the Unit 2 Reactor Vessel.</p> <p>Unit differences are as follows:</p> <p>This EDCR installs the Upper Head Injection and Core Exit Thermocouple adaptor caps on the Unit 2 Reactor Vessel Head. The UHI caps will be identical to Unit 1 which installed the UHI caps. The CETs are still used by Unit 1. Unit 2 will be installing WINCISE which makes the CETs obsolete and creates a difference between the two Units.</p>
46.	53144	Kerotest Ball Valves	<p>This EDCR replaces 13 Generator Cooling System Kerotest ball valves with ITT Grinnell diaphragm valves. Unit 2 will be using diaphragm valves instead of ball valves used in Unit 1. There is no operator impact due to this difference.</p>

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Item No.	EDCR No.	Title	Design Difference
47.	53178	Control Air Modifications	<p>This EDCR adds backup nitrogen compressed air and control air to the Steam Generator Power Operated (Atmospheric) Relief Valves (SG PORVs). Control air will also be run to the Main Steam Isolation Valves and to the Main Steam Warming Line valves.</p> <p>Unit differences are as follows:</p> <p>Nitrogen line size used on Unit 2 will have 1/4" SS tubing which differs from Unit 1 was 3/8" tubing. This will not affect the reading of the pressurized gas in the lines local pressure indicator.</p>
48.	53203	Moisture Separator Reheater Installations	<p>This EDCR provides for the installation of the Unit 2 moisture separator reheaters.</p> <p>Unit differences are as follows:</p> <ol style="list-style-type: none"> 1. The Unit 2 MSR's are longer, larger in diameter and heavier than those installed in Unit 1. 2. Mass flows from the MSR low pressure operating vents will be directed to the low pressure reheater drain header instead of the Number 2 extraction steam lines as on Unit 1. 3. The pipe diameter for both the high pressure and low pressure operating vent lines will increase from 3" to 4" between the MSR and the first flow control valve. 4. The low pressure drain tanks will be moved approximately two feet due to the increased length of the MSR's. This will require drain piping below the 755 elevation of the Turbine Building to be rerouted. 5. The drain line slope between the MSR's and the low pressure drain tanks will decrease by approximately six degrees due to a larger MSR hemi-head. The mechanical group has determined that the drain line can accommodate the increased flow rate despite the decreased slope. 6. Additional thermocouples will be provided with the MSR's to monitor MSR performance. 7. The existing MSR low pressure (LP), high pressure (HP) and moisture separator (MS); i.e., "belly", drain level control valves (LCVs) in the main drain lines, as well as the MSR LP and MS by-pass level control valves, will either be replaced or modified creating the unit differences: 8. Namco/EA170-31100 switches will replace the existing D-2400X-2 switches on valves 9. A model 3582 positioner will be replace the existing model 3580 positioner on valves 10. The MSR low power bypass control valves (2-FCV-1-0275, 2-FCV-1-0277, 2-FCV-1-0279, 2-FCV-1-0284, 2-FCV-1-0291 and 2-FCV-1-0298) will be supplied by Copes-Vulcan instead of Fisher. 11. The 8 inch MSR high pressure steam inlet control valves (2-FCV-1-0075, 2-FCV-1-0077, 2-FCV-1-0079, 2-FCV-1-0084, 2-FCV-1-0091 and 2-FCV-1-0098) will be supplied by Copes-Vulcan instead of Fisher.

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Item No.	EDCR No.	Title	Design Difference
49.	53207	Sodium And Conductivity Analyzer Installation	<p>This EDCR provides design output documents to procure and install Unit 2 sodium and conductivity analyzers and to incorporate Unit 1 outstanding historic changes.</p> <p>Unit differences are as follows:</p> <p>The proposed changes follow the Unit 1 design except for the deletion of roughing coolers and flow indicators in the conductivity analyzer sample lines. Normal operating temperature range for the sample liquid is expected to be 125°F to 130°F, maximum up to 140°F. New replacement conductivity analyzers (Martek, Model - Mark 20) has a sample operating range of 2°C to 1000°C (35°F to 2120°F). Therefore, the roughing coolers will not be required for Unit 2 conductivity analyzers.</p> <p>The flow indicators were installed in Unit 1 sample lines to monitor the flow requirement. However, the new replacement conductivity sensors are not flow dependent and can analyze the sample at any flow rate. Therefore, the flow indicators will not be installed in Unit 2 sample lines for the replacement conductivity analyzers.</p>
50.	53228	Ice Condenser Changes	<p>This EDCR provides design output for Ice Condenser changes.</p> <p>Unit differences are as follows:</p> <p>(1) The 6" Glycol Return Line Spool Piece, 2-SPPC-061-0001, was removed in 1994 and connecting piping was blind flanged. It will be reinstalled in accordance with design drawings. Unit 1 does not have this spool piece.</p> <p>(2) New valves 2-61-531, 2-61-1161, and 2-61-1162 have an engineering difference in that new and different EPDM Grade M1 diaphragm material is different from the EPT material originally specified. This new material does not adversely affect control, function, or operation of the valves.</p>
51.	53230	Main Steam Piping Changes	<p>This EDCR is to upgrade piping from carbon steel to a more flow accelerated corrosion resistant material in accordance with the Flow Accelerated Corrosion program requirements.</p> <p>Unit differences are as follows:</p> <p>Valve 2-ISV-1-603 is a manually operated isolation valve used to isolate steam feed flow, when necessary to the Unit 2 Main Feedwater Pump Turbine. This valve is being replaced because replacement parts needed to refurbish the valve are obsolete. Upon review of all material differences associated with the new/redesigned valve, all materials are equal to, or better than, those originally provided from strength, structural, and corrosion standpoints.</p>

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Item No.	EDCR No.	Title	Design Difference
52.	53243	Main Feedwater Pump Turbine Oil Filter Replacement	This EDCR replaces oil filters utilized by the Main Feedwater Pump Turbines (MFPTs) due to obsolescence identified by the MFPT vendor. These oil filters (UNIDs 2-FLTR-046-0018 and 2-FLTR-046-0051) on Unit 2 are being replaced with a different model. The new filters supplied by Siemens have a delta P of approximately 2.5 psid greater than that of the original filters. This does not change the function of the filters nor the Feedwater Control System's operational requirements. The oil used in the system has the ability to operate at a wide range of pressures, and therefore, a 2.5 psid increase does not impact/affect operating setpoints and does not increase the potential for an alarm or trip.
53.	53245	Generator Cooling Changes	<p>This EDCR installs the Unit 2 dual tower hydrogen gas dryer and associated concrete pad.</p> <p>Unit differences are as follows:</p> <p>The new dual tower gas dryer is a Lectrodryer, water cooled, Model BAC-50 the same as Unit 1. The Unit 2 dual tower gas dryer will be in a slightly different location on the floor as compared to Unit 1's gas dryer due to other equipment located in the general area. The Unit 1 Dryer is located between columns T6E and T7E, whereas the Unit 2 dryer will be located between T9E and T10E.</p>
54.	53247	Moisture Separator Reheater Flow Transmitters Replacements	<p>The scope of this EDCR is to replace six Moisture Separator Reheater Flow Transmitters (FT) with new high temperature rated FTs.</p> <p>Unit differences are as follows:</p> <p>New flow transmitters are loop powered (24 vdc) 4-20 mADC and are suitable for the Foxboro IA application. These six Moisture Separator Reheat Flow loops have high temperature rated FTs, along with their associated Annubar Flow Elements (FE), will have an integrally mounted 5-valve manifold installed at the factory. Original design for Unit 2 was a 10-60 mADC output with a remote FE for the transmitter, and required a 120 vac power supply to function.</p>

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Item No.	EDCR No.	Title	Design Difference
55.	53275	Turbine Driven Auxiliary Feedwater Pump Refurbishment	<p>This EDCR allows for the shipment of the Unit 2 Turbine Driven Auxiliary Feedwater Pump (TDAFWP) offsite, its refurbishment, and re-installation.</p> <p>Unit differences is as follows:</p> <p>Unit 1 Valve WBN-1-BYV-003-0949 is a 1" Whitey Valve while Unit 2 WBN-2-BYV-003-0949 will be 0.75" Anchor Darling valve. This change was made to keep the valve consistent with the size of the associated piping.</p> <p>Unit 1 has a bypass path including 1-BYV-3-952 to the low pressure Turbine Driven Auxiliary Feedwater drain piping. The valve was abandoned and the line was cut and capped in place, to alleviate a thermal stress problem. Unit 2 does not install the equivalent line or valve.</p>
56.	53275 B	Turbine Driven Auxiliary Feedwater Pump Refurbishment	<p>Additional Differences for EDCR 53275 have been identified by Rev B)</p> <p>1) The following components have been changed to stainless steel for increased corrosion resistance:</p> <ul style="list-style-type: none"> • Condensate Drain/Isolation Valves 2-IDV-003-0914, -0915, -0916 and -0917, 2-DRV-003-0918, -0919 • Piping & Fittings between the 4" Main Steam supply and the 10" Drain Tank <p>Unit 1 currently has carbon steel components instead of stainless steel.</p> <p>2) Unit 2 high pressure drain lines have been modified by installing two free-blowing orifices (2-OR-003-0955 and -0956) and strainers (2-STN-003-0001 and -0002) upstream of each orifice. Unit 1 Terry Turbine high pressure drain lines include steam traps (1-TRAP-003-0001B and -0001 C) instead of the orifice/strainer combination. The Unit 1 steam trap drain valves (1-DRV-003-0918 and -0919) route to the Turbine Driven AFW Pump Room 10" Drain Tank, while the Unit 2 strainer drain valves (2-DRV-003-0918 and -0919) are open to the atmosphere. This modification is based on a SQN design change which Unit 1 plans to duplicate in the near future due to the obsolescence of the steam traps.</p>

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Item No.	EDCR No.	Title	Design Difference
57.	53287	480V Reactor MOV BD 2A1-A Component Replacements	<p>This EDCR replaces safety related, Class 1E Motor Control Center (MCC) buckets (motor starters, circuit breakers, relays, internal wiring and other components) and feeder breakers in the existing compartments of the safety related, Class 1E MCC, 480V Reactor MOV BD 2A1-A (2-MCC-213-A1-A). The existing MCC is located at Column, A12T on Elevation 772 in the Auxiliary Building and serves Unit 1 (Operating Unit) and Unit 2 loads.</p> <p>Unit differences are as follows:</p> <ol style="list-style-type: none"> The replacement components (MCC buckets and feeder breakers) are furnished by TRENTec. The new components are classified as safety related, Class 1E, seismic Category 1 and QA level 1. The existing obsolete components will be replaced with new components in 2-MCC-213-A1-A. Components including MCC starters, breakers, status relays, timing relays, switches, pilot lights etc. are considered equivalent to the existing components in form, fit and function to their Unit 1 counterparts. Differences in the number of auxiliary contacts between the new Square D motor starters and the corresponding existing ITE motor starters are due to the existing MCC starter type are no longer available and the new components are produced by a different manufacturer. To improve the starter coil pickup voltage performance, two spare auxiliary contacts per starter coil are removed from Unit 2 MCC bucket replacements. The bus stabs for the replacement MCC buckets and feeder breakers are functionally designed to be the same as the existing stabs and engage into the existing MCC bus. The Unit 2 blown fuse detector (BFD) is used in a similar manner as a fuse guard for Unit 1. However, the BFD will not trip the load breaker like the fuse guard does for Unit 1. The BFD turns off the indicating lights (only) to let the Operator know of the blown fuse condition. Weights of the individual replacement MCC buckets (with doors) and feeder breakers (with doors) are not identical to the weights of the corresponding existing components to be replaced in 2-MCC-213-A1-A. This is due to the new components (such as starters, contactors, etc.) are produced by different manufacturers. The weight difference is not significant enough to cause maintenance problems, and the Civil ESQ group will perform the evaluation of the weight deviation to assure that the existing MCC structure to meet seismic Category 1 requirements. Unit 2 MCC replacement components are procured as safety-related, class 1E equipment and meet seismic Category 1 requirements.

**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
58.	53288	480V Reactor MOV BD 2A1-A Component Replacements	<p>This EDCR replaces safety related, Class 1E Motor Control Center (MCC) buckets (motor starters, Circuit breakers, relays, internal wiring and other components), feeder breakers and internal wiring in the existing compartments of the safety related, Class 1E MCC, 480V Reactor MOV BD 2A2-A (2-MCC-213-A2-A). The existing MCC is located in 480V Board .Room 2A at Column A12S on Elevation 772 in the Auxiliary Building and serves Unit 1, common and Unit 2 loads.</p> <p>Unit differences are as follows:</p> <ol style="list-style-type: none"> 1. The replacement MCC buckets and feeder breakers are furnished by TRENTTEC. The new components are classified as Safety Related, Class 1E, seismic Category 1, and QA level 1. The existing obsolete components will be replaced with new components in 2-MCC-213-A2-A. Components including MCC starters, breakers, status relays, timing relays, switches, indicating lights etc. are considered equivalent in form, fit and function to their Unit 1 counterparts. 2. Differences in the number of auxiliary contacts between the new Square D motor starters and the corresponding existing ITE motor starters are due to the existing MCC starter type are no longer available and the new components are produced by a different manufacturer. To improve the starter coil pickup voltage performance, two spare auxiliary contacts per starter coil are removed from Unit 2 MCC bucket replacements. The bus stabs for the replacement MCC buckets and feeder breakers are functionally designed to be the same as the existing stabs and engage into the existing MCC bus. 3. The Unit 2 blown fuse detector (BFD) is used in a similar manner as a Fuse Guard (FG) for Unit 1. However, the BFD will not trip the load breaker like the FG does for Unit 1. The BFD turns off the indicating lights (only) to let the Operator know of the blown fuse condition. 4. Unit 2 Appendix R safe shutdown analysis identifies Appendix R requirements for, valves 2-FCV-67-125-A (Compartment 5E), 2-FCV-67-126-A (Compartment 5F), 2-FCV-67-87-A (Compartment 7D), 2-FCV-67-107-A (Compartment. 8B), 2-FCV-67-99-A (Compartment 9A), 2-FCV-67-104-A (Compartment. 9B) and 2-FCV-67-112-A (Compartment. 10A). The Appendix R requirements must be met by providing modifications to the control circuit wiring, MOV limit switch wiring in the MCC buckets from the high side of the motor operating coils to be below the low side of the operating coils. This is to prevent fire damage to the limit switch cables and the fire will not cause spurious valve closure. The valve indicating light wiring is also modified to be connected above limit switches. 5. Weights of the individual replacement MCC buckets (with doors) and feeder breakers (with doors) are not identical to the weights of the corresponding components they are replacing in 2-MCC-213-A2-A due to the use of new components (such as starters, contractors, etc.). The weight difference is not significant enough to cause maintenance problems. Unit 2 MCC replacement components are also being evaluated to meet Seismic Category 1 requirements.

**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
59.	53290	480V Control & Auxiliary Building Vent Board Component Replacements	<p>This EDCR replaces safety related, Class 1E MCC Meet buckets,(motor starters, circuit breakers, relays, internal wiring and other components), feeder breakers and Internal wiring In the existing compartments of the safety related, Class 1E MCCs, 480V Control & Auxiliary Building Vent Boards 2A1-A, 2A2-A, 1B1-B and 2B2-B. The existing MCCs are located in 480V Shutdown Rooms 2A2-A and 2B2-B at Column A13R and A13 T, on Elevation 757 in the Auxiliary Building and serves Unit 0, 1, & 2 loads.</p> <p>Unit differences are as follows:</p> <ol style="list-style-type: none"> 1. The replacement MCC buckets and feeder breakers are furnished by TRENTTEC. The new components are classified as safety related, Class 1E, seismic Category 1 and QA level 1. The existing obsolete components will be replaced with new components in 2-MCC-214-A1-A, 2-MCC-214-A2-A, 2-MCC-214-B1-B, and 2-MCC-214-B2-B. Components including MCC starters, breakers, status relays, switches, pilot lights etc are considered equivalent to the existing components in form, fit and function to their Unit 1 counterparts. 2. Differences in the number of auxiliary contacts between the new Square D motor starters and the corresponding existing ITE motor starters are due to the existing MCC starter type are no longer available and the new components are produced by a two different manufacturers. Two spare auxiliary contacts per starter coil are removed from Unit 2 MCC bucket replacements to improve the starter coil pickup voltage performance. The bus stabs for the replacement MCC buckets and feeder breakers are functionally designed to be the same as the existing stabs and engage into the existing MCC bus. 3. Weights of the individual replacement MCC buckets (with doors) and feeder breakers (with doors) are not identical to the weights of the corresponding existing components to be replaced in 2-MCC-214-A1-A, 2-MCC-214-A2-A, 2-MCC-214-B1-B, and 2-MCC-214-B2-B. This is due to the new components (such as starters, contactors, etc.) are produced by different manufacturers. The weight difference is not significant enough to cause any maintenance problems, and the Civil ESQ group will perform the evaluation of the weight deviation to assure that the existing MCC structure to meet Seismic Category 1 requirements. Unit 2 MCC replacement components are procured as safety-related, class 1E equipment and meet seismic Category 1 requirements.

**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
60.	53291	480V Auxiliary Building Common, Fuel & Waste Handling, Chemical & Volume Control Board Component Replacements	<p>This EDCR replaces Quality Related Motor Control Center (MCC) starter buckets, feeder breakers and internal wiring in the existing MCC compartments for common board MCCs: 480V Auxiliary Building Common MCC A (0-MCC-208-A), 480V Auxiliary Building Common MCC B (0-MCC-208-B), 480V Auxiliary Building Common MCC C (0-MCC-208-C), 480V Fuel and Waste Handling Board A (0-MCC-216-A), 480V Fuel and Waste Handling Board B (0-MCC-216-B) and 480V Chemical & Volume Control Board B (0-MCC-217-B).</p> <p>Unit differences are as follows:</p> <ol style="list-style-type: none"> The replacement MCC buckets and feeder breakers are procured from the, equipment vendor, TRENTTEC. The new components are procured as safety related, Class 1E, seismic Category 1 and QA level 1, even though they are used in a quality related, application and seismic category 1(L). The existing obsolete MCC buckets and components as indicated in the DRAs will be replaced for the following Unit 0, MCCs: 0-MCC-208-A, 0-MCC-208-B, 0-MCC-208-C, 0-MCC-216-A, 0-MCC-216-B and 0-MCC-217-B. Components including MCC starters, breakers, switches, pilot lights, etc are considered equivalent to the existing components in, form, fit and function to their Unit 1 counterparts. Differences in the number of auxiliary contacts between the new Square D motor starters and the corresponding existing ITE motor starters are due to the fact that the equipment is produced by two different manufacturers. Two spare auxiliary contacts per starter coil are removed from Unit 2 MCC bucket replacements to improve the starter coil pickup voltage performance. The bus stabs for the replacement MCC buckets and feeder breakers are functionally designed to be the same as the existing stabs and engage into the existing MCC bus in a similar manner to the existing equipment: Weights of the individual replacement MCC buckets (with doors) and feeder breakers (with doors) are not identical to the weights of the corresponding existing components to be replaced. This is due to the new components (starters, breakers, components, etc.) are produced by two different manufacturers. The weight difference is not significant enough to cause maintenance problems. Unit 0 MCC replacement components for Unit 2 loads are procured as safety-related, Class 1E equipment and meets seismic Category 1 requirements.

**ENCLOSURE 1
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Item No.	EDCR No.	Title	Design Difference
61.	53292	480V Reactor MOV Board Component Replacements	<p>This EDCR replaces safety-related, Class 1E Motor Control Center (MCC) starter buckets, feeder breakers, relays, internal wiring and other components in the existing compartments of the safety related, Class 1E MCC, 480V Reactor MOV Board 2B1-B (2-MCC-213-B1-B). The existing MCC is located in the Auxiliary Building serving loads in Unit 1 (Operating Unit) and Unit 2. Unit differences are as follows:</p> <ol style="list-style-type: none"> The MCC replacement buckets contain components that are different from Unit 1 components due to obsolescence. Components including MCC starters, breakers, auxiliary relays, switches, pilot lights, etc. are considered equivalent to the existing components in form, fit and function as their Unit 1 counterparts. Differences in the number of auxiliary contacts between the new Square D motor starter and the corresponding existing ITE motor starters are due to the existing MCC starter type is no longer available and the new components are produced by a different manufacturer. To improve the starter coil pickup voltage performance, two spare auxiliary contacts per starter coil are removed from the Unit 2 MCC bucket replacements. The bus stabs for the replacement MCC buckets and feeder breakers are functionally designed to be the same as the existing stabs and engage into the existing MCC bus. The Unit 2 blown fuse detector (BFD) is used in a similar manner as a fuse guard for Unit 1. However, the BFD will not trip the load breaker like the fuse guard does for Unit 1. The BFD turns off the indication lights and removes power from the status monitor relays where applicable to let the Operator know of the blown fuse condition. Unit-2 change only, per the Appendix R Calculation Compartment 7A Load: 2-FCV-62-91-B Appendix R Resolution No. 5207: Re-wires limit switch connections in the MCC compartment from the high side of the contactor coils to the low side of the contactor coils such that fire damage to the limit switch cable will not cause spurious valve closure. There is no Unit 1 DCN for this modification and the Unit-1 schematic 1-45W760-62-3 and connection diagram 45B1766-7A does not display the implemented change. Unit 2 change only: For Compartment 2C TRENTTEC added an Auxiliary "CX" relay and contacts to the starter bucket due to manufacturing limitations of the replacement starters, which increased the CPT capacity from the original 150VA to 250VA., per transformer sizing calculation. Unit-2 change only: For Compartment 16A TRENTTEC added an Auxiliary "CX" relay and contacts to the starter bucket due to manufacturing limitations of the replacement starters, which increased the CPT capacity from the original 150VA to 200VA, per transformer sizing calculation. Unit-2 change only: For Compartment 70, TRENTTEC replaced the blow fuse detector shown on Unit 1 drawings with a combination phase monitor/blown fuse detector, (Macromatic model) to the starter bucket due to manufacturing limitations of the replacement starters, which increased the CPT capacity from the original 150VA to 200VA, per transformer sizing calculation. Unit-2 change only: For Compartment 10D, TRENTTEC replaced the blow fuse detector shown on Unit 1 drawings with a combination phase monitor/blown fuse detector, (Macromatic model) to the starter bucket due to manufacturing limitations of the replacement starters, which increased the CPT capacity from the original 100VA to 150VA, per transformer sizing calculation. Unit-2 change only: For Compartment 11B, TRENTTEC increased the CPT capacity from the original 100VA to 150VA to ensure combined devices would function properly, per transformer sizing calculation.

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Item No.	EDCR No.	Title	Design Difference
62.	53293	480V Reactor MOV Board Component Replacements	<p>This EDCR replaces safety related, Class 1E Motor Control Center (MCC) buckets (motor starters, circuit breakers, relays, internal wiring and other components), feeder breakers and internal wiring in the existing compartments of the safety related, Class 1E MCC, 480V Reactor MOV Board 2B2-B (2-MCC-213-B2-B). The existing MCC is located in 480V Board Room 2B at Column A12R, on Elevation 772 in the Auxiliary Building and serves Unit 1, common and Unit 2 loads.</p> <p>Unit differences are as follows:</p> <ol style="list-style-type: none"> The replacement MCC buckets and feeder breakers being supplied by TRENTEC. The new components classified as Safety Related, Class 1E, seismic Category 1 and QA level 1. The existing obsolete components will be replaced with new components in 2-MCC-213-B2-B. Components including MCC starters, breakers, status relays, timing relays, switches, indicating lights, etc. are considered equivalent in form, fit and function to their Unit 1 counterparts. <p>Differences in the number of auxiliary contacts between the new Square D motor starters and the corresponding existing ITE motor starters are due to the existing MCc starter type are no longer available and the new components are produced by a different manufacturer. To improve the starter coil pickup voltage performance, two spare auxiliary contacts per starter coil are removed from Unit 2 MCC bucket replacements. The bus stabs for the replacement MCC buckets and feeder breakers are functionally designed to be the same as the existing stabs and engage into the existing MCC bus.</p> <p>The Unit 2 blown fuse detector (BFD) is used in a similar manner as a Fuse Guard (FG) for Unit 1. However, the BFD will not trip the load breaker like the FG does for Unit 1. The BFD turns off the indicating lights (only) to let the Operator know of the blown fuse condition.</p> <ol style="list-style-type: none"> Unit 2 Change only: Unit 2 Appendix R requirements for valves 2-FCV-67-123-B (Compartment 5E), 2-FCV-67-124-B (Compartment 5F), 2FCV-67-103-B (Compartment 7D), 2-FCV-67-111-B (Compartment 8D), 2-FCV-67-88-B (Compartment 9A), 2-FCV-67-96-B (Compartment 9B), 2-FCV-67-99-B (Compartment 10A), 2-FCV-67-107-B (Compartment 10B), 2-FCV-26-244-B (Compartment 12F), 2-FCV-70-3-B (Compartment 14B) and 2-FCV-70-153-B (Compartment 15E), are incorporated by this EDCR package. Weights of the individual replacement MCC buckets (with doors) and feeder breakers (with doors) are not identical to the weights of the corresponding components they are replacing in 2-MCC-213-B2-B due to the use of new components (such as starters, contactors, etc.). The weight difference is not significant enough to cause maintenance problems, but is evaluated by the Civil ESQ group to assure the MCC structure continues to meet Seismic Category 1 requirements. Unit 2 MCC replacement components are also being evaluated to meet Seismic Category 1 requirements. The Unit-1 device 1-FCV-67-105-B starter bucket is located in compartment 11D for 1-MCC-213-B2-B, while the Unit-2 device 2-FCV-67-105-B starter bucket was pre-select for the future compartment 11B 2-MCC-213-B2-B.

**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
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Item No.	EDCR No.	Title	Design Difference
63.	53296	480V Reactor Vent Board Component Replacements	<p>This EDCR replaces safety related, Class 1E Motor Control center (MCC) buckets (motor starters, circuit breakers, and internal wiring), feeder breakers and existing internal wiring in the existing compartments of the safety related, Class 1E MCCs, 480V Reactor Vent Board 2A-A (2-MCC-232-A-A) and 480V Reactor Vent Board 2B-B (2-MCC-232-B-B). Existing MCCs are located in 480V Board Room 2A (Column A10S) and 28 (Column A8S) on Elevation 772' in the Auxiliary Building and serves Unit 2 loads.</p> <p>Unit differences are as follows:</p> <ol style="list-style-type: none"> The replacement MCC buckets and feeder breakers being supplied by TRENTec are QA-1, qualified for Safety Related Class 1E use, seismic Category 1, and replace equivalent obsolete equipment in 2-MCC-232-A-A and 2-MCC-232-B-B. Components, including pilot devices, such as indicating lights, are considered equivalent in form, fit and function to their Unit 1 counterparts. Differences in the number of auxiliary contacts between the new Square D motor starters and the corresponding existing ITE motor starters are due to the existing MCC starter type are not longer available and the new components are produced by a different manufacturer. To improve the starter coil pickup voltage performance, two spare auxiliary contacts per starter coil are removed from Unit 2 MCC bucket replacements. The bus stabs for the replacement MCC buckets and feeder breakers are functionally designed to be the same as the existing stabs and engage into the existing MCC bus. Weights of the individual replacement MCC buckets (with doors) and feeder breakers (with doors) are not identical to the weights of the corresponding components they are replacing in 2-MCC-232-A-A and 2-MCC-232-B-B due to the use of new components (such as starters, contactors, breakers, etc.). The Unit 2 MCC replacement components weight differences are not significant enough to present maintenance problems, and are being evaluated by the Civil ESQ group to assure they meet Seismic Category 1 requirements. Unit 2 MCC structure is being evaluated by the Civil ESQ group to verify it continues to meet Seismic Category 1 requirements.
64.	53307	Condensate System Pressure Switch/Pressure Transmitter Replacements/Installations	<p>This EDCR replaces obsolete United Electric pressure switches with SOR models and adds pressure indicators to provide local indication of pressure. This EDCR will also remove pressure indicators on hotwell pumps, replace pressure switch with pressure transmitter and connect to Foxboro I/A, connect thermocouples in condensate demineralizer pump to plant computer.</p> <p>Unit differences are as follows:</p> <ol style="list-style-type: none"> Unit 2 additions include new thermocouples added in the condensate demineralizer pumps will be connected to Integrated Computer System and will have log points for motor phase and bearing temperatures assigned to them. Pressure transmitters, 2-PT-002-0014 and 2-PT-002-0015, will give pressure indication to Foxboro I/A new pressure gauges 2-PI-002-0004, 2-PI-002-0005, 2-PI-002-0007, and 2-PI-002-0273 to provide local indication. Unit 2 changes are to re-tube Panels 2-L-590, 2-L-591, and 2-L-593 to add instrument isolation valves. Replace the I/P transducer 2-FM-002-0035B with a 4-20mA model. Control room annunciation changes will be addressed in the Foxboro I/A which processes the signal from 2-PT-002-0014 and 2-PT-002-0015.

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Item No.	EDCR No.	Title	Design Difference
65.	53309	Heater Drains & Vents System Control Valve Replacement	<p>The scope of this EDCR is to replace current 3" Fisher Control valves with 6" Control Component control valves (2-LCV-6-13B, 2-LCV-6-33B, 2-LCV-6-56B, 2-LCV-6-76B, 2-LCV-6-85B and 2-LCV-6-94B) to the Main Condenser. These valves, in Unit 1, were subjected to steam impingement and, consequently, the valve bodies eroded and developed through-wall leaks. This failure mechanism led to the replacement of the Fisher Control with Control Component valves.</p> <p>Although the Unit 2 valve materials, model number, and major dimensions are the same as the Unit 1 MSR High Pressure Bypass Valves, the Unit 2 valves are designed to allow for the passage of more flow for increased MSR flow rates.</p> <p>This EDCR installs High Point Vents for the Safety Injection System based on historic Unit 1 DCNs. The scope of this EDCR has been split up into two Revisions (A & B) in order to support Startup and Testing. Unit differences are as follows:</p>
66.	53311	Safety Injection System High Point Vent Installations	<ol style="list-style-type: none"> 1. The following valves are installed on the vents in Unit 1 but will not be installed on the equivalent Unit 2 vents: 1-VTV-63-195, 1-VTV-63-196, 1-VTV-63-197, 1-VTV-63-198, 1-VTV-63-199, 1-VTV-63-576, 1-VTV-63-639, 1-VTV-63-642, 1-VTV-63-649, 1-VTV-63-654, 1-VTV-63-657, 1-VTV-63-659, 1-VTV-63-660, and 1-VTV-63-661. In these cases, the Unit 1 vent consists of three valves in which the first is normally open. The Unit 2 vent will consist of 2 valves because the third is not required. 2. Other design differences are as follows: <ul style="list-style-type: none"> • Size - Some of the equivalent Unit 1 valves are 1/2" where they are 3/4" in Unit 2. • Location - The Unit 1 & 2 pipe routing is not identical. If the Unit 1 tap location was not the actual high point in Unit 2, the tap location was relocated to the actual high point. • Some of the equivalent Unit 1 valves are installed on tubing. The Unit 2 valves will be installed on piping.

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Item No.	EDCR No.	Title	Design Difference
67.	53321	Implementation of Various Residual Heat Removal System Changes	<p>This EDCR incorporates various changes into the Unit 2 Residual Heat Removal System. Unit differences are as follows:</p> <ol style="list-style-type: none"> Valves noted below do not use Stellite as a hard alloy for valve seating surfaces. The equivalent Unit 1 valves may employ a Stellite seating surface. Valves below will also have different maintenance requirements because the Kerotest valves are obsolete and are being replaced by a different Manufacturer. Unit 1 valves may still use a Kerotest valve. 2-DRV-074-0501, 2-DRV-074-0526, 2-ISV-074-0501, 2-DRV-074-0508A, 2-DRV-074-0535 The low point drain on Unit 2 at valves 2-DRV-07400537 and -0535 will not function the same as the low point drain on Unit 1 at valve 1-DRV-074-0537. Unit 1 consists of a single valve with a blind flange. Unit 2 will consist of a double valve set-up with quick disconnect easier draining and less time in a radiological controlled area. EDCR 53321 updates the appropriate non-physical drawings to reflect the addition of the alarm associated with high RCS pressure coincident with the RHR isolation valves not being fully closed which was completed by separate EDCRs. These drawing, updates include the use of MUX12 as opposed to Unit 1 which uses MUX19 for the same alarm. This difference only affects the design configuration and has no functional impact. Quick disconnects and splices associated with TE-74-29 and 39 are being installed to aid in device calibration and is considered a design difference from Unit 1. <p>The scope of this EDCR is to incorporate Unit 1 historical design changes into Unit 2 heaters, drains, and vents in the Turbine Building: Unit differences are as follows:</p>
68.	53326	Historical Design Changes for Heaters, Drains, Vents	<ol style="list-style-type: none"> 2-LIC-6-2026 is a Fisher Controls model 2502F-249B level controller whereas 1-LIC-6-2026 is a Masonneilan level controller. There is a difference in how the two products are calibrated. The Fisher Controls model's float tank must be pre-loaded prior to start-up. The Fisher Controls model measures 26.31" flange to flange. The Masonneilan model is 26.0" flange to flange. The Fisher level controller is an equivalent but more reliable instrument than the Masonneilan product. <p>The scope of this EDCR is replace various valves in the Chemical and Volume Control System due to failure of manual manipulation test by the Unit 2 Refurbishment Group. Unit differences are as follows:</p> <p>Several Kerotest valves will be replaced with Anchor Darling 1878 series or equal valves which will cause a difference between Unit 1 and Unit 2. These Kerotest valves have become obsolete.</p>
69.	53327	Chemical and Volume Control System Changes	

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Item No.	EDCR No.	Title	Design Difference
70.	53331	Valve Operator Replacement	<p>This EDCR replaces the valve operators for WBN-2-FCV-027-0140 and -0141, connects the cables to the operators, and changes the seals on these valves. Unit 2 differences are as follows:</p> <ol style="list-style-type: none"> 1. A lug will be attached to the base of the handwheel support shaft to create a place for personnel to tie-off while operating this equipment manually. This will be located on the outside of the concrete wells where the slide gate sits. This lug will be factored into the civil calculation which will analyze the frame to confirm that it can support the new valve operator. This lug does not exist on Unit 1. 2. Due to the difference in the position of the handwheel (it will come off of the frame at 45° instead of approximately 10°, Calculation WCG-2-538 is being developed to analyze the de-icing valve frame and determine that it can support the load of the valve operator. Unit 1 does not have a similar calculation. 3. The hp for the operator motors will be stated in hundredths instead of tenths as on Unit 1 to reflect supplied vendor data (Unit 2 is 0.64 hp and Unit 1 is .6 hp). 4. Due to this difference, the plate that supports extended handwheel shaft's pillowblock bearing will be enlarged so that the bearing will fit and the handwheel shaft support will be relocated. The material was not available to orient the handwheel at the exact same location as Unit 1 so the handwheel and handwheel shaft were provided by the valve operator manufacturer. TVA used existing material on Unit 1 for the handwheels. 5. The handwheel is now oriented at a different angle to account for the supplied gearbox. The operators for Unit 2 only allow the handwheel to be rotated at 1800 increments. The location of the handwheel will allow the operator to be on the platform during handwheel operation. The platform that goes to one side of the concrete opening will be to the operator's back during manual operation.
71.	53336	Historical Design Changes for Heaters, Drains, Vents	<p>The scope of this EDCR is to incorporate Unit 1 historic design changes into Unit 2 for heaters, drains, and vents in the Turbine Building.</p> <p>Unit differences are as follow:</p> <ol style="list-style-type: none"> 1. The Fisher level controllers are 26.31" flange to flange where as the Masonelian level controllers are 26" flange to flange. 2. Pro Mag level gauges and switches are heavier and longer than the armoured level gauges (No. 5 and No. 6 heaters) 3. Pipe supports will be required for heaters with Pro-Mag level gauges (No. 1, No. 2, No. 4, No. 5, and No. 6) 4. Process connections, visible length, and scaling of the Pro-Mag level gauges will correspond to the outer diameter of the tanks. They are not being retrofitted onto the existing pipe. 5. Drain and vent valves have been added above and below the caged sensor of the Fisher level controllers.

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Item No.	EDCR No.	Title	Design Difference
72.	53343	Valve Changes	<p>The scope of this EDCR is to modify, install and remove valves in component cooling system.</p> <p>Unit differences are as follows:</p> <ol style="list-style-type: none"> 1. Valves WBN-2-FCV-070-0089 and -0100 will have a 5 ft-lb motor instead of the 2 ft-lb motor supplied on the Unit 1 MOVs. 2. The body of valves 2-FCV-070-0089-B and 2-FCV-070-100-A are made of SA 516, Gr. 55 for Unit 1. For Unit 2, these valves will be made of SA 516, Gr. 70 as Gr. 55 is not available for the body. Grade 70 has a higher carbon content, and is therefore stronger. Based on the valves usage and the design temperature, the increase in material strength will have no adverse affect.
73.	53351	Component Cooling Water System Changes	<p>The scope of this EDCR is to install a missing pipe nipple and threaded caps which have been removed from System 70.</p> <p>Unit difference are as follows:</p> <p>This EDCR requires a 1/2" nipple and cap to be added. Unit 1 drawing does not indicate a cap on the corresponding test valve WBN-1-TV-070-0691A. The addition of a nipple and cap to Unit 2 is an improvement over the Unit 1 configuration. It is desirable because it will help keep debris out of the line and reduce the probability of leakage. The additional weight will have no impact on the structural design of the 6" main line.</p>
74.	53352	Component Cooling Water System Changes	<p>The scope of this EDCR is to install flex hose, pumps, motors, and thermowells in the component cooling system. Unit differences are as follows:</p> <ol style="list-style-type: none"> 1. The original thermal barrier booster pumps are no longer made; however, the new pumps are a direct replacement and an updated model of the original. The new pumps have a larger, redesigned reservoir, which results in longer bearing life. 2. The new pumps also have a different bearing isolator. The original pumps had a single lip seal; the new pumps utilize INPRO bearing isolators, which significantly increase bearing design life.

**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
75.	53354	Primary Water System Changes	<p>The scope of this EDCR is to install the missing primary makeup water pumps & motors, install valves, and replace terminal lugs as necessary. Unit differences are as follows:</p> <ol style="list-style-type: none"> 1. The original pumps for Unit 2 are obsolete and cannot be purchased. The original pumps required a 30 HP motor to obtain the required pump performance. The new pumps are more efficient, and therefore require a 20 HP motor to obtain the required pump performance. The new pumps and motors will cause the system description to be updated to reflect the new specifications. 2. The new base plates for the pumps and motors are thicker than the original. The concrete pad will have to have some concrete removed to allow the new pumps to have the same centerline as the original pumps. 3. The new primary makeup water pumps are being supplied with raised face flanges. The original pumps had flat face flanges. 4. The current mating discharge flange is a raised face, weld neck flange with the raised face removed. The modified weld neck flange is going to be replaced with a standard, raised face weld neck flange. The current mating suction flange is a raised face flange, which was connected to a flat face flange. The mating of a raised face flange to a flat face flange is not preferred. Because the new pump is being supplied with raised face flanges, both suction connections will be raised face.
76.	53390	Instrument Panel Completion	<p>This EDCR is to verify and install Instrument Panels 2-L-182, 2-L-182D, 2-L-580, 2-L-596 and 2-L-597 in accordance with applicable drawings and procedures. Unit differences are as follows:</p> <p>Rosemount 1154-series will replace the obsolete transmitters and Ashcroft Duragage series will replace the pressure indicator. The local panels and sense line routing is similar to Unit 1. The replacement instrumentation will function as the original.</p>

**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
77.	53392	Instrument Panel Completion	<p>This EDCR is to verify and install Instrument Panels 2-L-191A and 2-L-191B in accordance with applicable drawings and procedures.</p> <p>Unit differences are as follows:</p> <p>This EDCR replaces the transmitters on Panels 2-L-191A and 2-L-191B with Rosemount 1152 transmitters. Sense lines, supports, panel configurations and weights, maintenance and calibration methods and functions will be fundamentally the same as for Unit 1.</p>
78.	53401	Auxiliary Feedwater Changes	<p>This EDCR incorporates Unit 1 historical Design-Changes into Unit 2. Motor Driven Auxiliary Control Valves are to be reconfigured to install instrumentation appurtenance including new pneumatic positioners, current to pneumatic converters, solenoids, limit switches, and pressure regulators.</p> <p>Unit differences are as follows:</p> <p>Unit difference is the decision to standardize on I/P Mfg/Model (4-20 mA) and Fisher CFR series pressure Regulators. New I/P panel control air isolation valves are also installed. (The Unit 2 Devices operate identical to the Unit 1 components in the same role.)</p>

**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
79.	53405	Miscellaneous Changes	<p>This EDCR is the "wrap-up" EDCR for Condenser Circulating Water System field work not located in the Turbine Building or Cooling Tower. Unit differences are as follows:</p> <ol style="list-style-type: none"> 1. The ASME plugs used to plug the Unit 2 gland seal water lines that were removed from service are not ASME B&PV Code Section III Material as was used in Unit 1 to plug the gland seal lines that were removed from service. These plugs are only required by the pump vendor to be ASME SA 105 material and are not required to be Section III Material. Also, these plugs are ordered to standard mill finish instead of black finish. 2. The grade of material used for the Unit 2 pipe material in the access flange is ASTM A 106 Gr. B. The Unit 1 Field Change Request that installed piping did not specify the required grade of material. 3. The specification for the lifting eye is more detailed for Unit 2. Unit 1 only called for a 1 ½" lifting eye. The Unit 2 bill of material also specifies the Type 1 and Style B per ASME B18.15 of the lifting eye to be used. The nominal size of both the Unit 1 and Unit 2 lifting eyes for the access flanges is 1 ½". The type and style for Unit 2 were specified to use the least amount of space possible. This lifting eye is to carry the load of the 18" blind flange, 16" pipe, and piece of the increaser that is attached to the pipe. Type 1 is designed for greater loads than Type 2. 4. The Unit 1 document of record shows the backing plate as not being able to fit through the welding neck flange. The blind flange would not be removable as shown on the Unit 1 DOR since the backing plate would not fit through the blind flange. The Unit 2 detail will be shown correctly which would allow the blind flange and backing plate to be removed as shown on the drawing. WBN-2-ISV-027-0607 will be a slightly different valve than WBN-1-ISV-027-0607. The gaskets for the Unit 2 valve will be non-asbestos. The float mechanism is of a slightly different design, but this is internal to the valve so the form, fit and function in relation to the adjacent air release valve components is unchanged. 5. WBN-2-ISV-027-0607 is a later edition of the same model for WBN-1-ISV-027-0607. Both valves are made by the same manufacturer (APCO Valve and Primer Corporation) and the new valve is recommended by the vendor as a replacement to the older model. 6. Temperature Elements WBN-2-TE-027-0013A, 2-TE-027-0013F, 2-TE-027-0013L, 2-TE-027-0013M, 2-TE-027-0017A, 2-TE-027-0017F, 2-TE-027-0017L, 2-TE-027-0017M, 2-TE-027-0018A, 2-TE-027-0018F, 2-TE-027-0018L, 2-TE-027-0018M, 2-TE-027-0022A, 2-TE-027-0022F, 2-TE-027-0022L, and 2-TE-027-0022M (NQR) will be a different model than the thermocouples installed in Unit 1. Unit 2 will use Leeds and Northrup Model PP-3061-1-T-2-2.62-1-0-000 and PP-3061-1-T-2-3.25-1-0-000. These replace the originally installed TEs (Leeds and Northrup Models 8792-3-T-2.62 which were replaced with Leeds and Northrup Model 3061-1-T-1-3.25-1-0-1-0) that had asbestos material in the insulating block. The new TEs were evaluated for fit, form, and function by I & C and recommended by the pump vendor. These TEs were ordered so they could be similarly grounded to the originally installed TEs and match design output documents.

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WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
80.	53417	Trend Recorder Removal/Timing Relay Installations	<p>This EDCR removes Trend Recorder 2-TR-061-138 from Main Control Room Panel 2-M-10. This EDCR will also add Timers to Ice Condenser Air Handling Units the same as Unit 1.</p> <p>Unit differences are as follows:</p> <p>Timing Relays added for Unit 1 are Agastat versus Timing Relays add by this EDCR are Square D.</p>
81.	53421	Chemical and Volume Control System Changes	<p>This EDCR abandons the Unit 2 Reciprocating Charging Pump (2-PMP-062-0101) and associated components in the Chemical and Volume Control System and finish remaining physical work.</p> <p>Unit differences are as follows:</p> <ol style="list-style-type: none"> 1. Valves 2-ISV-062-656, 2-SMV-062-0668, 2-ISV-062-0713, and 2-CKV-062-0723 are being removed for future use as Unit 2 spares. Unit 1 interfaced these valves out and locked them closed. 2. A new drain valve (2-DRV-062-0755) is being added for Unit 2 to ensure piping can be drained for the Type C Leak Rate Testing. Unit 1 does not have this valve installed currently. 3. Kerotest valves 2-RTV-062-0353A and 2-DRV-062-0554 will be replaced with Anchor Darling 1878 series or equal versus Unit 1 valves are Kerotest which have become obsolete. 4. The Unit 1 low flow loop for F-62-93 is alarmed on window 108A of XA-55-5C. It is obtained via a digital output from the plant computer over cable 1A6800, which is routed between 1-R-157 and annunciator Remote MUX 12. For Unit 2, it will be obtained directly from Foxboro rack 2-R-18 over cable 2A3681, which is routed between 1-R-18 and 2-M-21.
82.	53425	Extraction Steam System Changes	<p>The scope of this EDCR is to replace five Extraction Steam System Flow Control Valves (FCV) and install ten (10) new Isolation Valves (ISV) upstream and downstream of the five FCVs, respectively.</p> <p>Unit differences are as follows:</p> <p>Flow Control Valves (FCV) WBN-2-FCV-005-0094 through -0098 will be replaced with an upgraded model (Camflex I replaced with Camflex II). The Unit 1 valves are still Camflex 1 model. The new Camflex II valves will have new solenoid valves, pressure regulators and limit switches. The solenoid valves, pressure regulators and limit switches will be different model numbers than on Unit 1. The Camflex II valves are approximately 5-8 lbs heavier than the Camflex I valves.</p>

**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
83.	53439	Main Feedwater System Changes	<p>This EDCR completes Siemens installation activities for the main feedwater system and incorporates historical unit 1 changes for unit 2. Unit differences are as follows:</p> <ol style="list-style-type: none"> 1. Unit 2 Panels containing the main feed pump turbine (MFPT) oil pressure indicators are named 2-L-933 and 2-L-934. On Unit 1, these were named 1-L-707 and 1-L-708. 2. Replacement items for 2-ST-46-20A and 20B perform the function of the old 2-ST-46-20A and 20B as well as the functions of 2-SS-46-20A and 2-SS-46-20B. 2-SE-46-20B and 20E are not connected to the ST and designated as spare now. 3. The new model for the linear voltage differential transformer (LVDT) demodulator (2-ZM-46-13) cannot handle inputs for both the HP and LP LVDTs. Siemens has provided two LVDT demodulators for each MFPT. 4. The motors for the governor valve positioner are now 250 VDC and do not require a voltage reduction network. The VRN is removed from design. Motor rating is unchanged. 5. Several valves located in system contain multiple limit switches. 6. Siemens is providing an Ametek/Dixson B1W71P for temperature indicator 2-TIS-46-59 thru 66. Unit 1 uses an Ametek/Dixson BW051P. 7. Siemens is providing a Bosch Rexroth 4WE10-series solenoid valve to replace the Racine OD4-series solenoid valve. Unit 1 uses the Racine model. Valves affected are 2-FSV-46-15A, 15B, 16A, 16B, 43A, 43B, 44A, and 44B. 8. Siemens is providing a Measurement Specialties IEM-422 to replace the Polyphase model T1D3273-1. Unit 1 uses the Polyphase model. Devices affected are 2-ZM-46-13A, 13B; 40A, 40B. 9. The replacement items for 2-ST-46-20A and 20B perform the function of the old 2-ST-46-20A and 20B as well as the functions of 2-SS-46-20A and 2-SS-46-20B. 2-SE-46-20B and 20E are not connected to the ST and designated as spare now. The new ST is a AI-Tek Instruments model TACHPAK 30. The new SE is a AI-Tek Instruments model RH1612-005. Unit 1 uses Airpax models. 10. Siemens is providing a Bosch Rexroth 081WV10P1V1001KAS230/00E51 to replace the Racine model OD4-FNKS-02S. Unit 1 uses the Racine model. Valves affected are 2-FSV-46-3B, 3D, 29B, 29D. 11. Siemens is providing a Magnetrol model B15-1H3C-BOB level switch to replace the Magnetrol A-153-F. Unit 1 uses the Magnetrol A-153-F. Level switches affected 2-LS-46-6A/B, 6B/A, 32A/B, 32B/A. 12. Relays installed in 2-L-275 and 2-L-276 on Unit 2 will be Allen Bradley models, Unit 1 uses Cutler Hammer relays. 13. Since Siemens will install valves from a different vendor than Unit 1, there will be a unit difference for the following valves: 2-FCV-046-0015D, 2-MVOP-046-0043D, 2-FCV-046-0043D, and 2-MVOP-046-0043D. Unit 1 currently utilizes Racine 2-way valves, and Unit 2 will operate with Moog 2-way valves controlled by Sun Hydraulics operators. The valves will function in the same manner and will not require drawing changes. 14. Isolation valves for IPI-46-5001 through 5010, and the isolation valves for the pressure indicators on the rear of Panels 2-L-275 and 276 are now Swagelok SS-43GS6. Unit 1 uses a SS-43S6 for the IPI isolation valves and a Siemens supplied carbon steel valve for the L275 and L276 valves. 15. Pressure switches on the rear of 1-L-275 and 276 and PS-46-70 and 71 are United Electric J300-series switches on Unit 1. These switches are obsolete and are replaced by the appropriate J400-series United Electric pressure switch. They function in the same manner as their Unit 1 counterparts.

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WATTS BAR NUCLEAR PLANT, UNIT 2
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Item No.	EDCR No.	Title	Design Difference
84.	53462	Steam Generator Blowdown System Changes	<p>This EDCR is to remove the Flash Tank Pumps, installs flanges and close valves.</p> <p>Unit differences are as follows:</p> <p>This EDCR removes the flash tank pumps, components related to the flash tank pumps, and power going to the flash tank pumps in Unit 2. Unit 1 has closed valves to abandon the flash tank pumps. Unit 1 has power going to the abandoned flash tank pumps.</p>
85.	53478	Generator Cooling System	<p>The scope of this EDCR is to incorporate Unit 1 historic design changes into Unit 2 for Generator Cooling System.</p> <p>Unit differences are as follows:</p> <ol style="list-style-type: none"> 1. The sight glass will be installed on the west end of the drain tank such that it faces the walkway instead of the condenser. This will be different from the placement of the Unit 1 sight glass since the seal oil skids are not a left hand/right hand configuration between Unit 1 and Unit 2. However, placing the sight glass on the west end of the drain tank will match the operational visibility of the Unit 1 sight glass. 2. Physical access to the sight glass will be different due to the different location on the Unit 2 seal oil skid. The vent line connection from 2-RTV-035-0243A2 will be a different combination of ½ inch pipe and ¾ inch pipe compared to the Unit 1 vent line. There will be a threaded union added to the vent line above 2-RTV-035-0243A2 to facilitate maintenance that is not used in the Unit 1 piping.

**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
86.	53537	Component Cooling Water System Changes	<p>This EDCR is to complete the remaining work identified on Component Cooling Water System. Unit differences are as follows:</p> <p>Valves 2-RFV-70-683A, 2-RFV-70-683D, 2-RFV-70-561B, 2-RFV-70-556B, and 2-RFV-70-565A are being procured as new flanged valves. Unit 1 has S/W valves with flanges on the supply and exit piping for 1-RFV-70-561B and 1-RFV-70-565A to allow for removal for maintenance and has S/W valves without flanges installed on the pipe for 1-RFV-70-683A and 1-RFV-70-683D, 1-RFV-70-683A, and 1-RFV-70-683D were mentioned in Unit 1 DCN 50949. This DCN installed flanges on the pipe for 1-RFV-70-683B and 1-RFV-70-683C but mentioned that 1-RFV-70-683A and 1-RFV-70-683D would be worked at a later date due to the requirement for piping changes to install the flanges. As of the issuance of this EDCR (53537), Unit 1 valves, 1-RFV-70-683A and 1-RFV-70-683D have not been reworked and still require the cutting of an ASME weld to perform maintenance. The corresponding Unit 2 valves will be flanged. The original valves are also obsolete so replacement valves with the same function from the same manufacturer have been used.</p> <p>New solenoid valve 2-FSV-70-85-B and Conduit Seal Case 2-CSC-70-85-B will differ from its Unit 1 counterpart in that the FSV uses a viton elastomer for optimal performance instead of ethylene-propylene (ethylene-propylene holds up better to radiation, but the environment doesn't experience enough to justify its use) and will possess 20 ft cable pigtails instead of 1.5 ft. This EDCR installs and connect new Zone Switches 2-ZS-70-85A-B and 2-ZS-70-85B-B, and Conduit Seal Connections 2-CSC-70-85A-B and 2-CSC-70-85B-B, which will differ from their Unit 1 counterparts in that the CSCs will be integral to the ZSs instead of separate components. The latter are obsolete.</p> <p>The Safety Injection Pump 2A-A and 2B-B oil cooler relief valves 2-RFV-70-561A and 2-RFV-70-561B are to have the exits routed through spare Penetration A0225AM and dumped into the floor in the SI Pump 2A-A room. These valves are in the general floor area in the Aux. Building on elevation 692 where no floor drain is present. Unit 1 routes the exit of each relief valve back into its respective room through its own penetration. Neither the function of the relief valves, nor the maintenance necessitates the drilling of a new penetration in the 2B-B room to match the Unit 1 configuration. This EDCR installs a replacement valve for 2-CKV-70-679. Unit 1 originally requested valve Walworth 5341WE, but received and installed an Atwood & Morrill 14735-01. Both the Walworth and Atwood & Morrill valves are available, but cannot be furnished in an acceptable amount of time. An Anchor Darling valve will be procured as the replacement and is technically acceptable.</p> <p>Positioner 2-POS-70-192 will be a Masonellan model 4701E positioner instead of a Masonellan model 8012. The positioner will have a 4-20mA input provided from Foxboro I/A instead of a 10-50mA input. The latter of which being what the current model 8012 device is constructed to utilize and which its Unit 1 counterpart is currently utilizing. Rather than refurbishing and re-tooling the existing device, the positioner will be replaced.</p> <p>Valves, 2-CKV-70-676A and 2-CKV-70-676B are missing their internals. The exact internals are no longer available; however, the model number of the valve is still available. The replacement performs the same function, with the same end-to-end dimension.</p>

**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
87.	53578	Instrument Panel Changes	<p>This EDCR performs instrument line inspections and instrument installations for Local Panel 2-L-27. Unit differences are as follows: This change approves the completion of Local Panel 2-L-27 and the replacement of missing/damaged instrumentation from the process pipe root valve to the panel. The affected systems are chemical volume and control and essential raw cooling water. Pressure transmitters, flow transmitters, and a temperature modifier will be replaced with models that have a 4-20 MA output range. The associated Unit 1 Instruments are similar in design except they have a 10-50 MA output range. Although the model numbers for the new instruments are different than their Unit 1 counterparts, they will be similar in design -and operation and will perform the same function. The panels and sense line routing is similar to Unit 1. The design for the new equipment is contained in this EDCR.</p>
88.	53580	Safety Injection System Changes	<p>This EDCR is to complete the remaining work identified on Safety Injection System. Unit differences are as follows:</p> <ol style="list-style-type: none"> 1. The bonnet overpressure line and its connecting drain line will be different from Unit 1 In that the valves make and model will be different. Valve type and function will be the same. New stellite free valves will be installed In the positions of 2-ISV-063-0172 and 2-ISV-063-0518. This is important as flow passes through these valve positions into the main process line that feeds hot legs 1 and 3. The existing stellite containing valve currently in the position of 2-ISV-063-0518 will be moved to the end of the drainage line becoming 2-DRV-063-0691A. The valve currently used for 2-DRV-063-0691 will retain that unique identifier. This ensures that flow that goes through Hot Legs 1 and 3 will pass through only stellite free valves. 2. Local control station for 2-MTR-62-108-A (2-HS-62-108B-A) is being disconnected and will not be used. This switch is located in Junction box 2-JB-292-1191-A on elevation 692 near A12 and T line. This switch removal was recommended in the Appendix R evaluation and is identified as resolution no. 5673. 3. This change authorizes the replacement of existing Boric Acid flow measuring instrumentation 2-FM-062-0139A with a Krohne MFC 300 F Converter/Transmitter 2-FT-062-0139, Unit 2 loop provides 4-20 mA to the Foxboro I/A System and Unit 1 loop provides a frequency pulse to a discrete controller. 4. In repositioning flow element 2-FE-063-0075, root valves 2-RTV-063-0347A and -0348A are being removed; therefore, the instrumentation on panel 2-PNL-276-554 will share existing root valves 2-RTV-063-0345A and 2-RTV-063-0346A. The sensing line connections at the header of local panel 2-PNL-276-554 will be reworked since two of the original four root valves and their two associated sensing lines will be removed. This will allow a simpler valve arrangement at the flow element and will allow both 2-FI-063-0075 and 2-FI-063-0076 to still receive a signal. Both of these flow Indicators are located on local panel 2-PNL-063-D075. 5. Unit 1 retains a four root valve/four sensing line arrangement. Reducing the number of root valves at the flow element from four to two does not compromise the accuracy or other significant characteristic of the Unit 2 flow indicators since they will receive the same signal as they would under a four root valve arrangement. This difference has been evaluated in Attachment 1, the Technical Evaluation. 6. On Unit 1, isolation valves, 1-ISV-063-0430, 1-ISV-063-0431, 1-ISV-063-0432, 1-ISV-063-0433, 1-ISV-063-0434, 1-ISV-063-0435, 1-ISV-063-0436, 1-ISV-063-0437, 1-ISV-063-0438, 1-ISV-063-0439, 1-ISV-063-0440, and 1-ISV-063-0441 were procured as TVA Class B valves though some were used in Class G areas. This was recognized in the work scope of DCN 51818, and was justified with the goal of allowing these valves to be installed in either Class G or Class B areas. On Unit 2, these will be procured to the classification specified by the flow diagram, either Class G or Class B respectively.

**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
			<p>The scope of this EDCR is to incorporate Unit 1 historic design changes and field configuration discrepancies into Unit 2 for the raw cooling water system changes in the Turbine Building.</p> <p>Unit differences are as follows:</p> <ol style="list-style-type: none"> 1. The temperature control valves, including several Unit 2 components are being replaced with stainless steel. The installation of stainless steel in these Unit 2 areas will require less maintenance from pipe degradation due to MIC. 2. Temperature control valves (2-TCV-24-41, 2-TCV~24-48, 2-TCV-24-56A, 2-TCV-24-56B) including their actuators and positioners, have new models with different part numbers from the current Unit 1 valves. 3. Lastly, isolation gate valve (2-ISV-24-688) has a different pressure rating and different weld type than Unit 1. 4. The following components have been upgraded on Unit 2 to 4~20mA because of the Foxboro IA upgrade on Unit 2. Unit 1 currently still uses a 10-50 mA signal. <ol style="list-style-type: none"> a. This EDCR installs Moore industries (TCT) Thermocouple Transmitters where Unit 1 currently has Transmation 611-T-T Thermocouple Transmitters. The replacement instrument performs the exact same function as the original. b. This EDCR installs ITT Conoflow GT 28 I/P. Unit 1 currently uses Masonelian 8005N, Foxboro 69TA-1, or ITT Conoflow GT25 I/Ps. The replacement instrument performs the exact same function as the original. c. EDCR 53585 installs Moore Industries SPT transmitter with a Moore Industries RTD (WSPT-TB6). Unit 1 currently uses Foxboro M/694A-OAN Temperature Transmitter along with the Foxboro RTD (DB-13V-227W). The replacement instruments perform the exact same function as the original. d. The PREGs which are replaced by a different manufacturer and model number than what is installed on Unit 1. 5. Control air is supplied to new field panel WBN-2-PNL-276-L920 to provide air to WBN-2-TM-24-4-B. 6. Valve 2-FCV-024-0191 will be a different model than the equivalent Unit 1 valve. The new Unit 2 valve is a butterfly valve with wafer style connections and the Unit 1 valve is a butterfly valve with lug style connections. All other attributes of the two valves are equivalent. The different model valve was selected in order to support the WBN2 construction schedule. <p>This EDCR incorporates WBN 1 DCNs 36588, 21401, system walkdown information ,Boron Injection Tanks and Refurbishment Group manipulation test information for completion of WBN Unit 2 Containment Spray System</p> <p>Unit differences are as follows:</p>
90.	53590	Containment Spray System Changes	<p>Valve, 2-VTV-072-0515, will be replaced with an Anchor Darling 1878 Darling series or equal and the equivalent. Unit 1 valve is a Kerotest metal diaphragm valve.</p> <p>Valves, 2-DRV-072-D538 and -0539, are being replaced with valves that have been removed from other locations in Unit 2. The replacement valves are an equivalent design and meet the requirements of ASME Section Class 1. The equivalent Unit 1 valves are ASME Section III Class 2 and the design for Unit 2 is consistent with Unit 1 in requiring ASME Section III Class 2. It is acceptable to use a Class 1 valve in a Class 2 application.</p>

**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
91.	53591	Completion of Local Instrument Panels for Control Air, Chemical and Volume Control, and Component Cooling Water Systems	<p>This EDCR will install and inspect instrument lines and instrument installation for Local Panels 2-L-335, 2-L-349/A and 2-L-349/B. This change approves the completion of Local Panel 2-L-335, 2-L-349/A, 2-L-349B, and the replacement of missing/damaged instrumentation from the process pipe root valve to the panel. The affected systems are control air, chemical volume and control, and component cooling.</p> <p>Unit differences are as follows:</p> <p>Flow transmitters, flow modifiers, and temperature modifiers will be replaced with models that have a 4-20 MA output range. The associated Unit 1 instruments are similar in design except they have a 10-50 MA output range. Although the model numbers for the new instruments are different than their Unit 1 counterparts, they will be similar in design and operation and will perform the same function. The panels and sense line routing is similar to Unit 1.</p>
92.	53592	Completion of Local Instrument Panel for Waste Disposal System	<p>This EDCR will install and inspect instrument lines and instrument installation for Local Panels 2-L-190.</p> <p>Unit differences are as follows:</p> <p>The replacement instrumentation will be of the same design and function as the original. A Rosemount model 1152 series transmitter will replace the obsolete transmitter (2-PT-77-2) and an ITT Conoflow model will replace the existing flow modifier (2-FM-63-65). A Fisher 67 series model will replace the existing pressure regulator (2-PREG-63-65A), 2-PI-775 and 2-PI-77-8 will be replaced with a similar pressure indicators, capillary, and diaphragm seals using the same manufacturer (Ametek U.S. Gauge). This replacement equipment will be calibrated in accordance with the referenced vendor instructions.</p>
93.	53593	Completion of Local Instrument Panels for Chemical Volume and Control and Safety Injection Systems	<p>This EDCR will install and inspect instrument lines and instrument installation for local panels 2-L-135, 2-L-153.</p> <p>Unit differences are as follows:</p> <p>The local panels and sense line routing is similar to Unit 1. This EDCR does not affect system logic or function features. The replacement instrumentation will be of the same design and function as the original. Instruments 2-PdIS-62-96 and -97 will be replaced with the ITT Barton 288 series. Instruments 2-TM-63-131 and 2-TM-63-132 will be replaced with the Moore Industries TCT series. Instrument 2-LM-62-118 will be replaced with the Conoflow GT25 series. The following instruments 2-PI-62-116, 2-PI-62-117, and 2-PI-62-235 will remain as originally supplied. The replacement switches and modifiers are selected: 1) to resolve obsolescence replacement, 2) to provide proven performance, and 3) to provide manufacturer standardization. The above described replacement equipment is typically used throughout the plant. Maintenance activities associated with the replacement equipment will be in accordance with reference vendor manual instruction and the maintenance work performed to be similar to that of the originally supplied instruments.</p>

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Item No.	EDCR No.	Title	Design Difference
94.	53594	Completion of Local Instrument Panels for Chemical Volume and Control System	<p>This EDCR provides for the complete installation/inspection of the specified local panels and associated equipment located in the Auxiliary Building. The local panels covered by this change are 2-L-43 and 2-L-46.</p> <p>Unit differences are as follows:</p> <p>This change replaces transmitters which have a 10-50 mA DC output with Rosemount Model 1152/3051 series, which have a 4-20 mA DC output. 2-FM-62-140 is being replaced by ITT Conoflow I/P model GT25CD1826. 2-TM-70-154 is replaced by Moore Industries mV/1 temperature modifier. The function and setpoints of the associated instrument loops are not affected by this EDCR. The local panel location and sense line routing is similar to Unit 1. This EDCR does not affect system logic or functional features. The replacement instrumentation will function as the original. The design for the new equipment is contained in this EDCR. Also, 2-RTV-62-356A is replaced with Anchor Darling Model 1878-series. This root valve meets design pressure temperature ratings and seismic qualification requirements.</p> <p>This EDCR will install and inspect instrument lines and instrument installation for local panels 2-L-187, 2-L-256, 2-L-418, and 2-L-419.</p> <p>Unit differences are as follows:</p> <p>Temperature Indicating Switch, 2-TIS-61-99, will be replaced with a Foxboro 43EP series switch. The local panels and sense line routing is similar to Unit 1. This EDCR does not affect system logic or function features. The replacement instrumentation will function as the original.</p> <p>This EDCR will install and inspect instrument lines and instrument installation for local panel 2-L-136.</p>
95.	53596	Completion of Local Instrument Panels for the Ice Condenser System	<p>Unit differences are as follows:</p> <p>Temperature Indicating Switch, 2-TIS-61-99, will be replaced with a Foxboro 43EP series switch. The local panels and sense line routing is similar to Unit 1. This EDCR does not affect system logic or function features. The replacement instrumentation will function as the original.</p> <p>This EDCR will install and inspect instrument lines and instrument installation for local panel 2-L-136.</p>
96.	53597	Completion of Local Instrument Panel for the Safety Injection and Component Cooling Water Systems	<p>Unit differences are as follows:</p> <p>This change authorizes the installations and replacement of transmitters, pressure switches, and a pressure indicating controller. Specifically, 2-FT-70-147 is replaced with a (4-20 mA) Rosemount 3051-series transmitter where the Unit 1 transmitter, 1-FT-70-147, will remain a (10-50 mA) Rosemount 1152-series. 2-FT-70-148 is replaced with a (4-20 mA) Rosemount 3051-series transmitter where the Unit 1 transmitter, 1-FT-70-148, will remain a (10-50 mA) General Electric 555. 2-PT-63-18 is replaced with a (4-20 mA) Rosemount-3051 series transmitter where the Unit 1 transmitter, 1-PT-63-18, uses a Robert Shaw transmitter. 2-PT-63-149 is replaced with a (4-20 mA) Rosemount 3051-series transmitter where the Unit 1 transmitter, 1-PT-63-149, will remain a (10-50 mA) Rosemount 1152-series. This EDCR does not affect system functional or logic features.</p>

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Item No.	EDCR No.	Title	Design Difference
97.	53598	Completion of Local Instrument Panels for Chemical Volume and Control System	<p>This EDCR will install and inspect instrument lines and instrument installation for local panels 2-L-574, 2-L-578, 2-L-598 and 2-L-599.</p> <p>Unit differences are as follows:</p> <p>Obsolete pressure transmitters are being replaced with Rosemount 1152 series. The local panels and sense line routing is similar to Unit 1. This EDCR does not affect system logic or function features. The replacement instrumentation will function as the original. Also, root valve 2-RTV-62-313A is replaced with Anchor Darling Model 1878 series. These root valves meet design pressure/temperature ratings and seismic qualification requirements. There are no flow requirements for sense lines applications.</p>
98.	53606	Completion of Local Instrument Panels for Auxiliary Feedwater System	<p>This EDCR will install and inspect instrument lines and instrument installation for local panels 2-L-216, 2-L-357, 2-L-548, and 2-L-654.</p> <p>Unit differences are as follows:</p> <p>This change authorizes the installations and replacement of transmitters. Specifically, transmitters 2-FT-1-152, -156, -160, and -164 and 2-FT-3-163A, -163B, -170A, and -107B are replaced with a (4-20 mA) versions. These transmitters will meet and exceed Unit 1 performance requirements. The associated sense line routing and panel location will be similar (but not exact) to Unit 1 configuration. In summary, the design of this EDCR package meets quality requirements and performance requirements as specified in design basis documents.</p>

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Item No.	EDCR No.	Title	Design Difference
99.	53607	Completion of Local Instrument Panels for the Main Steam System	<p>This EDCR will install and inspect instrument lines and instrument installation for local panels 2-L-102, 2-L-196, 2-L-197, 2-L-250, 2-L-251, 2-L-169, and 2-L-940.</p> <p>Unit differences are as follows:</p> <p>This change authorizes the installations and replacement of main steam loops 1 and 4 pressure transmitters and a steam flow transmitter. Specifically, transmitters, 2-PT-1-1C, 2-PT-1-2B, 2-PT-1-5, 2-PT-1-6, 2-PT-1-26C, 2-PT-1-27A, 2-PT-1-27B, 2-PT-1-30, and 2-PT-1-31; 2-FT-1-17 are replaced with a (4-20 mA) versions. These transmitters will meet and exceed Unit 1 performance requirements. The associated sense line routing and panel location will not be similar to the Unit 1 configuration. Transmitters, 2-PT-1-1C, 2-PT-1-2A, 2-PT-1-26C and 2-PT-1-27A, will remain on elevation 713 on local panel 2-L-196. However, due to Appendix R separation requirements, pressure transmitters 2-PT-1-5, 2-PT-1-6, 2-PT-1-30, and 2-PT-1-31 (2-L-102) will be relocated on Auxiliary Building elevation 737 and pressure transmitters 2-PT-1-2B and 2-PT-1-27B (new panel 2-L-940) will be located to Auxiliary Building elevation 692. Auxiliary Building elevation 692 is an Essentially Mild environment; therefore, 10 CFR 50.49 environment qualification is not required for pressure transmitters 2-PT-1-28 and 2-PT-1-27B. Transmitter relocations will not impact transmitter range or performance. The new transmitter locations are easily accessible by maintenance and operations personnel. Pressure switches 2-PS-1-6 and -31 are removed by EDCR 54986-A, and placed in the Foxboro I/A process control system.</p> <p>In summary, the design of this EDCR package meets quality requirements, environmental qualification requirements, and performance requirements as specified in design basis documents.</p>
100.	53610	Completion of Local Instrument Panel for the Component Cooling Water System	<p>This EDCR will install and inspect instrument lines and instrument and component installation for local panel 2-L-575.</p> <p>Unit differences are as follows:</p> <p>This change authorizes the installation and replacement of transmitters. Specifically, transmitters, 2-FT-70-215A and 2-FT-70-215B are replaced with (4-20 mA) Rosemount 1153 D series transmitters compared to the (10-50 mA) transmitters in Unit 1. These transmitters will meet and exceed Unit 1 performance requirements. The associated sense line routing and panel location will be similar (but not exact) to Unit 1 configuration. The design of this EDCR package meets quality and performance requirements as specified in design basis documents.</p>

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Item No.	EDCR No.	Title	Design Difference
101.	53611	Completion of Local Instrument Panels for the Safety Injection and Component Cooling Water Systems	<p>This EDCR will install and inspect instrument lines and instrument installation for local panels 2-L-174, 2-L-175A, 2-176, and 2-L-177</p> <p>Unit differences are as follows:</p> <p>This change authorizes the completion of local panel installations and replacement of missing/damaged instrumentation. The missing / damaged pressure transmitters (2-PT-63-86, 2-PT-63-83C, 2-PT-63-88, and 2-PT-63-62) are being replaced with Rosemount that output a 4-20 mA signal. The Unit 1 counterparts, (1-PT-63-83C, 1-PT-63-88, and 1-PT-63-62), use Foxboro transmitters that output a 10-50 mA signal. The missing / damaged flow transmitters (2-FT-70-124, 2-FT-70-125, and 2-FT-70-128) are being replaced with Rosemount 1152-series transmitters that output a 4-20 mA signal. The Unit 1 counterparts (1-FT-70-124, 2-FT-70-125, and 2-FT-70-128) use Foxboro transmitters that output a 10-50 mA signal. This EDCR does not affect system functional or logic features.</p>
102.	53612	Completion of Local Instrument Panels for the Safety Injection and Chemical and Volume Control Systems	<p>This EDCR will install and inspect instrument lines and instrument installation for local panels 2-L-170A, 2-L-171, 2-L-172A, and 2-L-173.</p> <p>Unit differences are as follows:</p> <p>This change authorizes the completion of local panel installations and replacement of missing/damaged instrumentation. The missing / damaged pressure transmitters (2-PT-63-120C, 2-PT-63-126, 2-PT-63-128, 2-PT-63-102C, 2-PT-63-106, and 2-PT-63-108) are being replaced with Rosemount 1152-series transmitters with 4-20 mA output. Unit 1 transmitters (1-PT-63-120C, 1-PT-63-126, 1-PT-63-128, 1-PT-63-102C, 1-PT-63-106, and 1-PT-63-108) are Foxboro transmitters with 10-50mA output. The missing/damaged flow modifier (2-FM-62-56) is being replaced with a Conoflow GT-25 series transducer. The Unit 1 flow modifier (1-FM-62-56) uses a Fisher flow modifier. This EDCR does not affect system functional or logic features.</p>

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Item No.	EDCR No.	Title	Design Difference
103.	53613	Completion of Local Instrument Panels for the Reactor Coolant System	<p>This EDCR will install/verify the installation of instrument panels, 2-L-134, 2-L-366 and 2-L-351B, connection A1 and P1 only, and their associated instruments and instruments lines, in accordance with applicable drawings and procedures.</p> <p>Unit differences are as follows:</p> <p>This change authorizes the installation and replacement of transmitters, pressure modifiers, temperature modifiers and associated equipment. Specifically, 2-PT-68-301 and 2-PT-68-311C will be replaced with Rosemount 1152-series transmitters which will differ from the ITT Barton 763 transmitters used in Unit 1. The new transmitters are better than the Barton transmitters because they can be set to different values when necessary while the Barton transmitters cannot. 2-L-T-68-300 and 2-L-T-68-312C will be replaced with Rosemount 1154DP-series transmitters which are a LOCA qualified version of the commercial grade 1151 DP Rosemount transmitters used in Unit 1. 2-PM-68-340H will be replaced with a Fisher Controls 546. In addition, the PM and its associated equipment will be relocated from inside the crane wall to outside. This will allow for it be accessed while the plant is in operation. Finally, 2-TM-68-1C, 2-TM-68-24C, 2-TM-68-43C, and 2-TM-68-65C are being replaced with Moore Industries TCT compared to the Transmation 3610T used in Unit 1. This equipment operates in a similar fashion to those used in Unit 1.</p>
104.	53614	Completion of Local Instrument Panels for the Reactor Coolant System	<p>This EDCR will install and inspect instrument lines and instrument installation for local panels 2-L-358, 2-L-360 and 2-L-361.</p> <p>Unit differences are as follows:</p> <p>Transmitter PT-68-66 is being replaced by Rosemount Model 1154GP9RC to eliminate obsolescence issues and convert the loop from 10-50mA to 4-20 mA output. Unit 1 uses a Foxboro Model E11GH. Design pressure is unchanged at 3000 PSI.</p> <p>Pressure switch PS-68-66A will be replaced with an SOR Model 9N6 series switch. This replacement equipment will be calibrated in accordance with referenced vendor instructions.</p> <p>These items are replaced with industry standard equipment that meets the form, fit, function and engineering requirements of the intended design. There are no systems or functional changes. These differences do not impact system descriptions or licensing based documents.</p>

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Item No.	EDCR No.	Title	Design Difference
105.	53615	Completion of Local Instrument Panels for the Auxiliary Feedwater System	<p>This EDCR will install and inspect instrument lines and instrument-installation for local panels 2-L-215, 2-L-385, 2-L-431, 2-L-432, and 2-L-915.</p> <p>Unit differences are as follows:</p> <p>This change authorizes the installations and replacement of transmitters, pressure switches, and a pressure indicating controller. Specifically, 2-FT-3-142 is replaced with a (4-20 mA) Rosemount 1152 transmitter and the Unit 1 transmitter, 1-FT-3-142, is a (10-50 mA) Rosemount 1152-series. 2-PT-3-135 is replaced with a (4-20 mA) Rosemount transmitter and the Unit 1 transmitter, 1-PT-3-135, uses a General Electric transmitter. Root valve, 2-RTV-3-321A will be spared, with 2-RTV-3-371A used as a replacement. This EDCR does not affect system functional or logic features.</p>
106.	53616	Completion of Local Instrument Panels for the Component Cooling Water and HVAC Systems	<p>This EDCR will install and inspect instrument lines and instrument and component installation for local panels 2-L-289, 2-L-290, 2-L-292, 2-L-293.</p> <p>Unit differences are as follows:</p> <p>This change authorizes the installation and replacement of transmitters, flow indicator switch, and temperature indicators. Specifically, 2-FT-70-81A, 2-FT-70-81B, 2-FT-70-81D, and 2-FT-70-81E are replaced with (4-20 mA) Rosemount 1152 transmitters. The replacement flow indicator switch, 2-FIS-70-81, is an ITT-Barton 288 series. The temperature indicators, 2-TI-31-300 and 2-TI-31-333, are being replaced with Johnson Controls model number T-2100-204. These instruments will meet and exceed Unit 1 performance requirements. The associated sense line routing and panel location will be similar (but not exact) to Unit 1 configuration. In summary, the design of this EDCR package meets quality and performance requirements as specified in design basis documents.</p>
107.	53617	Completion of Local Instrument Panels for the HVAC System	<p>This EDCR will install and inspect instrument lines and instrument installation for local panels 2-L-433 and 2-L-474.</p> <p>Unit differences are as follows:</p> <p>This change authorizes the completion of local installations and replacement of missing/damaged instrumentation. Instrument 2-PdIT-30-133 and 2-PdIT-30-30C will be replaced with the Rosemount 1152DP series. Instrument 2-PdIT-30-128 with the 1153DD series, Instrument 2-PdIT-30-127 with the 1152DP series. The local panels and sense line routing is similar to Unit 1. This replacement does not affect system logic or function features and will function as the original.</p>

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Item No.	EDCR No.	Title	Design Difference
108.	53618	Completion of Local Instrument Panels for the Component Cooling Water and Residual Heat Removal Systems	<p>This EDCR will install and inspect instrument lines and instrument installation for local panels 2-L-12, 2-L-5, 2-L-13, 2-L-22.</p> <p>Unit differences are as follows:</p> <p>Pressure Transmitters, 2-PT-74-13 and 2-PT-74-28, will be replaced with the Rosemount 3051ND series. Flow Transmitters, 2-FT-70-151 and 2-FT-70-152, will be replaced with the Rosemount 3051ND series. Pressure Indicators, 2-PI-74-6 and 2-PI-74-18, will be replaced with ASHCROFT 1377-series. Instruments 2-TM-74-38C and 2-TM-74-40C will be replaced with the Moore TCT series. Flow Indicating Switches, 2-FIS-74-12 and 2-FIS-74-1-24 will be replaced with an indicator (2-FI-74-12 and 2-FI-74-24) and separated switches for the high/low (2-FS-74-12A, 2-FS-74-12B, 2-FS-74-24A, and 2-FS-74-24B). These instruments are used throughout the plant and the maintenance difference will be three calibrations to do instead of one. The following instruments 2-PI-74-22, 2-PI-74-4, 2-TIS-74-7, 2-TIS-74-19 will remain as originally supplied. The replacement transmitter/switch/modifier is selected: 1.) to resolve obsolescence issues, 2.) to provide proven performance, and 3.) to provide manufacturer standardization. The above described replacement equipment is typically used throughout the plant Maintenance activities associated with the replacement equipment will be in accordance with reference vendor manual instruction and the maintenance work performed will be similar to that of the originally supplied instruments. Also, root valves 2-RTV-74-100A, 2-RTV-74-102A, 2-RTV-74-103A, 2-RTV-74-104A, 2-RTV-74-107A, 2-RTV-74-108A, 2-RTV-74-118A, and 2-RTV-74-111A are replaced with Anchor Darling Model 1878-series. These root valves meet design pressure/temperature ratings and seismic qualification requirements.</p>
109.	53619	Completion of Local Instrument Panels for the Component Cooling Water and Containment Spray Systems	<p>This EDCR will install and inspect instrument lines and instrument installation for local panels 2-L-15, 2-L-16 and sense line 2-SEN-072-0212A on local panel 2-L-13.</p> <p>Unit differences are as follows:</p> <p>This change authorizes the completion of local panel installations and replacement of missing/damaged instrumentation. Pressure Transmitters, 2-FT-70-150, 2-FT-72-18, 2-FT-70-149, and 2-PT-72-17, will be replaced with Rosemount 3051-series transmitters with 4-20 mA output. Unit 1 transmitters, 1-FT-70-150, 2-FT-72-18, 2-FT-70-149, and 2-PT-72-17, have a 10-50 mA output signal. This EDCR does not affect system functional or logic features.)</p>
110.	53620	Completion of Local Instrument Panel for the Safety Injection System	<p>This EDCR will install and inspect instrument lines and instrument installation for local panel 2-L-472.</p> <p>Unit differences are as follows:</p> <p>This change authorizes the completion of local panel installations and replacement of missing/damaged instrumentation. The missing/damaged flow transmitters (2-FT-63-20, 2-FT-63-151, and 2-FT-63-170) are being replaced with 1152-series transmitters with 4-20mA output. Unit 1 utilizes transmitters (1-FT-63-20, 1-FT-63-151, and 1-FT-63-170) with a 10-50mA output. This EDCR does not affect system functional or logic features.</p>

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Item No.	EDCR No.	Title	Design Difference
111.	53621	Completion of Local Instrument Panels for the Safety Injection System	<p>This EDCR provides for the complete inspection/installation of the specified local panels and associated equipment located at the Refueling Water Storage Tank. The local panels covered by this change are 2-L-344, 2-L-345, 2-L-352, 2-L-452, 2-L-453, 2-L-860 and 2-L-651.</p> <p>Unit differences are as follows:</p> <p>This change replaces Safety Injection System (System 63) transmitters which have a 10-50 mADC output with Rosemount Model 1152/1154 series, which have a 4-20 mADC output. The function and setpoints of the associated instrument loops are not affected by this EDCR. Level switch installation is essentially the same as Unit 1. The local panel location and sense line routing is similar to Unit 1. This EDCR does not affect system logic or functional features.</p>
112.	53622	Completion of Local Instrument Panels for the Chemical Volume and Control System	<p>This EDCR will install/verify the installation of instrument panels (2-L-353, 2-L-374A, 2-L-374B, 2-L-556, and 2-L-558) and their associated instruments and instrument lines, in accordance with applicable drawings and procedures.</p> <p>Unit differences are as follows:</p> <p>Pressure and flow I/P transducers 2-PM-62-81 an 2-FM-62-143 will be replaced with ITT Conoflow Model No. GT25CD1826 transducers which will differ from the Fisher Controls Model 546 transducers used in Unit 1. The new transducers are functionally identical to the Fisher Controls models currently installed in Unit 1.</p>
113.	53623	Completion of Local Instrument Panels for the Chemical Volume and Control System	<p>This EDCR will install and inspect instrument lines and instrument installation for local panels 2-L-207 and 2-L-268.</p> <p>Unit differences are as follows:</p> <p>Transmitters, 2-L-T-62-129A, 2-L-T-62-129C, 2-L-T-62-130A, and 2-L-T-62-130C will be replaced with Rosemount 1154DP-series transmitters (4-20mA) which will differ from the ITT Barton 763 transmitters (10-50mA) used in Unit 1. Transmitter 2-L-T-62-130 is being replaced with a 4-20 mA VX-252 indicator from Westinghouse instead of the 10-50 mA VX-252 used in Unit 1 to provide compatibility with Foxboro I/A. The associated sense line (capillary) routing and panel location will be similar (but not exact) to Unit 1 configuration. The design of this EDCR package meets quality and performance requirements as specified in design basis documents. Valve, 2-RTV-62-360A, from Kerotest will be replaced with an Anchor-Darling 1878 series due to Kerotest valves being obsolete.</p>

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114.	53624	Completion of Local Instrument Panel for the Chemical Volume and Control System	<p>This EDCR will install and inspect instrument lines and instrument and component installation for local panel 2-L-112.</p> <p>Unit differences are as follows:</p> <p>The associated sense line routing and panel location will be similar (but not exact) to Unit 1 configuration. The design of this EDCR package meets quality and performance requirements as specified in design basis documents.</p> <p>Transmitters/indicators, 2-PT-62-92A, 2-PT-62-92C, and 2-PT-62-106 will be replaced with those from different manufacturers.</p> <p>Obsolete Kerotest valves, 2-RTV-62-350A and 2-RTV-62-341A, will be replaced with Anchor-Darling 1878 series.</p> <p>Flow Modifier 2-FM-62-938 will be replaced with Conoflow GT25 series. Indicators 2-FI-62-938 & 2-PI-62-928 will be replaced with a Weschler VX-252 series.</p> <p>Instrument 2-HIC-62-93B, that Unit 2 has, is no longer produced by Foxboro and is being replaced the with a Foxboro PM960 model. In addition, an optional Pressure Switch to activate the Control Room Light when the HIC is in the "manual position" since the HIC no longer has electrical contacts on it to control this feature. Pressure switch 2-PS-62-93B is being added which is a SOR Model Number 4N6-B4-U8-C1A-RR. This addition does not change the functionality of the design but this will create a unit difference.</p>
115.	53629	Completion of Local Instrument Panels for the Safety Injection and Containment Spray Systems	<p>This change approves the completion of local panels, 2-L-55/A and 2-L-55/B, and the replacement of missing/damaged instrumentation from the process pipe root valves to the panels.</p> <p>Unit differences are as follows:</p> <p>The affected systems are Safety Injection (63) and Containment Spray (72). Flow transmitters will be replaced with models that have a 4-20 mA output range. The Unit 1 instruments are similar in design except they have a 10-50 mA output range. Although the model numbers for the new instruments are different than their Unit 1 counterparts, they will perform the same function. The panels and sense line routing are similar to Unit 1.</p> <p>Obsolete Kerotest valve, 2-RTV-72-204A, will be replaced with an Anchor Darling 1878 series or equal valve.</p>

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Item No.	EDCR No.	Title	Design Difference
116.	53630	Completion of Local Instrument Panels for the Essential Raw Cooling Water System	<p>This EDCR will install and verify the installation of instrument panels (2-L-26, Sections a, b, c, and d) and their associated instrument lines. This EDCR will also delete instrument panels (2-L-26, Sections e, f and g), in accordance with applicable drawings and procedures. Unit differences are as follows:</p> <p>The deletion of the Temperature Modifiers (MV/I convertor) and the replacement of the Electronic Controllers from Robertshaw 326-C3-C1 with Foxboro 743CB eliminates the need for the Temperature Modifiers. The new Foxboro 743CB Electronic Controllers will perform both functions. Therefore, this controller will require new Setpoint and Scaling Documents (SSDs).</p> <p>This EDCR will install and inspect instrument lines, instrument installation, and the replacement of missing/damaged instrumentation and associated root valves for local panels 2-L-108 and 2-L-137. Unit differences are as follows:</p>
117.	53632	Completion of Local Instrument Panels for the Primary Water Makeup and Chemical Volume and Control Systems	<p>Pressure gauges, 2-PI-81-6 and 2-PI-62-109, are replaced with Ashcroft Model 1377 and 1379-series. Pressure gauge, 2-PI-62-110, will be replaced with a US Gage with a range of 0-5000 psig. These replacement gauge ranges agrees with the ranges on Unit 1. Pressure transmitter, 2-PT-62-110, will be replaced with a Rosemount model 1152-series. Root valves 2-RTV-62-352A and 2-RTV-62-353A are replaced with Anchor Darling Model 1878-series valves.</p> <p>The replacement equipment meets operating parameters and nuclear qualification requirements. The design and configuration of the instrument lines is in compliance with applicable requirements of Project Specification N3E-934.</p> <p>This EDCR will install and verify the installation of local panels 2-L-559 and 2-L-264 and their associated instrument and instrument lines in accordance with applicable drawings and procedures.</p>
118.	53637	Completion of Local Instrument Panels for the Chemical Volume and Control System	<p>Unit differences are as follows:</p> <p>Transmitters 2-FT-62-23, 2-FT-62-24, 2-FT-62-36, 2-FT-62-37 are being replaced with Rosemount 1152 transmitters (4-20 mA) compared to the transmitters (10-50 mA) in Unit 1. The replacement transmitters will not be indicating compared to Unit 1 transmitters 1-FIT-62-24 and 1-FIT-62-37. The associated sense line routing and panel location will be similar (but not exact) to Unit 1 configuration.</p> <p>In addition, this EDCR deletes 4 root valves and replaces 5 root valves in the chemical volume and control system. The obsolete Kerotest root valves being deleted (2-RTV-62-422A, 2-RTV-62-425A, 2-RTV-62-428A, and 2-RTV-62-431A) will be removed since the present four root valve/sense line configuration from each flow element will be reduced to two sense line configuration by merging the 2 high-side lines and the two low-side lines. The two sense lines from each flow element will then be split off into four separate lines and isolation valves at the "top" of the local panel and routed to their respective instruments. The replacement valves will be Anchor-Darling 1878 series or equal.</p>

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Item No.	EDCR No.	Title	Design Difference
119.	53638	Completion of Local Instrument Panels for the Reactor Coolant System	<p>This EDCR will install and inspect instrument lines and instrument and component installation for local panels 2-L-226, 2-L-227, 2-L-228, 2-L-475, 2-L-476, 2-L-477, 2-L-478, 2-L-479, 2-L-480, 2-L-501, 2-L-502, and 2-L-503.</p> <p>Unit differences are as follows:</p> <p>Foxboro Model E13DH-HIH1 Flow Transmitters will be replaced by Rosemount 1154HH. The Rosemount transmitter meets environmental and seismic qualification requirements. Rosemount transmitters supply a 4-20ma output signal which is compatible with Eagle 21 Reactor Protection Control System.</p>
120.	53640	Completion of Local Instrument Panels for the Component Cooling System	<p>This EDCR will install and verify the installation of instrument panels (2-L-259, 2-L-299 and 2-L-515b) and their associated instrument lines in accordance with applicable drawings and procedures.</p> <p>Unit differences are as follows:</p> <p>Rosemount 1154-series and 3051 N-series transmitters will replace the obsolete transmitters. The local panels and sense line routing will be similar to Unit 1. This EDCR does not affect system logic or function features.</p>
121.	53642	Completion of Local Instrument Panels for the Safety Injection System	<p>This EDCR will install and inspect the installation sense lines and instruments for local panels 2-L-42, 2-L-107, and 2-L-369 in accordance with applicable drawings and procedures.</p> <p>Unit differences are as follows:</p> <p>This change installs current generation Rosemount transmitters which use 4-20 mA output in place of originally installed now obsolete transmitters which utilized 10-50 mA outputs. The associated sense line construction and routing will be similar to that on Unit 1 as will be the approximate panel locations and configurations.</p> <p>Other replaced instruments will be Westinghouse VX-252 indicators and Ashcroft gauges which are the same design as those on Unit 1. The Rosemount transmitters and the above indicators are commonly used throughout the industry. The function and configuration of the replaced instruments will be basically the same as on Unit 1 except for the differences caused by different manufacturer and calibration ranges.</p>

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Item No.	EDCR No.	Title	Design Difference
122.	53643	Completion of Local Instrument Panels for the Essential Raw Cooling Water System	<p>This EDCR will install and verify the installation of instrument panels (2-L-329, sections a and b, and 2-L-336, sections a and b) and their associated instrument and instrument lines in accordance with applicable drawings and procedures.</p> <p>Unit differences are as follows:</p> <p>Obsolete temperature Indicating controllers will be replaced with Foxboro 130M-N4. This EDCR does not affect system functional or logic features.</p>
123.	53644	Completion of Local Instrument Panel for the Chemical Volume and Control System	<p>This EDCR will install and inspect instrument lines and instrument installation for local panel 2-L-348A, B.</p> <p>Unit differences are as follows:</p> <p>Transmitters, 2-FT-62-1, 2-FT-62-14, 2-FT-62-27, and 2-FT-62-40 are being replaced with 4-20 mA versions supplied by Rosemount. The associated sense line routing and panel location will be similar to the Unit 1 configuration.</p>
124.	53645	Completion of Local Instrument Panel for the Component Cooling System	<p>This EDCR provides for the complete inspection/installation of local panels, 2-L-351A and 2-L-351B, and associated equipment located in the Reactor Building.</p> <p>This change replaces transmitters which have a 10-50 mADC output with Rosemount Model 1152 series, which have a 4-20 mADC output. The local panel location and sense line routing is similar to Unit 1. The function and setpoints of the associated instrument loops are not affected by this EDCR.</p>
125.	53646	Completion of Local Instrument Panel for the Component Cooling System	<p>This EDCR will install and verify the installation of instrument panels (2-L-24 and 2-L-291) and their associated instrument lines in accordance with applicable drawings and procedures.</p> <p>Unit differences are as follows:</p> <p>Flow transmitters are being replaced with Rosemount model versions and the temperature modifiers with Moore Industries TCT series. The local panels and sense line routing is similar to Unit 1. This EDCR does not affect system logic or function features. The replacement instrumentation will function as the original.</p>

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Item No.	EDCR No.	Title	Design Difference
126.	53676	Completion of Local Instrument Panels for the Chemical Volume and Control, and Component Cooling Systems	<p>This EDCR will install and verify the installation of instrument panels (2-L-271, 2-L-263, 2-L-560, and 2-L-561) and their associated instrument and instrument sense lines in accordance with applicable drawings and procedures.</p> <p>Unit differences are as follows:</p> <p>Transmitters 2-FT-62-10, 2-FT-62-11, 2-FT-62-49, 2-FT-62-50 and 2-PDT-70-117 are replaced with 4-20 mA versions. The associated sense line routing and panel location will be similar (but not exact) to Unit1 configuration.</p> <p>In addition, this EDCR deletes 4 root valves and replaces 3 root valves on Chemical Volume and Control System. The root valves being deleted (2-RTV-62-434A, 2-RTV-62-437A, 2-RTV-62-440A and 2-RTV-62-443A) will be deleted because the present four root valve/sense line configuration from each flow element will be reduced to two sense line configurations by merging the two high-side lines and the two low-side lines. The two sense lines from each flow element will then be split off into four separate lines and isolation valves at the tops of each of the local panels and routed to their respective instruments. The replacement root valves (2-RTV-062-438A, 2-RTV-062-439A and 2-RTV-062-441A) which are obsolete Kerotest valves will be replaced with Anchor-Darling 1878 series or equal.</p>
127.	53684	Completion of Local Instrument Panels for the Main Steam System	<p>This EDCR will install and inspect instrument lines and instruments for local panels 2-L-106, 2-L-194, 2-L-195 and 2-L-363. In addition, delete local instrument panels 2-L-252 and 2-L-253.</p> <p>Unit differences are as follows:</p> <p>This change authorizes the installations and replacement of main steam loops 2 and 3 pressure transmitters, and a steam flow transmitter. Specifically, transmitters, 2-PT-1-8C, 2-PT-1-9A, 2-PT-1-9B, 2-PT-1-12, 2-PT-1-13, 2-PT-1-19C, 2-PT-1-20A, 2-PT-1-20B, 2-PT-1-23, and 2-PT-1-24 are replaced with 4-20 mA versions. The associated sense line routing and panel location will not be similar to Unit1 configuration.</p> <p>Transmitters, 2-PT-1-8C, 2-PT-1-9A, 2-PT-1-19C and 2-PT-1-20A will be relocated to the Unit 2 Reactor Building (Annulus), local panel 2-L-194 due to Appendix R separation requirements. The required transmitter relocations will not impact transmitter range or performance.</p> <p>Pressure switches 2-PS-1-13 and 2-PS-1-24 are removed by this EDCR.</p>
128.	53685	Completion of Local Panel Installations	<p>The replacement Pressure Modifiers will be of the same function as the original. Pressure Modifiers will be replaced with Fisher modifiers. This replacement equipment will be calibrated in accordance with referenced vendor instructions. This unit difference is that the Pneumatic Manual Loading Stations and the associated Transfer Valves are being removed for Unit 2 operation. The pneumatic loading station is not required for normal operation.</p>

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LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
129.	53692	Various Equipment Changes on Listed Systems	<p>The scope of this EDCR is the following:</p> <ol style="list-style-type: none"> 1) Change setpoints on existing instruments, 2) Update master equipment list, 3) Update flow diagram, 4) Installs missing flow elements 2-FE-054-0040 through -0045 along with missing flanges and root valves 2-RTV-054-224A through 2-RTV-054-237A 5) Removes injection water alarm associated with No. 3 heater drain pumps 6) Valves 2-ISIV-054-0215C, 2-ISIV-054-0218C, 2-ISIV-054-0217C, 2-RTV-054-0215C, 2-ISIV-054-0216C, and 2-ISIV-054-0217C will be spared in place, 7) Instruments 2-PDIS-054-0020, 2-PDIS-054-0023, and 2-PDIS-054-0026 will be removed and placed in storage 8) Replace updated instruments, 9) Install isolation valves for pump instrumentation 10) Install threaded caps on test valves, 11) Adds temporary strainers to 2-PMP-054-0009A and 2-PMP-054-0009B, 12) Install missing root valves and pressure indicators on main feedwater pumps. <p>Unit differences are as follows:</p> <p>Instrument isolation valves (ISIVs) will be installed for No.3 Heater Drain Tank Pumps, Condensate Booster Pumps, and No. 7 Heater Drain Tank Pumps instruments.</p> <p>Specifically, ISIV valves, 2-ISIV-054-0020A, 2-ISIV-054-0020B, 2-ISIV-054-0021A, and 2-ISIV-054-0021B have been added to instrument lines for 2-PDI-054-0020, 2-PI-054-0021, and 2-PC-054-0021. ISIV valves have been added to allow maintenance to repair without taking No.3 Heater Drain Tank Pump "A" offline.</p> <p>ISIV valves, 2-ISIV-054-0023A, 2-ISIV-054-0023B, 2-ISIV-054-0524A, and 2-ISIV-054-524B have been added to Instrument lines for 2-PDI-054-0023, 2-PI-054-0024, and 2-PC-054-0024. ISIV valves have been added to allow maintenance to repair without taking No.3 heater Drain Tank Pump "B" offline.</p> <p>ISIV valves, 2-ISIV-054-0026A, 2-ISIV-054-0026B, 2-ISIV-054-0027A, and 2-ISIV-054-0027B have been added to Instrument lines for 2-PDI-054-0026, 2-PI-054-0027, and 2-PC-054-0027. ISIV valves have been added to allow maintenance to repair without taking No.3 heater Drain Tank Pump "C" offline.</p> <p>ISIV valves, 2-ISIV-054-0013A and 2-ISIV-054-0013B have been added to Instrument lines for 2-PI-054-0013 and 2-PC-054-0013. ISIV valves have been added to allow maintenance to repair without taking Condensate Booster Pump "A" offline.</p> <p>ISIV valves, 2-ISIV-054-0015A and 2-ISIV-054-0015B have been added to Instrument lines for 2-PI-054-0015 and 2-PC-054-</p>

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WATTS BAR NUCLEAR PLANT, UNIT 2
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Item No.	EDCR No.	Title	Design Difference
			<p>0015. ISIV valves have been added to allow maintenance to repair without taking Condensate Booster Pump "B" offline.</p> <p>ISIV valves, 2-ISIV-054-0018A and 2-ISIV-054-0018B have been added to instrument lines for 2-PI-054-0018 and 2-PC-054-0018. ISIV valves have been added to allow maintenance to repair without taking Condensate Booster Pump "C" offline.</p> <p>2-PS-054-0010A and 2-PS-054-0010B were replaced with SOR pressure switches but will operate identical to Unit 1 pressure switches.</p> <p>Unit 2 will not have local RONAN reflasher WBN-2-PDA-054-30 mounted in local panel L-81, but instead pressure switches WBN-2-PDIS-054-30 and 2-PDIS-054-32 will go directly to window 2B-35D.</p> <p>Pressure switches WBN-2-PS-054-10A and 10B are obsolete and will be replaced with SOR model 9N6-AA4-M4-C1A. A similar replacement was done for pressure switch WBN-2-PS-054-10D using the exact same model number.</p> <p>This EDCR will install required conduit and cables from various equipment and or cabinets to the annunciation panel (M21, M8, L115, and L122). Meters (2 each) will be added to panel 2-L-115A and 2-L-115B.</p> <p>Unit differences are as follows:</p> <p>The new meters are wired different from the Unit 1 meters. This does not represent a functional change to the circuit.</p> <p>This EDCR will replace equipment that is obsolete, install six vacuum breakers, nine flow control valves, and remove piping.</p> <p>Unit differences are as follows:</p>
130.	53699	Equipment Changes for the Control Rod Drive System	<p>1) Valves 2-FCV-014-0034, 2-FCV-014-0058 and 2-FCV-014-0067 with a RTFE seat and seal would be an acceptable replacement because it can withstand a temperature of 450 degrees F while the design temperature is 120 degrees F.</p> <p>2) Valve 2-FCV-014-0004 with a polyprop lining is an acceptable replacement because it can withstand a temperature of 200 degrees F while the design temperature is 120 degrees F.</p> <p>3) Valves 2-FCV-014-0020, 2-FCV-014-0023, 2-FCV-014-0025 and 2-FCV-014-0053 with PTFE packing are an acceptable replacement because PTFE can withstand a temperature of 350 degrees F while the design temperature is 120 degrees F</p> <p>4) Valves 2-RFV-014-0731, 2-RFV-014-0732, 2-RFV-014-0733, 2-RFV-014-0734, 2-RFV-014-0735, and 2-RFV-014-0736 are an acceptable replacement because the old valve had a required vacuum to open of 0.78" Hg and the one on the Warren was 0.75" Hg. The new valve has a stainless steel interior which comes in contact with the demineralized water. Stainless steel does not corrode unlike brass which was originally installed.</p>
131.	53740	Equipment Changes for the Condensate Demineralizer System	<p>1) Valves 2-FCV-014-0034, 2-FCV-014-0058 and 2-FCV-014-0067 with a RTFE seat and seal would be an acceptable replacement because it can withstand a temperature of 450 degrees F while the design temperature is 120 degrees F.</p> <p>2) Valve 2-FCV-014-0004 with a polyprop lining is an acceptable replacement because it can withstand a temperature of 200 degrees F while the design temperature is 120 degrees F.</p> <p>3) Valves 2-FCV-014-0020, 2-FCV-014-0023, 2-FCV-014-0025 and 2-FCV-014-0053 with PTFE packing are an acceptable replacement because PTFE can withstand a temperature of 350 degrees F while the design temperature is 120 degrees F</p> <p>4) Valves 2-RFV-014-0731, 2-RFV-014-0732, 2-RFV-014-0733, 2-RFV-014-0734, 2-RFV-014-0735, and 2-RFV-014-0736 are an acceptable replacement because the old valve had a required vacuum to open of 0.78" Hg and the one on the Warren was 0.75" Hg. The new valve has a stainless steel interior which comes in contact with the demineralized water. Stainless steel does not corrode unlike brass which was originally installed.</p>

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Item No.	EDCR No.	Title	Design Difference
132.	53763	Equipment Changes for the Heating, Ventilation, and Air Conditioning System	<p>The scope of this EDCR is to incorporate Unit 1 historic design changes into Unit 2, procure "missing" equipment and components, and carry-out modifications to the HVAC system.</p> <p>Unit differences are as follows:</p> <p>The Unit 1 Incore Instrument Room chillers have reciprocating compressors, use R-12 refrigerant, and have a capacity of 8.75 tons. The new Unit 2 Incore Instrument Room chillers have scroll compressors, use R-407C refrigerant, and have a capacity of 10 tons.</p>
133.	53764	Equipment Changes for the Heating, Ventilation, and Air Conditioning System	<p>The scope of this EDCR is to incorporate previous Unit 1 design changes into Unit 2, procure "missing" equipment and components, and carry-out modifications to the HVAC system.</p> <p>Unit differences are as follows:</p> <p>Changes made by this EDCR will repair and/or replace damaged equipment to make Unit 2 similar to Unit 1. The Unit 1, RFV's (1-RFV-31-3406, 1-RFV-31-3420, 1-RFV-31-3377, and 1-RFV-31-3391) are manufactured by Kunkle Valve Company. The replacement Unit 2 RFV's will be by Dresser-Consolidated (or equal).</p> <p>Orifice diameters for the H2 Header are slightly different as determined by calculation.</p> <p>The Containment Air Return Fan motors will be replaced on Unit 2. These Unit 2 motors will be functionally the same as those for Unit 1.</p>
134.	53765	Equipment Changes for the Heating, Ventilation, and Air Conditioning System	<p>The scope of this EDCR is to incorporate Unit 1 historic design changes into Unit 2, procure "missing" equipment and components, and carry-out modifications to the HVAC system.</p> <p>Unit differences are as follows:</p> <p>The dimension between the Turbine Building (TB) Cooler housing to the outermost point on the deflectors will be 3'-0". On Unit 1, this dimension was 3'-2". The clearance between the TB Cooler housing and the adjacent instrument rack to which the cooler's conduits and operating switches attach is approximately 1 inch further out on Unit 1 than Unit 2. The 3'-0" dimension for configuring the placement of the deflectors allows sufficient clearance for the modifications to be made on the Unit 2 TB Cooler and it will not have an effect on the overall functionality of the cooler.</p>

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Item No.	EDCR No.	Title	Design Difference
135.	53788	Equipment Changes for the Heating, Ventilation, and Air Conditioning System	<p>The scope of this EDCR is to incorporate Unit 1 historic design changes into Unit 2, Unit differences are as follows:</p> <p>Temperature Elements, 2-TE-030-1032A, 2-TE-030-1033A, 2-TE-030-1034A, and 2-TE-030-1035A, connect directly to computer system, no converters or isolation amplifiers are required. Temperature displays are on computer system, no indicators are required. Flow Transmitters, 2-FT-30-38 and 2-FT-30-39 were replaced by a junction box on Unit 1 but are being abandoned in place on Unit 2.</p>
136.	53809	Completion of Local Instrument Panel for the Emergency Gas Treatment System	<p>This EDCR will install and inspect instrument and instrument lines at Local Panels, 2-L-44 and 2-L-45 for EGTS loops 2-PD-65-80 and 2-PD-65-82.</p> <p>Unit differences are as follows:</p> <p>Transmitters 2-PDT-65-80 and 2-PDT-65-82 and transducers 2-PDM-65-80 and 2-PDT-65-82 are replaced with a 4-20 mA versions. Replacement of obsolete regulators 2-PREG-65-80, 2-PDT-65-80A, 2-PDT-65-82, and 2-PDT-65-89 was based on the review of models and manufacturers used on Unit 1. The associated sense line and control air routing and panel location will be similar (but not exact) to the Unit 1 configuration.</p>

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Item No.	EDCR No.	Title	Design Difference
137.	53817	Equipment Changes for the Essential Raw Cooling Water System	<p>This EDCR will complete remaining work for the Essential Raw Cooling Water. The scope of this EDCR is derived from input from Unit 1 historical changes, items identified during walkdowns, and items identified during preparation of ASME N-5 documentation packages. Unit differences are as follows:</p> <p>Engineering Difference No. 1:</p> <p>Valve numbers 1-67-587A and 1-67-587D; 1-67-588C; 1-67-589A, 1-67-589B, 1-67-589C, and 1-67-589D are 2" class 300 No. socket weld plug valves produced by Xomox Tuffline. The Unit 2 equivalent valves are 2" class 150 No. socket weld plug valves produced by Flowsolve. These valves serve as isolation, throttle and bypass for the temperature control valves on the return piping from the Upper Containment Vent Coolers. Both valve types are certified to ASME Section III Class 3 and meet the pressure requirements of the system.</p> <p>Engineering Difference No. 2:</p> <p>The solenoid valve and pressure regulator used on valve 2-TCV-67-137 are different from Unit 1. The solenoid valve used on Unit 1 is ASCO model HB8300C58U. The solenoid valve specified for Unit 2 is ASCO NPL8300141RVU. The Unit 1 solenoid meets the design requirements but contains commercial grade components and BUNA-N seals. The solenoid used on Unit 2 provides equivalent operation, is nuclear grade with ethylene propylene seal material. The pressure regulator used on Unit 1 is Masonelian model 77-4. The pressure regulator specified for Unit 2 is Masonelian model 78-4. Both provide equivalent operation.</p> <p>Engineering Difference No. 3:</p> <p>Isolation valves 2-ISV-67-1015B and 2-ISV-67-1016B are different from Unit 1. Unit 1 uses a 2" packless diaphragm valve manufactured by Kerotest, Unit 2 uses a 2" Anchor Darling valve provided with bellows seal.</p> <p>Unit 1 valve body material is SA182 Type F316; Unit 2 valve body material is SA-351 Grade CF8M. Both materials are stainless steel, of comparable chemical and physical properties, suitable for the intended use.</p> <p>Unit 1 disc material is SA479 Type 316; Unit 2 disc material is SA564 Type 630-1075. The material used for Unit 2 provides corrosion resistance at a higher strength.</p> <p>The Cv specified for the Unit 1 valves is 35; the Cv for the Unit 2 valve is 36. This difference will not affect the ability of this system to provide backup cooling water to the CCP Oil Cooler.</p> <p>Unit 1 valve weight is 50 lbs. Unit 2 valve weight is 60 lbs. Unit 2 piping stress analysis will be performed with the actual Unit 2 component weights.</p>

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Item No.	EDCR No.	Title	Design Difference
136	53817 (cont.)	Equipment Changes for the Essential Raw Cooling Water System	<p>Engineering Difference No. 4: For WBN-2-TCV-067-0137; The pressure regulator used on Unit 1 is Masonelian model 77-4 which is obsolete. The pressure regulator specified for Unit 2 is Masonelian model 78-4. The manual selector valve on the Unit 1 valve is a Teledyne Republic model A311-221D-1/4 and the Unit 2 valve will be the Swagelock 4 port 3-way selector model SS-45ZF8-ND-093 which is a larger valve but will perform the same and equivalent function as the Teledyne valve. Both provide equivalent operation. Also, Unit 2 model is offered with a silicon rubber with Dacron Insert diaphragm that can withstand higher temperature and radiation conditions. Unit 2 model 78-4 pressure regulator is the equivalent replacement for Unit 1 model 77-4.</p>
138.	53850	Equipment Changes for the Safety Injection System	<p>The scope of this EDCR is to handle the equipment/components/piece parts that have been identified as "Missing" in Unit 2, ventilation system.</p> <p>Unit differences are as follows:</p> <p>This EDCR changes the Unit 2, CRDM fans from a two fan/two motor to a two fan/one motor operating configuration. This change does not affect the reliability of -the system. System redundancy is provided by two coolers per duct path. With the original system and with the current system, if a motor fails, the fan assembly fails and the other cooler is placed into operation.</p> <p>The scope of this EDCR is to replace valves 2-ISV-024-0500 and 2-ISV-024-0502 and the cooling coil of the Main Bus Heat Exchanger 2-HTX-058-0102 located in the switchyard.</p> <p>Unit differences are as follows:</p>
139.	53863	Main Bus Heat Exchanger Work	<p>Valves 2-ISV-024-0500 and 2-ISV-024-0502 will be replaced with carbon steel butterfly valves.</p> <p>This EDCR includes several distinct scopes of work for Main/Auxiliary Feedwater, and Control Air systems.</p> <p>Unit differences are as follows:</p>
140.	53876	System Completion for Main/Auxiliary Feedwater and Control Air Systems	<p>Unit 2 has the original D3 Steam Generators which require a warming sequence to bring the main feedwater nozzles up to operating temperature in a controlled manner to avoid thermal shock. This warming sequence is consistent with the original plant design and was used on Unit 1 until the steam generators were replaced. Unit 1's upgraded generators do not require this warming sequence and it has been eliminated. 2-PT-3-1B and 2-PT-3-1D were added off the main feed water header to get a more accurate reading of feedwater pressure. An average will be taken across the three (2-PT-3-1A is already installed) transmitters rather than off a single instrument. They will also eliminate single point failure and keep the loop in service while performing maintenance.</p>

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Item No.	EDCR No.	Title	Design Difference
141.	53895	System Completion for Condenser Cooling Water and Condenser Tube Cleaning Systems	<p>The scope of this EDCR consists of design activities that support construction completion of the Condenser Cooling Water System and the Condenser Tube Cleaning System in the Turbine Building.</p> <p>Unit differences are as follows:</p> <p>The screen, circuit breaker, distributor, and ball collector tank designs specified are different from those in Unit 1. Their fit and function was maintained essentially the same as the original design (e.g., weight, dimensions, etc.).</p>
142.	53901	Heater Drains & Vents System Valve Replacements	<p>The scope of this EDCR is to install missing drain lines, pipe nipples, caps, install temporary strainers for pump protection during startup, replace 4" isolation valves with 4" wafer valves, replace missing 3" control valves with new model, install missing vent valve, relocate drain valves, and install missing 8" and 4" isolation valves</p> <p>Unit differences are as follows:</p> <p>Valves, 2-LCV-006-127B, 2-LCV-006-147B, and 2-LCV-006-166B, were changed only due to valves no longer being available. The weight of the new model of valve is 218 lbs versus old valve weight was 325 lbs. Manufacturer will remain identical and will not have functional differences.</p> <p>The Atmospheric Condenser Drain Pumps take suction from the Atmospheric Condenser Drain Tank, which is vented to atmosphere and discharge the drains to the Main Condenser. Each suction line has an isolation valve, 2-ISV-006-0926 and 0927. To accommodate a temporary strainer, each of the isolation valves will be changed from gate to butterfly. The Cv of the butterfly valves is 400, and of the gate valves is 1200. This difference is found to be acceptable. The head loss of a 4" gate valve flowing 200 gpm through it, is calculated to be approximately 0.06 ft while for a butterfly is 0.4 ft. The NPSH required for this pump is 6 ft. and the available NPSH is at least 32 ft (atmospheric tank). The additional head loss of the butterfly is negligible because of the available NPSH.</p> <p>Valves, 2-ISV-006-1988 and 2-ISV-006-1989, will be 150# class as designed. Unit 1 installed valves as 900#, ISV-006-1988, and 1500#, ISV-006-1989. Design is for 150# valves therefore that is all that is needed. This will also allow for less support in the condenser walls because 150# class weighs 97 lb while 1500# and 900# weigh 550 and 390 lbs. Material for valves changed from stainless to carbon steel. Stainless material is not required in this application.</p> <p>Valves, 2-ISV-006-1990, 2-ISV-006-1991, 2-ISV-006-1992, 8" valves changed material from stainless to carbon steel. Stainless material is not required in this application.</p>

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Item No.	EDCR No.	Title	Design Difference
143.	53917	Completion of Water Quality and Sampling System	<p>The scope of this EDCR is to modify, inspect, and/or install Water Quality and Sampling System sample lines 2-L-231, 2-L-232, and 0-L-233 including valves up to (but not to include) the process root/sample valves (23-lines. 6511 ft in the Auxiliary Building and Unit 2 RB). Install 31 Air Operated Control Valves with accessories.</p> <p>Unit differences are as follows:</p> <p>The following sample lines will be abandoned by this EDCR. Waste Evaporator Condensate Filter, Waste Evaporator Demineralizer Outlet, Before Evaporator Condensate Demineralizer, and After Evaporator Condensate Demineralizer</p> <p>Copes-Vulcan Air operated Valves will be the qualified replacement AOVs for Target Rock and Hoke valves identified in the following list.</p> <p>2-FCV-043-1, 2-FCV-043-2B, 2-FCV-043-3A, 2-FCV-043-5, 2-FCV-043-10, 2-FCV-043-11B, 2-FCV-043-12A, 2-FCV-043-30, 2-FCV-043-31, 2-FCV-043-32, 2-FCV-043-33, 2-FCV-043-34, 2-FCV-043-35, 2-FCV-043-54A, 2-FCV-043-54B, 2-FCV-043-54D, 2-FCV-043-55, 2-FCV-043-56A, 2-FCV-043-56B, 2-FCV-043-56D, 2-FCV-043-58, 2-FCV-043-59A, 2-FCV-043-59B, 2-FCV-043-59D, 2-FCV-043-61, 2-FCV-043-63A, 2-FCV-043-63B, 2-FCV-043-63D, 2-FCV-043-64, 2-FCV-043-67, and 2-FCV-043-69. The valves are purchased and complete with two limit switches and a solenoid valve.</p>
144.	53919	Completion of Residual Heat Removal and Reactor Coolant Systems	<p>The scope of this EDCR is to modify, inspect, and/or install sample lines, including valves up to (but not to include) the process root/sample valves, of the containment sump (RHR) Pump A and B Discharges) and Reactor Coolant System (RCS) Hot Legs 1 and 3 (3 lines, 1154 ft. Auxiliary Building/Reactor Building 713 ft.).</p> <p>Unit differences are as follows:</p> <p>Valve 2-FCV-43-22 will be changed to a Copes Vulcan instead of the Target Rock valve used in Unit 1, due to switch failures at high temperatures. The operational logic will remain the same.</p> <p>Valves, 2-FCV-43-20, 2-FCV-43-21 and 2-FCV-43-23, will be Copes Vulcan valves instead of the Hoke valves used in Unit 1. The operational logic will remain the same.</p> <p>Connections for Unit 2 RCS and RHR sample system lines will be made using automatic machine butt weld connections. Butt welded tubing made up this way eliminate connections using compression fittings, thus eliminating leaks due to thermal stress and crud traps.</p>

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Item No.	EDCR No.	Title	Design Difference
145.	53927	Completion of Water Quality and Sampling and Auxiliary Feedwater Systems	<p>The scope of this EDCR is to modify, inspect, and/or install Water Quality and Sampling System Sinks 3,12, and Auxiliary Feedwater Pumps 2A and 2B; Panels 0-L-206A, sample lines including valves up to (but not to include) the process roof/sample valves (13 lines, 2625 ft. Auxiliary Building/Reactor Building Elevations 692 to 757).</p> <p>Unit differences are as follows:</p> <p>Connections for Unit 2 sample system lines will be made using automatic machine butt weld connections. Butt welded tubing made up this way eliminate connections using compression fittings, thus eliminating leaks due to thermal stress and crud traps.</p>
146.	53936	Equipment Changes for the Chemical Volume and Control System	<p>The scope of this EDCR is to replace/relocate obsolete level transmitter on Boric Acid Tank C, to remove filled capillary system, and to install direct connection to the tank.</p> <p>Unit differences are as follows:</p> <p>This change authorizes removal of the capillary tube system connecting Boric Acid Tank C to 2-L-T-62-242-G and replacing with a more accurate differential pressure tube system. The 10-50 mA Barton model 752 transmitter will be replaced with a 4-20 mA Rosemount model 1152 and relocated from panel 0-L-94 to new panel 2-L-930. The associated sense line routing and panel location will be similar (but not exact) to Unit 1 configuration.</p>

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Item No.	EDCR No.	Title	Design Difference
147.	53939	Equipment Changes for the Turbogenerator Control System	<p>The scope of this EDCR is to support completion of Siemens installation activities and to incorporate historical Unit 1 changes for Unit 2.</p> <p>Unit differences are as follows:</p> <ol style="list-style-type: none"> 1. Accumulators 2-ACUM-47-0901, 2-ACUM-47-0902 and 2-ACUM-47-0903 are being replaced with upgraded Parker Model A7L2888D79D accumulators provided by Siemens. The Unit 2 Electro Hydraulic Control (EHC) skid does not have an Auxiliary Fluid Reservoir, Accumulator 2-ACUM-047-0900 and associated devices, 2-PI-047-0310, 2-RTV-047-310A 2-ISV-047-0310B, 2-ISV-047-031C have been removed. The EHC Fluid side isolation valve 2-ISV-047-0830A and drain valve 2-DRV-047-0832A associated with 2-ACUM-047-0900 are still in place in a common valve block but the line to the accumulator has been cut and capped at the valve block. 2. EHC Fuller Earth Filter (2-FLTR-047-0001) bypass valve 2-BYV-047-0801 is being replaced with an upgraded Marsh 1/2 N1314 316 SS needle valve provided by Siemens. 3. EHC Fuller Earth Filter (2-FLTR-047-0001) Isolation valve 2-ISV-047-0840 is being replaced with an upgraded Marsh 1/2 N1314 316 SS needle valve provided by Siemens. 4. EH Fluid Pump Auto Start isolation valve 2-ISV-047-0021 is being replaced with an upgraded Parker 133-1/4SS needle valve provided by Siemens. 5. EH Fluid Pump Suction isolation valves 2-ISV-047-0827 and 2-ISV-047-0828 are being replaced with upgraded Hancock model no. 5500 globe stop valves provided by Siemens. 6. Main Turbine Oil Tank Vapor Extractor 2-VEXT-047-0106 is being replaced with an upgraded New York Blower Company model no. 6821C16001 Size 1908A provided by Siemens. 7. Isolation valves 2-ISV-047-0520, 2-ISV-047-0521, and 2-ISV-047-0522 are being added to Unit 2 as Fisher Posi-Seal model no. A81 with gear operators. The equivalent Unit 1 valves are Fisher Posi-Seal model no. A41 with lever operators. This design difference is due to the A41 series valves being obsolete. The Unit 1 valves are hand lever operated, but Fisher valves will only supply wafer valves 6" and less with hand levers. Valve 8" or larger is being supplied with gear assisted operators. 8. Isolation valves 2-ISV-047-0059, 2-ISV-047-0087, and 2-ISV-047-0088 are being added to Unit 2 as Hancock model no. 950W class 800 valves. The equivalent Unit 1 valves are Hancock model no. 950W class 300 valves. This design difference is due to the 950W class 300 valves being obsolete. The vendor's suggested replacement is the stronger class 800 valves.

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Item No.	EDCR No.	Title	Design Difference
			<p>9. Motors 2-MTR-47-61, 2-MTR-47-108, 2-MTR-47-209A, 2-MTR-47-209B, 2-MTR-47-0009, 2-MTR-47-0014 are upgraded by Siemens Motors 2-MTR-47-61, 2-MTR-47-108 have different horsepower ratings and subsequently the associated cables and breaker sizes are changed to accommodate the larger size motors. The remaining motors are the same horsepower but different models provided by Siemens.</p> <p>10. Hagan Transmitters 2-PT-047-0018, -0063, -0082, -0084, -0098, and -0187 are obsolete and are replaced with Rosemount models. This difference also requires additional power supplies to be installed. 2-PX-047-0018, 0063, 0082, and 0187 are added.</p> <p>11. The Ametek 1736-1 tachometer installed on Unit 1 for SI-047-0053 is obsolete and cannot be purchased. Unit 2 will use a AI Tek tachometer (2-ST-047-0053) and a local Weschler indicator (2-SI-047-0053)</p> <p>12. The I/P positioners installed on Unit 1 for POS-047-0189 (Moore Products 750E) and POS-047-0193 (Valtek Beta I/P 2000) are obsolete and cannot be purchased. Unit 2 will use a Moore products 760E and Valtek Beta I/P 3000, respectively, for these positioners.</p> <p>13. Solenoid valve FSV-047-0195 is an ASCO safety related NP8320A185E. This change was made to eliminate the BUNA-N elastomer in the valve. Unit 2 will have an ASCO HC8320G184E solenoid valve; both valves have ethylene propylene elastomers, same line and orifice sizes, and class H coil insulation.</p> <p>14. Pressure transmitter 2-PT-047-0013 is removed by this EDCR. The Unit 1 Main Turbine is a partial arc admission design with a common impulse chamber whereas the Unit 2 Main Turbine is a full arc design that does not have an Impulse Chamber or Impulse Pressure tap. Turbine Steam Input Pressure will be sampled on four inlets to the Unit 2 Governor Valve in lieu of Turbine Impulse Pressure. Siemens has submitted a preliminary design to utilize the existing MW transducer output in lieu of turbine impulse pressure, and a preliminary design has been established for additional system 1 transmitters and Foxboro I/A to provide the runback functionality from the impulse pressure switches (1-PIS-047-0013 on Unit 1).</p> <p>15. The sight glass installed on the EH Reservoir on unit 1 (LG-047-1033) is a Jerguson 215-R-12 with model 64 gagecocks. This model is obsolete and no longer available. Unit 2 will use a Jerguson 215-300L with 64 gagecocks.</p> <p>16. United Electric 300-series pressure switches in system 047 are upgraded to 400-series pressure switches. The 300-series are obsolete. This is only a difference where the obsolete transmitter on Unit 1 has not yet been replaced with the newer 400 series.</p> <p>17. Valves 2-TV-047-0435, 2-TV-047-0436, 2-TV-047-0438, 2-TV-047-0439, 2-TV-047-0440, 2-TV-047-0441, 2-TV-047-0442, 2-TV-047-0443, and 2-TV-047-0444 are provided by Siemens and will be installed on Unit 2 as Vogt Model Number 801 Globe Valves.</p>

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Item No.	EDCR No.	Title	Design Difference
148.	53941	Equipment Changes for the Turbine Bldg Cranes & Miscellaneous System	<p>The scope of this EDCR is to incorporate and support Westinghouse/Par Upgrade Services for Existing Turbine Building 200/25 Tons Crane WBN-2-CRN-270-T1.</p> <p>Unit differences are as follows:</p> <p>Drives will be upgraded by Westinghouse/Par using Variable Frequency Drives (VFD) technology. Unit 1 has solid state digital controllers supplied by ABB Industrial Systems, whereas Unit 2 will have VFDs manufactured by Magnetek Electromotive or Equal variable frequency (flux vector).</p>
149.	53949	Equipment Changes for the Main Steam System	<p>The scope of this EDCR is to handle the components/piece parts that have been identified as "MISSING" in Unit 2, were identified in Unit 1 changes as needing modification or upgrade, to remedy discrepancies between Unit 1 and Unit 2 configuration.</p> <p>Unit differences are as follows:</p> <p>Six (6) new Main Steam Safety Valves (MSSVs) and fourteen (14) refurbished MSSVs that are missing or uninstalled in Unit 2 piping. On Unit 2, the new MSSVs will have a different model number than the refurbished valves. Design differences are primarily related to the material differences; between various part numbers, that will exist due to the model number change associated with the newly manufactured MSSVs versus the refurbished MSSVs.</p> <p>Valves 2-TV-001-0825, 2-TV-001-0826 on Unit 1, valves are Yarway Valve Corporation Model # 55158 which has become obsolete; consequently, Model # 56178 will be installed in Unit 2. Anchor Darling valves for test valves, 2-TV-001-0868, and 2-TV-001-0869, will be installed on Unit 2 in lieu of the Unit 1 Kerotest. A material difference associated with the Disc hard facing material exists between the two valves. Unit 1 valve has stellite hard face and Unit 2 valve will have a stellite alternative.</p> <p>The Unit 2 setpoint is increased from 140F to 160 F by calculation 2TS0010017A-A due to lower analytical margin (LAL) than the worst-case accuracy. The Unit 2 Temperature switch will be of a different type from that used on Unit 1.</p> <p>This EDCR specifies the use of graphite bonnet gaskets in lieu of the Armco iron silver plated gaskets, as specified and supplied on Walworth valves. This gasket change will enhance the sealing capability on the bonnet ring, thus, reducing leak failure risk experienced with steel plated gaskets.</p> <p>Unit 2 valve, 2-THV-001-0829, will be procured from Flowsolve - Edward which will differ from Unit 1 valve which is from Borg Warner.</p>

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Item No.	EDCR No.	Title	Design Difference
150.	53963	Equipment Changes for the Gland Seal Water System	<p>The scope of this EDCR is to incorporate previous Unit 1 design changes into Watts Bar Unit 2 procure/ install "missing" equipment and components and carry-out modifications and work identified from "Walkdowns."</p> <p>Unit differences are as follows:</p> <p>The following valve and associated piping are abandoned in place in this EDCR:</p> <p>2-ISV-037-0503, 2-ISV-037-0506, 2-ISV-037-0509, 2-ISV-037-0510, 2-ISV-037-0511, 2-ISV-037-0514, 2-ISV-037-0516, 2-ISV-037-0517, 2-ISV-037-0518, 2-ISV-037-0524, 2-ISV-037-0525, 2-ISV-037-0528, 2-ISV-037-0529, 2-ISV-037-0530, 2-ISV-037-0531, 2-ISV-037-0532, 2-ISV-037-0533, 2-ISV-037-0534, 2-ISV-037-0535, 2-ISV-037-0536, 2-ISV-037-0537, 2-ISV-037-0538, 2-ISV-037-0539, 2-ISV-037-0544, 2-ISV-037-0546, 2-ISV-037-0547, 2-ISV-037-0548, 2-ISV-037-0549, 2-ISV-037-0550, 2-ISV-037-0576, 2-ISV-037-0577, 2-ISV-037-0585, 2-ISV-037-0619.</p> <p>In Unit 1, the valves listed above have been removed from the plant. The lines that are abandoned in place use a blind coupling. Abandoning these lines in place achieves the same goal as removing them and is more cost effective.</p> <p>Check valves 2-CKV-037-0706, 2-CKV-037-0707, and 2-CKV-037-0708 are being replaced with stainless steel valves. These valves in Unit 1 are cast iron.</p> <p>The scope of this EDCR is to add a Westronics model SV100-300 recorder, 2-TR-047-0120, to capture 5 orphaned thermocouples in 2-M-1.</p>
151.	53993	Equipment Changes for the Turbogenerator Control System	<p>Unit differences are as follows:</p> <p>Unit 1 currently has the signal from the SV100 Recorder to Integrated Computer System (ICS) as a 10 Base T signal on a coax cable. Due to changes in technology, the Unit 2-communication between the SV Recorder and ICS will be TCP/IP over Cat 5 cable.</p> <p>The scope of this EDCR is to inspect, modify, and/or install Water Quality and Sampling System Sample Sinks 2-1A, 2-2A, 2-4A thru 2-8A, 2-10A, 2-11, 2-14, 2-15A, 2-21, and sample sink 2-SINK-43-432, associated sample coolers, cooling water tubing and valves from the sink out to the first cooling water system valve or process connection, and sample lines including valves up to (but not to include) the root valve of the sampled system. (33 lines, 3000 ft. Turbine Building elevations 685 to 729 and selected line changes from 3/8" to 1/4").</p> <p>Unit differences are as follows:</p> <p>Automatic (machine) butt welding is optional for compression type fitting replacement in the Turbine Building. Automatic (machine) butt welding would then replace each compression fitting with an automatic butt weld (ABW) union, tee or adaptor.</p>
152.	53994	Completion of Water Quality and Sampling System	<p>Unit differences are as follows:</p> <p>Automatic (machine) butt welding is optional for compression type fitting replacement in the Turbine Building. Automatic (machine) butt welding would then replace each compression fitting with an automatic butt weld (ABW) union, tee or adaptor.</p>

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Item No.	EDCR No.	Title	Design Difference
153.	54057	Completion of the Fuel Handling and Storage System	<p>The scope of this EDCR authorizes Westinghouse to perform various work activities for the Fuel Handling system including Manipulator Crane and Fuel Transfer system upgrades.</p> <p>Unit differences are as follows:</p> <p>The Unit 2 Manipulator Crane will use a different programmable logic controller than the Unit 1 Crane; however, it will operate in a similar manner.</p> <p>The Unit 2 Manipulator Crane will have permanent 120V power to the motor heaters. The Unit 1 Crane receives power through the use of a 120V wall outlet that is plugged-in prior to use.</p> <p>Unit 1 relocated Transfer System controls to the top of an existing junction box. The Unit 2 controls will no longer be separate and will be incorporated into the main controls on the console.</p>
154.	54070	Completion of the Containment Spray System	<p>The scope of this EDCR is to replace resistance temperature devices (RTDs) for 2-TE-72-6 and 2-TE-72-31. This EDCR is to incorporate aspects of Unit 1 historic changes into Unit 2 design. This EDCR also adds annunciator inputs for 2-FCV-72-44-A and 2-FCV-72-45-B, respectively, by connecting contacts in parallel.</p> <p>Unit differences are as follows:</p> <p>The conduit seal for the RTDs on unit:2 is an EGS quick disconnect seal rather than Conax type seal used on Unit 1. Both are qualified for this application.</p>
155.	54103	Completion of the Reactor Coolant System	<p>The scope of this EDCR is to authorize various electrical work (e.g., replace obsolete time delay relays, breakers, reactor coolant pump (RCP) under frequency relays, etc.), for completion of the reactor coolant system.</p> <p>Unit differences are as follows:</p> <p>RCP Undervoltage Time Delay Relays in Unit 1 are model ATC 317. This model of relay is obsolete. The specified replacement model, ATC 328D, is functionally equivalent and can be implemented with no setpoint change. The replacement Pressurizer Heater Distribution panels are specified with new molded case circuit breakers. The new breakers have sufficient interrupt rating and do not require integral fuses.</p>

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Item No.	EDCR No.	Title	Design Difference
156.	54124	Completion of the Component Cooling System	<p>The scope of this EDCR is to replace 10-50 mA DC Indicators on panel 0-M-27B in the Main Control Room with 4-20 mA DC indicators, verify components in the Aux. Building and to terminate cables.</p> <p>Unit differences are as follows:</p> <p>The Unit 2 replacement indicators replicate those of Unit 1 using methodology similar to that of Unit 1. The indicators are fed from the same existing power supply and will perform the same function, and transmit the same analog information.</p> <p>FCR 55516 scope modifies the system 67 valve circuits to add a disconnect switch and a short circuit across the solenoid valve to address Appendix R Fire Protection requirements. This change is driven by NEI-00-001 which applies only to Unit 2, and is addressed by a WBN calculation.</p>
157.	54145	Completion of the Auxiliary Feedwater System	<p>This EDCR is being issued to address electrical work scope for Auxiliary Feedwater System for equipment located in the Auxiliary Building.</p> <p>Unit differences are as follows:</p> <p>The resulting design for Unit 2 will be identical to that of Unit 1 except for the removal of 2-FIS-3-11D, 2-FIS-3-21D, 2-FIS-3-31D and 2-FIS-3-41D. These components are abandoned in place in Unit 1 but will be physically removed for Unit 2.</p> <p>This EDCR is being issued to address electrical work scope for the Heating, Ventilation, and Air Conditioning System components.</p>
158.	54172	Completion of the Heating, Ventilation, and Air Conditioning System	<p>Unit differences are as follows:</p> <p>The U1 Incore Instrument Room Chillers (1-CHR-31-303B and 1-CHR-31-3248) each use a temperature switch (1-TS-31-314 and 1-TS-31-321) and a flow indicating switch (1-FIS-31-311 and 1-FIS-31-332) as permissives to start the chillers. The new U2 chillers are self-contained units which include digital temperature control and integrated flow switches thereby eliminating the need for the external switches. The existing U2 temperature switches (2-TS-31-314, -321) and flow indicating (2-FIS-31-311, -332) switches are being abandoned in place.</p>
159.	54180	Completion of the Feedwater Control System	<p>This EDCR performs the Unit 1 non-programmatic Feedwater Control System historical design work for Unit 2 that is located in the Auxiliary Building and Control Building. The work to be done on Unit 2 is based on multiple Unit 1 changes.</p> <p>Unit differences are as follows:</p> <p>Potter and Brumfield KUIP relays B002/1-S and B002/2-S currently in use in Unit 1 are obsolete. These relays will be replaced by Struthers-Dunn model 219BBX relays which are functionally identical.</p>

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Item No.	EDCR No.	Title	Design Difference
160.	54187	Completion of the Feedwater Control System	<p>This EDCR is being issued to replace Unit 2 Main Feed Pump Turbine A and B Trip Solenoid Valves.</p> <p>Unit differences are as follows:</p> <p>The coil voltage of the Eaton Vickers replacement model is 125V DC whereas the coil voltage of the Unit 1 valves is 110V DC. The solenoids are powered by the 125V DC Vital Battery Boards III and IV, with a normal operating (float) voltage of approximately 135V DC.</p>
161.	54191	6.9kV Shutdown Board Work	<p>The scope of this EDCR is to perform Unit 2 internal changes to 6.9kV Shutdown Board 2-BD-211B-B which includes relay replacement in Shutdown Board 2-BD-211A-A.</p> <p>Unit differences are as follows:</p> <p>Struthers-Dunn 219BBX relays and Agastat ETR relays are used in place of obsolete Potter-Brumfield and Agastat relays used in Unit 1. The Unit 1 relays are no longer available. The replacement relays selected are functionally equivalent.</p>
162.	54192	6.9kV Shutdown Board Work	<p>The scope of this EDCR is to perform Unit 2 internal changes to 6.9kV Shutdown Board 2-BD-211A-A, including relays (control, and time delay), fuses/blocks, internal wiring, and elapsed time meters, as required.</p> <p>Unit differences are as follows:</p> <p>Potter Brumfield Relay SM is being replaced by a Struthers-Dunn model. Time delay relays OPRX and OSA are electronic delay relays (not pneumatic delay relays). Both the Potter Brumfield relays and the pneumatic time delay relays are obsolete. The new relays are identical in function to the old relays.</p>
163.	54263	Main Steam, Feedwater, Steam Generator Blowdown, and Feedwater Secondary Treatment Systems	<p>The scope of this EDCR is to abandon/remove the steam generator wet layout system (SGWLRs). Additionally, four pressure control valve setpoints are modified to facilitate an alternate method of layout.</p> <p>Unit differences are as follows:</p> <p>From the perspective of the main steam, feedwater, steam generator blowdown, and feedwater secondary treatment systems, the SGWLRs are abandoned identically in both units. However, Unit 2 will be removing the piping/components from outside of containment. In addition, the stress analysis for the system will be different due to the removal of class G piping rather than abandonment in place.</p>

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Item No.	EDCR No.	Title	Design Difference
164.	54318	Completion of the Station Drainage System	<p>The scope of this EDCR is to authorize the necessary discipline work for the completion of station drainage system.</p> <p>Unit differences are as follows:</p> <p>The Accumulator Room No. 3 floor drain will have to be routed to a different penetration on Unit 2. To mirror Unit 1 configuration, the drain piping should be routed to a 6 inch penetration located in the Reactor Building Raceway at elevation 710 (Azimuth (AZ) 235°). The drain piping cannot be routed through this penetration due to interference with a permanent ladder. The ladder permits access to a reactor coolant pump and would involve installing platforms in order to rotate this ladder to clear the penetration. The new Unit 2 configuration will utilize a spare 6 inch penetration that is located at elevation 712' (AZ 219°). This change in configuration will not affect the functionality of the drain line.</p>
165.	54385	Air Operated Valves for Main Steam, Auxiliary Feedwater, and Heating, Ventilation and Air Conditioning Systems	<p>This EDCR is documentation only and will provide the necessary Category 1, Air Operated Valve (AOV) Actuator Capability Calculation Results as design output to be used for actuator setup and testing for those AOVs determined critical to the safe operation and shutdown of Watts Bar Nuclear (WBN), Unit 2.</p> <p>Unit differences are as follows:</p> <p>Category 1 AOV set points determined to have differences from Unit 1 for the following:</p> <p>Some Unit 2 spring rates are different than Unit 1 due to Unit 1 having measurement data while Unit 2 used vendor data. For example,</p> <p>Valves, 2-FCV-1-11-T and 2-FCV-1-29-T, have spring rates of 728 lbs/in whereas Unit 1 valves have spring rates of 745 and 742 lbs/in, respectively.</p> <p>Valves, 2-PCV-1-23 and 2-PCV-1-30, have spring rates of 1,560 lbs/in whereas Unit 1 valves have spring rates of 1,669 lbs/in.</p> <p>Valve 2-PCV-3-122 has a spring rate of 1,560 lbs/in whereas Unit 1 valves have a spring rate of 1,900 lbs/in.</p> <p>Valves 2-LCV-3-172, 2-LCV-3-173, 2-LCV-3-174, and 2-LCV-3-175 have spring rates of 3500 lbs/in whereas Unit 1 valves have spring rates of 3884, 3791, 4045, and 4032 lbs/in, respectively.</p> <p>Valves, 2-LCV-3-148A, 2-LCV-3-156A, 2-LCV-3-164A, and 2-LCV-3-171A, have spring rates of 2125 lbs/in whereas Unit 1 valves have spring rates of 2250, 2269, 2314, and 2122 lbs/in, respectively.</p> <p>Valves, 2-FCV-30-37 and 2-FCV-30-40 have spring rates of 100 lbs/in whereas Unit 1 valves have spring rates of 112 and</p>

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			<p>101 lbs/in.</p> <p>Some Unit 2 running loads (sum between breakaway force and packing load) are different than Unit 1 due to Unit 1 having measurement data for packing loads while Unit 2 used vendor data. For example.</p> <p>Valves, 2-FCV-1-4 and 2-FCV-1-11 have running loads of 4,572 lbs whereas Unit 1 valves have running loads of 4,052 and 4,422 lbs, respectively.</p> <p>Valves, 2-FCV-30-37 and 2-FCV-30-40 have running loads of 56.55 lbs whereas Unit 1 valves have running loads of 75 and 65 lbs, respectively.</p> <p>Some Unit 2 stroke lengths are different than Unit 1 due to Unit 1 having measurement data for stroke lengths while Unit 2 used vendor data. For example.</p> <p>2-FCV-30-37 and 2-FCV-30-40 have different stroke lengths of 5.25 in whereas Unit 1 valves have stroke lengths of 5.84 and 5.77 in, respectively.</p> <p>Category 2 AOV set points determined to have differences from Unit 1 for the following:</p> <p>Unit 2 has the following 2 flow control valves: 2-FCV-3-185, 2-FCV-3-186, 2-FCV-3-187 and 2-FCV-3-188 whereas Unit 1 removed these valves for the steam generator replacement. Unit 2 will retain these valves and will maintain the set points (pressure regulator setting, stroke length, and/or bench set).</p> <p>The following flow control valves have been replaced in Unit 2 due to manufacturer obsolescence: 2-FCV-43-3, 2-FCV-43-12, 2-FCV-43-23, 2-FCV-43-35, 2-FCV-43-55, 2-FCV-43-58, 2-FCV-43-61, and 2-FCV-43-64. These valves will have different set points.</p> <p>Unit 2 will remove 2-FCV-43-77 due to the Post Accident Sampling System being abandoned-in-place. This valve's set points for the pressure regulator setting, stroke length, and/or bench set will not be maintained by Unit 2.</p>

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Item No.	EDCR No.	Title	Design Difference
166.	54449	Completion of the Steam Generator Blowdown System	<p>The scope of this EDCR is to remove isolation valves and a flow control valve, to install a socket weld cap, to remove piping, fittings, and supports upstream of the level control valve.</p> <p>Unit differences are as follows:</p> <ol style="list-style-type: none"> 1) Remove 2-FCV-015-0006 and 2-ISV-015-0918. Install a socket weld cap downstream of these valves before the 2 inch line ties into the 4 inch header. 2) Remove 2-ISV-015-0917 and install a socket weld cap downstream before-the line from the radiation monitors 2-RE-090-0120 and 2-RE-090-0121 ties into the 2 inch line. 3) Remove piping, fittings, and supports upstream of the newly installed socket weld caps to 2-LCV-015-0009. <p>EDCR 53462 removed the flash tank pumps from the system. Therefore these valves are no longer needed.</p> <p>The scope of this EDCR is to install and inspect sense lines associated with the following pressure control valves: 2-PCV-62-119, 2-PCV-62-120, 2-PCV-62-126, 2-PCV-68-304, and 2-PCV-77-158.</p> <p>Unit differences are as follows:</p> <p>This change authorizes the installation/inspection of the sense line from the Root/Isolation Valves, to their associated Pressure Control Valves. The sense line routing will be similar (but not exact) to Unit 1 configuration. In addition, this EDCR will also replace 3 Root/Isolation valves in the chemical volume and control system.</p> <p>The obsolete Kerotest valves, 2-ISV-62-698, 2-RTV-62-412A, 2-RTV-62-444A will be replaced with Anchor-Darling 1878 series.</p> <p>The scope of this EDCR is to incorporate Unit 1 historic design changes and field configuration discrepancies into Unit 2. This EDCR also includes Raw Cooling Water changes in the Turbine Building and Yard Area.</p> <p>Unit differences are as follows:</p> <p>The difference applicable in this design change applies to the actuator and positioner for temperature control valve 2-TCV-24-69. The actuator, 2-MVOP-24-69, for this valve is more compact than the identical Unit 1 actuator and the positioner, 2-POS-24-69, is now pneumatic vs. electro pneumatic. The new actuator and positioner do not differ in their function. The new compact actuator improves robustness and the pneumatic positioner enhances the control loop reliability. The weight difference between carbon steel and stainless steel in this application is negligible. Installation of stainless steel provides a permanent solution to MIC and cavitation.</p>
167.	54482	Sense Line Work on the Chemical Volume and Control, Reactor Coolant, and Waste Disposal Systems	<p>The scope of this EDCR is to install and inspect sense lines associated with the following pressure control valves: 2-PCV-62-119, 2-PCV-62-120, 2-PCV-62-126, 2-PCV-68-304, and 2-PCV-77-158.</p> <p>Unit differences are as follows:</p> <p>This change authorizes the installation/inspection of the sense line from the Root/Isolation Valves, to their associated Pressure Control Valves. The sense line routing will be similar (but not exact) to Unit 1 configuration. In addition, this EDCR will also replace 3 Root/Isolation valves in the chemical volume and control system.</p> <p>The obsolete Kerotest valves, 2-ISV-62-698, 2-RTV-62-412A, 2-RTV-62-444A will be replaced with Anchor-Darling 1878 series.</p> <p>The scope of this EDCR is to incorporate Unit 1 historic design changes and field configuration discrepancies into Unit 2. This EDCR also includes Raw Cooling Water changes in the Turbine Building and Yard Area.</p> <p>Unit differences are as follows:</p> <p>The difference applicable in this design change applies to the actuator and positioner for temperature control valve 2-TCV-24-69. The actuator, 2-MVOP-24-69, for this valve is more compact than the identical Unit 1 actuator and the positioner, 2-POS-24-69, is now pneumatic vs. electro pneumatic. The new actuator and positioner do not differ in their function. The new compact actuator improves robustness and the pneumatic positioner enhances the control loop reliability. The weight difference between carbon steel and stainless steel in this application is negligible. Installation of stainless steel provides a permanent solution to MIC and cavitation.</p>
168.	54505	Raw Cooling Water Changes	<p>The scope of this EDCR is to incorporate Unit 1 historic design changes and field configuration discrepancies into Unit 2. This EDCR also includes Raw Cooling Water changes in the Turbine Building and Yard Area.</p> <p>Unit differences are as follows:</p> <p>The difference applicable in this design change applies to the actuator and positioner for temperature control valve 2-TCV-24-69. The actuator, 2-MVOP-24-69, for this valve is more compact than the identical Unit 1 actuator and the positioner, 2-POS-24-69, is now pneumatic vs. electro pneumatic. The new actuator and positioner do not differ in their function. The new compact actuator improves robustness and the pneumatic positioner enhances the control loop reliability. The weight difference between carbon steel and stainless steel in this application is negligible. Installation of stainless steel provides a permanent solution to MIC and cavitation.</p>

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Item No.	EDCR No.	Title	Design Difference
169.	54655	Fire Protection Related Work	<p>This EDCR authorizes fire protection related work in the Unit 2 Reactor Building</p> <p>Unit differences are as follows:</p> <p>To meet Appendix R requirements, this EDCR adds additional smoke detectors and sprinkler heads in the Unit 2 Reactor Building annulus to eliminate the need to wrap cable trays in this area.</p>
170.	54782	Component Cooling Water and Primary Makeup Water Systems	<p>This EDCR is to abandon in place the component cooling side of the Unit 2 Gross Failed Fuel Detector (GFFD) and the Unit 2 Post Accident Sampling System (PASS). This EDCR also contains documentation only work as pulled from historical Unit 1 changes for Component Cooling Water and Primary Makeup Water Systems.</p> <p>Unit differences are as follows:</p> <p>The Unit 1 Post Accident Sampling System (PASS) is still active. The Unit 2 PASS was abandoned in place under EDCR 53920. This EDCR will abandon in place the component cooling supply and return lines to the PASS.</p> <p>The component cooling supply and return for the Unit 1 Gross Failed Fuel Detector (GFFD) was functionally abandoned in place by locking the valves 1-70-742 and 1-70-745 closed. To avoid the need to maintain these valves and the long legs of pipe leading to these valves. Unit 2 is abandoning the entire supply and return legs for the GFFD by hard interfaces.</p>
171.	54783	Redesigned Throttle Valves for the Safety Injection System	<p>The scope of this EDCR is to install the Westinghouse redesigned emergency core cooling system (ECCS) throttle valves for the safety injection system.</p> <p>Unit differences are as follows:</p> <p>Weights, flow conditions in the line, valve type, etc. will be different from Unit 1. Westinghouse is performing flow modeling in order to assure that the valve redesign will be successful. Pipe stress and support calculations will be issued and required supports installed in order to ensure the structural integrity of the piping .system after the modification.</p>

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Item No.	EDCR No.	Title	Design Difference
172.	54835	Reactor Coolant System Work	<p>This EDCR installs the reactor head vent modifies piping through steel containment vessel (SCV) penetrations and SCV penetration sleeves, welds control rod drive mechanism (CRDM) funnels to their respective thermal sleeves, and removes core exit thermocouples (CET) funnels which are no longer needed.</p> <p>Unit differences are as follows:</p> <p>The obsolete Kerotest RPV Head Vent Valve (2-VTV-068-0607) will be replaced with Anchor Darling 1878 series or equal. The Unit 1 Kerotest valve drawing specifies as flow coefficient of 7.1 while the Anchor Darling valve for Unit 2 specifies a flow coefficient of 9.</p> <p>The core exit thermocouples (CET) are not need for Unit 2 due to the WINCISE modification. The CET columns are being capped by Westinghouse and the column funnels are not needed. Rather than weld the column funnels to match Unit 1, the Unit 2 column funnels will be removed.</p>
173.	54847	Station Drainage System	<p>The scope of this EDCR is to install level switch, 2-LS-040-0119 for the Turbine Building foundation sump Level HI alarm, verify log points, and annunciation.</p> <p>Unit differences are as follows:</p> <p>The Level Switch 2-LS-040-0119 that was used on Unit-1 has become obsolete. Unit 2 will install the recommended replacement.</p>

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Item No.	EDCR No.	Title	Design Difference
174.	54850	Limitorque Valve Actuators for the Auxiliary Feedwater, Safety Injection, Essential Raw Cooling and Component Cooling Systems.	<p>This package describes proposed for actuator and valve assembly replacements of various valves in systems auxiliary feedwater, safety injection, essential raw cooling water, and component cooling systems. In general the valves are being modified to come into compliance with NRC Generic Letter (GL) 89-10 requirements, however, some of the valves are safety related valves which will not be included in the GL 89-10 program.</p> <p>Unit differences are as follows:</p> <p>Limitorque model SMB-000 actuators are available with both large and small limit switch covers. On Unit 1, some actuators have the small covers and some have large covers. On Unit 2, SMB-000 actuators will have the large covers to allow more space to make electrical connections. The large cover weighs approximately 40 lbs more than the small cover.</p> <p>On Unit 1, some motors are insulation class B and class RH. On Unit 2, motors are insulation class RH. Insulation class RH increases the weight by 15 lbs compared to insulation class B.</p> <p>On Unit 1, some Limitorque model SMB-000 actuators have 2 ft-lb motors and some have 5 ft-lb motors. The 2 ft-lb motors are no longer available. Unit 2 SMB-000 actuators will have 5 ft-lb motors which results in a 1 lb weight increase. The physical size of the replacement actuators is increased compared to the existing actuators.</p> <p>On Unit 1, valves FCV-63-47 and FCV-63-48 are torque closed whereas Unit 2 these valves are limit closed. The overall gear ratios for valves FCV-63-47, FCV-63-48 and FCV-63-172 are also different between Units 1 and 2 resulting in different stroke times. Although there are design differences the form fit and function of the components are not changed.</p>

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Item No.	EDCR No.	Title	Design Difference
175.	54851	<p>Limitorque Valve Actuators for the Feedwater, Chemical Volume Control, Containment Spray, Residual Heat Removal Systems</p>	<p>This package describes actuator replacements of various valves in the feedwater, chemical volume control, containment spray, residual heat removal systems. The valves are being modified to come into compliance with NRC Generic Letter (GL) 89-10 requirements. Unit differences are as follows:</p> <p>Limitorque model SMB-000 actuators are available with both large and small limit switch covers. On Unit 1, some actuators have the small covers and some have large covers. On Unit 2, SMB-000 actuators will have the large covers to allow more space to make electrical connections. The large cover weighs approximately 40 lbs more than the small cover.</p> <p>On Unit 1, some motors are insulation class Band class RH. On Unit 2, motors are insulation class RH. Insulation class RH increases the weight by 15 lbs compared to insulation class B.</p> <p>On Unit 1, some Limitorque model SMB-000 actuators have 2 ft-lb motors and some have 5ft-lb. motors. The 2 ft-lb motors are no longer available whereas Unit 2 SMB-000 actuators will have 5 ft-lb motors which results in a 1lb weight increase. The physical size of the replacement actuators is increased compared to the existing actuators.</p> <p>On unit 1, valves FCV-74-1, FCV-74-2, FCV-74-12 and FCV-74-24 and LCV-62-135 and LCV-62-136 are torque closed whereas Unit 2 valves will limit closed. The overall gear ratios for valves FCV-74-1 and FCV-74-2 are also different between Units 1 and 2 resulting in different stroke times. Although there are design differences the form fit and function of the components are not changed.</p>
176.	54852	<p>Limitorque Valve Actuators for the Main Steam, Feedwater, High Pressure Fire Protection And Reactor Coolant Systems</p>	<p>This package describes actuator replacements of various valves in systems main steam, feedwater, high pressure fire protection and reactor coolant systems. The valves are being modified to come into compliance with NRC Generic Letter (GL) 89-10 requirements. Unit differences are as follows:</p> <p>Limitorque model SMB-000 actuators are available with both large and small limit switch covers. On Unit 1, some actuators have the small covers and some have large covers. On Unit 2, SMB-000 actuators will have the large covers to allow more space to make electrical connections. The large cover weighs approximately 40 lbs more than the small cover.</p> <p>On Unit 1, some motors are insulation class Band some class RH. On Unit 2 motors are insulation class RH. Insulation class RH increases the weight by 15 lbs compared to insulation class B. On Unit 1, some Limitorque model SMB-000 actuators have 2ft-lb motors and some have 5 ft-lb motors. The 2 ft-lb motors are no longer available whereas Unit 2 SMB-000 actuators will have 5 ft-lb motors which results in a weight increase of 1 lb.</p> <p>The physical size of the actuators is increased compared to the existing actuators. Although there are design differences the form fit and function of the components are not changed.</p>

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Item No.	EDCR No.	Title	Design Difference
177.	54853	<p>Generic Letter 89-10 Program for Main Steam, Main Feedwater, Auxiliary Feedwater, High Pressure Fire Protection, Chemical Volume Control, Safety Injection, Essential Raw Cooling Water, Reactor Coolant, Component Cooling, Containment Spray, And Residual Heat Removal Systems</p>	<p>This EDCR has been generated to support documentation changes that are essential to the establishment of the Generic Letter 89-10 Program for Watts Bar Nuclear Unit 2. Impacted systems are main steam, main feedwater, auxiliary feedwater, high pressure fire protection, chemical volume control, safety injection, essential raw cooling water, reactor coolant, component cooling, containment spray, and residual heat removal.</p> <p>Unit differences are as follows:</p> <p>The Unit 2 "Table of Motor-Operated Valve Requirements" drawings are identical to Unit 1. These drawings include information on Motor Operated Valves (MOVs) selected for Watts Bar Nuclear Plant's GL 89-10 MOV program. Unit 2 GL 89-10 valves were selected based upon the existing Unit 1 GL 89-10 valves. However, there are differences between the Unit 1 and Unit 2 programs due to selection of different motor operated valves to support the Unit 2 GL 89-10 program.</p>
178.	54903	<p>Essential Raw Cooling Water and Demineralized Water And Cask Decon Systems</p>	<p>This EDCR contains the items needed for the completion of the essential raw cooling water and demineralized water and cask decon systems.</p> <p>Unit differences are as follows:</p> <p>The chilled water supply connection for temporary cooling of the Lower Containment Vent Coolers (LCVC) 2A and 2C during outages is located on the 10" supply line instead of the downstream 8" line like the configuration of Unit 1. The reason for this change is due to the space constraints on the 8" line, however, the hose connection is still located downstream of the isolation valve normally required to be closed during temporary cooling of the LCVCs 2A and 2C.</p>

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Item No.	EDCR No.	Title	Design Difference
179.	54923	Heating Ventilation and Air Conditioning System	<p>The scope of this EDCR is to incorporate Unit 1 historic design changes into Unit 2, install missing equipment, and carry-out work previously identified.</p> <p>Unit differences are as follows:</p> <p>These work scopes involve the installation of replacement actuators (air operators, in this case) on four (4) butterfly valves. The actuators are "missing" off the valves. The butterfly valves were supplied by Posi-Seal and the actuators mounted on the valves were by Matryx. The Matryx actuator is no longer available for safety-related applications. Unit 2 actuators on valves 2-FCV-030-0037, 2-FCV-030-0050, 2-FCV-030-0051, and 2-FCV-030-0053 will be manufactured and supplied by another company. The actuators, to be supplied, are specified to meet the form, fit, and function requirements for the specific valve application.</p> <p>In addition, the work scope installs new 1/2-inch check valves in the Chilled Water System (2-CKV-031-3378 and 2-CKV-031-3392). The check valves were "missing." The check valves to be installed, are being supplied by ITT/Enertech, and are an "equal to" those installed in Unit 1. Also, another task of this EDCR is to install a new 1/2-inch globe valve (vent application) (2-VTV-031-3439) to match the Unit 1 configuration. The globe valve that will be installed will be an "equal to" that installed in Unit 1.</p> <p>This EDCR work scope also involves installing "missing" ductwork associated with the CRDM Coolers. Specifically, the ductwork that connects to the CRDM Shroud. The design is such that the routing of the ductwork, in what is referred to as the "pant leg" sections, is different between Units 1 and 2.</p> <p>This work scope specifies "Full Face" gaskets for use on butterfly valves inside containment, in addition to the "Ring Type." EPDM is the specified gasket material and is an acceptable material for use at WBN. EPDM is a favorable gasketing material due to its good sealing properties at lower contact loads. Lower contact loads reduce pressure on flanges and reduce risk of damaging them.</p> <p>This work scope adds tags to Balancing Gates 2-BLD-030-5251 and 2-BLD-030-5252. The drawings reflect the installation of these 2 Balancing Gates. On Unit 1, however, for the same applications a Blastgate and Orifice Plate was installed for system balancing purposes.</p> <p>This work scope is a documentation only change to Flow Diagram 2-47W866-1 to show the elimination of valves 2-FSV-030-0134 and 2-FSV-030-0135. These 2 valves currently exist on Unit 1. These FSVs were in the compliance instrument loop for Containment Pressure associated with 2-PDT-30-133. This transmitter is being replaced on Unit 2 with a qualified (double diaphragm) device which will meet redundant isolation requirements for containment isolation.</p> <p>This work scope installs new solenoid valves, limit switches, and quick exhaust valves on various Flow Control Valves. For</p>

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Item No.	EDCR No.	Title	Design Difference
			<p>the solenoid valves, the Unit 2 part numbers may not match Unit 1 part numbers. The Unit 2 solenoids are equal in form and function from the manufacturer per a generic substitution. The Unit 2 solenoids were supplied with 20 foot leads and standard ¾ inch conduit connections whereas some of the Unit 1 solenoids contain ½ inch conduit connection with a ¾ inch reducer.</p> <p>For the limit switches, the Unit 2 part numbers may not match Unit 1 part numbers. The Unit 2 limit switches are supplied with an integral receptacle assembly, quick disconnect fittings, and 20 foot leads whereas the Unit 1 limit switches contained Conax conduit seals.</p> <p>An updated filter model (No. 0-007-U-42-03-NU-13-13-GGFU5) will be used in the filter housings for the Sample Rooms. This filter will be provided by Flanders Filters, Inc. (FFI). FFI has discontinued use of its previous model number and this updated filter now offers a 11 inch deep media pack, in lieu of the previous 8 inch deep media pack. This updated filter model affords more media and therefore greater dust-loading capacity and longer filter life. The filter housings can accommodate the filter with the 11 inch deep media pack.</p> <p>This EDCR will Abandon-In-Place the Reciprocating Charging [Positive Displacement (PD)] Pump Room Cooler. Although Unit 1 has not abandoned the PO Pump Room Cooler, it is not in use.</p>
180.	54983	Equipment for Feedwater, Sampling and Water Quality, Emergency Gas Treatment, Essential Raw Cooling Water, Reactor Coolant Systems	<p>The scope of this EDCR is to provide generic substitutions for obsolete components for the following:</p> <p>Conoflow has discontinued the model number GFH20XT1767F, filter-pressure regulator. The obsolete regulator is used in Quality Related and Non-Quality Related applications. The new model number GFH25XT1767F is a direct replacement for obsolete Conoflow regulator model GFH20XT1767F.</p> <p>Qualified replacement for Namco limit switch model number SL 3C-B2 is Namco model EA700-20100 limit switch.</p> <p>Unit differences are as follows:</p> <p>This change package approves the generic replacement of obsolete Conoflow model GFH20XT1767TG air pressure regulators with Conoflow model GFH25XT1767G and Namco model SL3C-B2 limit switch with Namco model EA700-20100 limit switch.</p>

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Item No.	EDCR No.	Title	Design Difference
181.	55006	Containment Electrical Penetration Assemblies	<p>This EDCR will restore 32 selected CONAX supplied Unit 2 Containment Electrical Penetration Assemblies (EPA's) as listed in this EDCR to service ready condition by addressing identified issues.</p> <p>Unit differences are as follows:</p> <p>One of the two runs of fiber optic cable for Portable CCTV system and dosimetry equipment shall be routed through Electrical Penetration 26 in the Containment wall rather than Penetration 25 as was done in Unit 1 in DCN 39928. This is due to the lack of available spare ports in which to install a new fiber optic feed through module in Penetration 25.</p>
182.	55172	Heating, Ventilation, and Air Conditioning System	<p>The Watts Bar Unit 2 Appendix R Analysis determined that the containment pressure transmitters PdT-30-42-G, 2-PdT-30-44-E, and 2-PdT-30-45-D and their associated panels 2-L-186, 2-L-188, 2-L-189, and 2-L-133 are to be relocated from their original design configuration to a new proposed location in the Annulus. Due to the Appendix R issue, the existing sense lines will be cut and capped and new penetrations will be assigned in various locations for the new installation. The remaining section of sense lines going to the panels will be removed in their entirety to accommodate more space in the area.</p> <p>Unit differences are as follows:</p> <p>As stated, some of the instruments within the scope of EDCR are being replaced with instruments from different vendors that supply similar design and function as the original. The local panels and sense line routing will differ from that of Unit 1 but does not affect system logic or function features.</p> <p>In addition, this EDCR changed some steel containment penetrations by installing some lines through spare penetrations.</p>
183.	55174	Containment Electrical Penetration Assemblies	<p>The scope of this EDCR is to re-configure three (3) CONAX supplied Unit 2 containment electrical penetrations 30-B, 37-A and 40 to separate Train A cables from Train B cables going through the penetrations.</p> <p>Unit differences are as follows:</p> <p>Unit 2 cables 2PM3582/2PM3583 are being re-routed to Penetration 28 and cables 2PM3622/2PM3623 and 2PM3642/2PM3643 are being re-routed to Penetration 34. In Unit 1, these cables were re-routed to Penetrations 37-A and 30-B respectively by Train A-Train B Separation.</p>

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Item No.	EDCR No.	Title	Design Difference
184.	55177	<p>Condensate System, Heater Drains and Vents, Raw Cooling Water, Station Drainage, Injection Water, and Local Instrument Control Panel Systems</p>	<p>The scope of this EDCR is to install and inspect sense lines and instruments associated with local panels 2-L-72, 2-L-81/A, 2-L-81/B, 2-L-557.</p> <p>Unit differences are as follows:</p> <p>This change installs current generation, smart Rosemount transmitters which use 4-20 mA output in place of the originally installed, now obsolete, instruments which utilize 10-50 mA outputs. The associated sense line construction and routing will be similar to that on Unit 1 as will be the approximated panel locations and configurations.</p>
185.	55180	<p>Annunciator/ Sequential Events Recording System</p>	<p>The scope of this EDCR is to verify and/or install wiring between SSPS Control Room Demux and Annunciator panels and incorporate applicable Unit 1 changes to the Reactor Trip Switchgear Panel (2-L-116).</p> <p>Unit differences are as follows:</p> <p>Unit 1 deleted cable 1A2075 and 1A2077 but Unit 2 will make cable 2A2075 and 2A2077 available for future use. This difference does not affect the function or logic of circuit, thus is acceptable from a design perspective.</p>
186.	55243	<p>Containment Electrical Penetration Assemblies</p>	<p>The scope of this EDCR is to restore 5 non-1E Conax supplied unit 2 containment electrical penetrations.</p> <p>Unit differences are as follows:</p> <p>Unit 1 cables 1PP980 and 1PP981 are swapped on their respective port connections in Penetration 1</p>
187.	55244	<p>Containment Electrical Penetration Assemblies</p>	<p>The scope of this EDCR is to restore 16 safety related (class 1E) Conax supplied unit 2 containment electrical penetrations.</p> <p>Unit differences are as follows:</p> <p>Unit 1 cables 1PL4750AI51A, 1PL4764B/65B, 1PL4775A/76A and 1PL4789B/90B relocated to 250MCM ports. Unit 2 cables remain on #2/0 ports in Penetrations 6-A, 7-B, 8-A and 9-B</p>

**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
188.	55337	Component Cooling System Changes	<p>The scope of this EDCR is to isolate the Unit 2 component cooling system (CCS) from the Unit 0 Condensate Demineralizer Waste Evaporator (CDWE) and to perform various other remaining component cooling system work.</p> <p>Unit differences are as follows:</p> <p>Unit 1 functionally abandoned the Unit 1 CCS supply and return to the CDWE by locking close valves 1-FCV-70-207 and 0-FCV-70-206. Unit 2 will isolate the Unit 2 CCS supply by removing valve 2-FCV-70-207 and replacing it with blank off plates rather than leaving the valve in place. 1-FCV-70-207 and 0-FCV-70-206 will remain in their current locked closed positions to isolate the Operating Unit from the CDWE. These three isolation points fully isolate the CCS from the CDWE for Unit 1 and Unit 2. The Unit 2 owned cables and local handswitch associated with valve 2-FCV-70-207 are abandoned in place, while the equivalent Unit 1 components for 1-FCV-70-207 are still active.</p> <p>The scope of this EDCR is to replace the Flow Switches for the RHR Mini-Flow Valves 2-FCV-74-12 and 2-FCV-74-24.</p>
189.	55707	Residual Heat Removal Changes	<p>Unit differences are as follows:</p> <p>This design, which mimics a similar design found at another TVA plant, was due to the inability to obtain a suitable replacement from the vendor (Barton). The separate instruments chosen are used throughout the plant and were chosen to provide a better accuracy and reliability. After calibration, the new switches will have approximately 40 in WC between the high and low resets to provide non overlapping dead bands to ensure pump protection during ECCS operation.</p> <p>The scope of this EDCR is to replace Radiation Monitoring ratemeters, recorders, and handswitch in 0-M-12 and connection of Containment Vent Isolation/Auxiliary Building Isolation cross-tie.</p>
190.	55801	Radiation Monitoring System	<p>Unit differences are as follows:</p> <p>The RM-23A ratemeters are similar to those used in quality related applications in Unit 1. These digital ratemeters are multichannel devices which allows for the consolidation of the original 2 analog ratemeters to one device for the 2-RE-90-120 and 2-RE-90-121 loops. These NIM-bins will be installed in Main Control Room panel 0-M-12.</p> <p>The digital ratemeters provide the same function as their analog counterparts including indicated range, current value, and operate/alarm status, as well as being an overall better device by providing improved reliability, faster channel calibration, reduction in drift, and much more accurate control and readout module at an overall reduced cost (initial and regular maintenance) when compared to the analog ratemeters. These devices will allow for fidelity across area monitor channels by providing a unified interface that can be easily changed to meet specific needs.</p>

**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
191.	55835	Steam Generator Tube Plugging	<p>The scope of this EDCR is to plug the Steam Generator Tubes as needed based on evaluations of pre-service examinations which include Eddy Current testing, previous plugging patterns, AVB insertion depths, F* "distances, loose parts, secondary side fluid conditions, etc. Unit differences are as follows:</p> <p>The WBN U1 Steam Generators are different from the WBN U2 Steam Generators. The Replacement Steam Generators (U1) have 5,128 tubes and are designed for a higher power rate. The Original Steam Generators (U2) have 4,674 tubes; therefore, the number of tubes plugged as well as the tube locations plugged differs between the units.</p> <p>The scope of this EDCR is to incorporate Unit 2 design changes associated with Siemens Turbine Impulse Pressure Modifications, No. 3 Heater Drain Tank Pump Runout Protection, and associated Turbine Runback circuitry external to Foxboro IA. Unit differences are as follows:</p> <p>The design differences below are a result of the upgrade of the Unit 2 Main Turbine, which has no impulse chamber, and required relocating the transmitter sense lines from the former "Impulse Pressure" taps to locations in the High Pressure (HP) Inlet Piping between the individual Governor Valves and the HP Turbine Inlet flanges. This is being done to improve reliability and redundancy as well as minimize the impact of pressure variations on the Impulse Pressure equivalent signal during Governor Valve testing or from the accidental closure of one or more Governor Valves during normal operation.</p>
192.	55879	Main Turbine Upgrade	<ol style="list-style-type: none"> 1. Root Valve 2-RTV-1-243A was moved and sense lines were rerouted for the affected transmitters 2-PT-1-72-E and 2-PT-1-314 to measure the HP Turbine Inlet Pressure between HP Governor Valve # 3 and the HP Turbine inlet. 2. Root Valve 2-RTV-1-244A was moved and sense lines were rerouted for the affected transmitters 2-PT-1-73-D and 2-PT-1-315 to measure the HP Turbine Inlet Pressure between HP Governor Valve No. 1 3. New Root Valve 2-RTV-1-230A was installed and sense lines were routed for new transmitter 2-PT-1-74 (Rosemount model 1152GP9N92PB) to measure the HP Turbine Inlet Pressure between HP Governor Valve No. 2 and the HP Turbine inlet. 4. New Root Valve 2-RTV-1-231A was installed and sense lines were routed for new transmitter 2-PT-1-81 (Rosemount model 1152GP9N92PB) to measure the HP Turbine Inlet Pressure between HP Governor Valve No. 4 and the HP Turbine inlet. 5. Foxboro IA replaced functionality previously provided by LPP-47-13 pressure switches for increased reliability and fault tolerance. <ol style="list-style-type: none"> a. Unit 2 does not have PT-47-13, PX-47-13 or PIS-47-13 and RLY output contacts 1-4 b. Foxboro IA soft switches 2-PS-47-13A, 2-PS-47-13B, 2-PS-47-13D, 2-PS-47-13E take the place of 1-PIS-47-13RLY1, 1-PIS-47-13RLY2, 1-PIS-47-13RLY3, and 1-PIS-47-13RLY4, respectively c. Relays TDR-106 and R-606 in 2-R-70 are not used on Unit 2 (Logic incorporated into Foxboro IA) 6. # 3 HDT Pump Protection incorporated into Foxboro IA for increased reliability and fault tolerance. <ol style="list-style-type: none"> a. 2-LCV-6-106B, 2-HS-6-106A (relabeled as HS-6-106B on Unit 2) completely removed on Unit 2 b. LCV-6-106A Preload station and associated components (LSV-6-106B, PREG-6-106BA, HIC-6-106A) not installed on Unit 2. 7. Transmitters 2-PT-1-72-E and 2-PT-1-73-D are Rosemount model 1152GP9N92PB to match other HP Inlet Pressure Transmitters and accommodate conversion to 4-20ma loops.

**ENCLOSURE 1
WATTS BAR NUCLEAR PLANT, UNIT 2
LIST OF DESIGN DIFFERENCES, REVISION 1**

Item No.	EDCR No.	Title	Design Difference
193.	55948	Limit Switch and Manual Selector Valve Work	<p>The scope of this EDCR is to replace safety-related (1E) non-EQ and quality-related limit switches and replace manual selector valves.</p> <p>Unit differences are as follows:</p> <p>The Teledyne valves originally supplied with some essential raw cooling system temperature control valves (TCVs) and flow control valves (FCVs) are obsolete and no longer manufactured. This EDCR allows replacement with a Parker 711-221-1/4B. A Teledyne Republic (now Parker/Republic) valve model 711-221 was used on unit 1.</p> <p>Several obsolete NAMCO part numbers have been updated to allow replacement with current NAMCO part numbers.</p>

Enclosure 2
Watts Bar Nuclear Plant
List of Commitments

1. Additional unit differences could emerge through field implementation. If significant unit differences emerge, then TVA will provide another updated list, if necessary, when field implementation is complete.