Common Q PAMS Secure Development and Operational Environment SSER 23 Appendix HH Action Item 98 Requests for Additional Information

Watts Bar 2

February 2012

Westinghouse Electric Company LLC
1000 Westinghouse Drive
Cranberry Township, PA 16066

The following RAIs are regarding the Watts Bar 2 Common Q PAMS Secure Development and Operational Environment. The action associated with this review area is captured in SSER 23 Appendix HH, Action Item 98 (ML11270A306). TVA submitted documents (reference below) on September 1, 2011 to address this item.

1. *Platform Development – The US Nuclear Regulatory Commission staff notes that the Common Q platform was subject to commercial grade dedication and that a topical report on the platform was reviewed and approved by the staff (ML003740165). However, at the time of the staff's previous review, no evaluation was performed regarding the secure development environment for the Common Q platform and the staff is aware that the platform has undergone changes. Regulatory Guide 1.152, Revision 3, which is cited by the licensee as being used to conform to establishing a secure development environment, contains regulatory positions related to ensuring that superfluous features are not present in software-based safety systems that could present the potential for degrading the reliable operation of the system.*

   a) *Since the Common Q platform was originally designed to potentially serve in several different plant applications, please provide references for and a description of any analyses that were performed to determine if there are any superfluous functions or features resident on the platform (i.e., in any of the platform software or software-driven components, such as PLCs) that are not utilized by the Common Q platform or post accident monitoring system (PAMS) application, as well as a summary of the results of such analyses. If any unnecessary functions or features were identified, please explain what measures were taken to resolve any potential impact on the Common Q platform or PAMS application operation (i.e., were features disabled, removed or determined by analysis not to have potential to impact operations?). [e.g., the staff notes that in Attachment 9 of the September 1, 2011, Request for Additional Information responses (ML11257A050), it is stated that the Function Enable keyswitch on the Operators Module was not installed for the Watts Bar Unit 2 PAMS application, and that the Operator's Module has no connection to a printer.]*

      Westinghouse Response: The AC160 uses a PC element library from which logic elements are selected to implement the Watts Bar Unit 2 PAMS. [

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b) *It is essential that the Common Q platform operating system software be maintained in a fashion that protects it from unauthorized changes. Please confirm that WNA-LI-00058-WBT-P, Revision 3, Sections 2.2.1 and 2.2.2 (ML110950334) describe the changes made to the platform. If not, please provide a description of changes made (including removal of unnecessary features) to the Common Q operating system software since it was initially subject to commercial grade dedication and analyses were performed of the features resident on the platform. Please describe the processes followed to ensure that only authorized changes have been made.*

Westinghouse Response:
WNA-LI-00058-WBT-P, Revision 3 "Post-Accident Monitoring System Licensing Technical Report", (LTR) Sections 2.2.1 and 2.2.2 describe the changes made to the platform. It has been realized that an extra Product Version of the PC Node Box and the Flat Panel Displays were being tracked that were not pertinent to the Watts Bar Nuclear (WBN) Unit 2 PAMS project. The LTR will be updated to remove these extra Product Versions.

The change process, to ensure that only authorized changes to the platform have been made, is described in WCAP-17266-P, Revision 0, "Common Q Platform Generic Change Process," (ML102310113).

c) *WCAP-17427-P, Revision 1 (ML11257A061) states that the approved version of the QNX software is protected by a CRC stamp to ensure that the correct configuration is used. For the WBN2 PAMS application, provide documentation indicating your confirmation that the CRC stamp for QNX was verified to be the correct version intended for use.*

Westinghouse Response:
Section 5.3 of WNA-IP-00528-WBT, "Post Accident Monitoring System Software Installation Procedure" Revision 0, includes a Cyclic Redundancy Check (CRC) validation for the QNX software. The CRC for the Flat Panel Display System (FPDS) application software was verified through inspection and documented in WNA-VR-00279-WBT, Revision 5, "Requirements Traceability Matrix for the Post-Accident Monitoring System" (Software Requirement R7.2.47-2) and WNA-VR-00295-WBT, Revision 1, "Code Review Report for the Post Accident Monitoring System Flat Panel Display". IV&V also witnessed the CD installation of both the QNX operating system and the display application software (FPDS) to ensure WNA-IP-00528-WBT, "Post Accident Monitoring System Software Installation Procedure" were followed.

d) *WCAP-17427-P, Revision 1 states that the AC160 software is under strict configuration controls and that any changes are jointly approved by Westinghouse and ABB. Please confirm that the summary of changes provided in Section 2.2.2 of WNA-LI-00058-WBT-P, Revision 3 (ML110950334) accurately reflects modifications since dedication. Also, please describe what measures were taken to ensure that the correct, commercially-dedicated version of AC160 software is installed on the WBN2 PAMS system.*

Westinghouse Response:
The summary of changes provided in subsection 2.2.2 of the LTR accurately depicts the modifications since the original dedication to version 1.3/8 of the AC160 Base Software.

The "approved" AC160 Base software is recorded in the Software Release Records (SRRs) (see response to item 2.h for a complete list of SRRs for the WBN Unit 2 PAMS) [

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2) *Application Development – Staff reviewed WCAP-17427-P, Revision 1 and found it to be largely consistent with APP-GW-J0R-012, Revision 1 (ML102170268 dated June 2010). However, much of the processes described are in future-tense and it is not clear to the staff what actions were accomplished for this particular Watts Bar Unit 2 PAMS application development to establish a secure development environment. WCAP-17427-P, Revision 1 (ML11257A061 dated August 2011) describes the security assessment for the Common Q PAMS for Watts Bar Unit 2.*

   a. *In Section 2.2.3.1.1.a, the statement is made that the Westinghouse Quality Management System (QMS) "will be" followed to ensure documents from hardware and software development efforts are adequately protected. Specifically, the section states that documents are to be stored in the Enterprise Document Management System (EDMS).*

      i) *Please identify what documents related to the Common Q platform development (relevant to the Watts Bar 2 PAMS) are protected under the QMS / EDMS.*

      Westinghouse Response:
      Westinghouse differentiates platform development from application development. [
      ]^{a,c} The intent of this statement is that the Westinghouse development documents for the WBN Unit 2 PAMS are stored in EDMS.

      ii) *Please identify what documents related to the Watts Bar 2 PAMS development are protected under the QMS/EDMS.*

      Westinghouse Response:
      All WBN Unit 2 PAMS Westinghouse design, IV&V and testing documents are protected under the QMS/EDMS.

   b) *In Section 2.2.3.1.1.b, discussions of controls contained in the Software Program Manual are detailed. Please provide a confirmatory statement that the Watts Bar 2 PAMS development process conformed to these controls.*

      Westinghouse Response:
      Westinghouse confirms that the WBN Unit 2 PAMS development was in accordance with WCAP-16096-NP-A, Revision, 1A, "Software Program Manual for Common Q Systems," (SPM) as augmented by WNA-LI-00058-WBT-P.

   c) *In Section 2.2.3.2, items 2. and 3. are identical. Please clarify if one of these items is intended to state something else.*

Westinghouse Response:
Items 2 and 3 in subsection 2.2.3.2 are not identical. The underlined indicates the difference:

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d) *In Section 2.2.3.2, the statement is made that during the implementation phase, software "shall be" code reviewed by IV&V using a defined checklist for adherence to coding standards and application requirements. Please clarify if this step was performed for the Watts Bar Unit 2 PAMS application.(1) Please clarify if WNA – VR-00283-WBT-P, Revision 4 (ML110770540) contains this record. If not, please provide a reference for the code review results and provide a statement indicating the findings of the review.(2)*

Westinghouse Response:
(1) IV&V performed a code review for both the Flat Panel Display (FPD) Application Software and the AC160 Software during the implementation phase.

Implementation Review Checklists (listed below) have been completed and archived in EDMS to document the parameters considered during the code review process. WNA-VR-00283-WBT-P, Revision 4 calls out these checklists.

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Implementation Phase Checklists:

- The FPDS Code Review Report (WNA-VR-00295-WBT) contains a checklist for each module
- The Element Software Test (EST) Reports for Custom PC Elements (listed in table 3.3-1 of WNA-VR-00283-WBT-P) contain a code review checklist
- WNA-RL-00646-WBT_TrainA_R5_CheckList (AC160)
- WNA-RL-00648-WBT_TrainB_R3_CheckList (AC160)
- WNA-RL-00743-WBT_R5_Checklist (FPD)

The PAMS applications were verified to be compliant with the coding standards defined in:

- 00000-ICE-3889, Revision 12, "Coding Standards and Guidelines for Common Q Systems"
- WNA-DS-01070-GEN, Revision4, "Application Restrictions for Generic Common Q Qualification".

(2) WNA-VR-00283-WBT-P, Revision 4, "IV&V Summary Report for the Post Accident Monitoring System," provides a summary for the code review results. Detailed code review results are provided in:

- WNA-TR-02389-WBT, Revision 0, "Processor Module Software Test Report for the Post Accident Monitoring System"
- WNA-VR-00295-WBT, Revision 1, "Code Review Report for the Post Accident Monitoring System Flat Panel Display"

e) *In Section 2.3.1.5, the statement is made that the security requirements "shall be" verified and validated as part of the overall system requirements. Please clarify if this step was performed for the Watts Bar Unit 2 PAMS application (1). Please clarify if WNA – VR-00283-WBT-P, Revision 4 (ML110770540) contains this record. If not, please provide a reference for the results of the V&V of the security requirements and provide a statement indicating the findings of the V&V.(2)*

Westinghouse Response:

(1) Security requirements were verified and validated as part of the overall system requirements. Security requirements are identified and traced as shown below:

- Security requirements are identified in:
  - WNA-DS-01617-WBT, Revision 4, "PAMS System Requirements Specification"
  - WNA-DS-01667-WBT, Revision 4, "System Design Specification"
  - WNA-SD-00239-WBT, Revision 4, "Software Requirements Specification"
- Security requirements are traced in:
  - WNA-VR-00279-WBT, Revision 5, "Watts Bar 2 NSSS Completion Program I&C Projects Requirements Traceability Matrix for the Post-Accident Monitoring System"
  - WNA-VR-00280-WBT, Revision 2, "Watts Bar 2 NSSS Completion Program I&C Projects Requirements Traceability Matrix for the Reactor Vessel Level Indication System (RVLIS) Custom PC Elements"

(2) The security requirements were reviewed for completeness and accuracy as part of the Independent Verification and Validation (IV&V) effort documented in WNA-VR-00283-WBT, Revision 4.

f) *In Section 2.4.1, the statement is made that an assessment of the PAMS "will be" performed to verify that requirements for security controls are implemented correctly in the design. Please clarify if this step was performed for the Watts Bar Unit 2 PAMS application.(1) Please clarify if WNA – VR-00283-WBT-P, Revision 4 (ML110770540) contains this record. If not, please provide a reference for the results of the V&V of the security requirements and provide a statement indicating the findings of the assessment.(2)*

Westinghouse Response:

(1) The requirements for security controls were verified as part of the overall system design requirements. Requirements for security controls are identified in:

- WNA-DS-01617-WBT, Revision 4, "PAMS System Requirements Specification"
- WNA-DS-01667-WBT, Revision 4, "System Design Specification"
- WNA-SD-00239-WBT, Revision 4, "Software Requirements Specification"

(2) The security control requirements were reviewed for correct implementation as part of the Independent Verification and Validation (IV&V) effort. This review is documented in WNA-VR-00283-WBT, Revision 4,

g) *In Section 2.5.1.1, the statement is made that an IV&V assessment "will be" performed of the security requirements during the implementation phase and that any anomalies will be documented. Please clarify if this step was performed for the Watts Bar Unit 2 PAMS application.(1) Please clarify if WNA – VR-00283-WBT-P, Revision 4 (ML110770540) contains this record. If not, please provide a reference for the results of the IV&V of the security requirements.(2) Please provide a brief summary of any anomalies found and, if there were any, please confirm that they were resolved in accordance with the Software Program Manual processes.(3)*

Westinghouse Response:

(1) Assessment of security requirements are part of the Requirement Traceability Assessment activity performed by IV&V on every phase where the RTM has been updated. The requirement traceability assessment includes the review of test coverage against the System Definition (Requirements) Phase documents, including security requirements. This review has been performed during the Integration Phase. This assessment is documented in Section 3.5.3 of WNA-VR-00283-WBT, Revision 4.

(2) There were no anomalies recorded during the assessment of the security requirements.

h) *In Section 2.5.3, [the] IV&V Phase Summary Report and Software Release Records are given as outputs of the implementation phase. Please confirm if WNA-VR-00283-WBT P, Revision 4 (ML110770540) is the appropriate IV&V Phase Summary Report Record. Please provide a reference for Software Release Records documents and submit on docket.*

Westinghouse Response:

WNA-VR-00283-WBT-P, Revision 4 is the appropriate IV&V Phase Summary Report for the implementation phase. The following table lists the Software Release Records for the WBN Unit 2 PAMS:

Software Release Record Number	Revision	Title
WNA-RL-00249-GEN	0V	Software Release Record for the REFLASH Type Circuit
WNA-RL-00286-GEN	3V	Software Release Record for the Exclusive Module Error Type Circuit
WNA-RL-00327-GEN	1V	Software Release Record for the PAMS01 AC160 Library
WNA-RL-00412-GEN	2V	Software Release Record for PM Diagnostics Type Circuit
WNA-RL-00441-GEN_Rev7_Verified	0	Software Release Record for the RVLIS AC160 Library – Verified
WNA-RL-00530-GEN	0V	Software Release Record for the STDADD05 AC160 Library
WNA-RL-00540-GEN	0	Common Q Software Release Record AC1601P3R8
WNA-RL-00563-GEN	0V	Common Q Software Release Record AMPL Control Configuration Advanced 1.7/1
WNA-RL-00646-WBT_Rev5_Verified	0	Common Q Software Release Record for Watts Bar Unit 2 PAMS Train A, PAMA – Verified
WNA-RL-00648-WBT_Rev3_Verified	0	Common Q Software Release Record for Watts Bar Unit 2 PAMS Train B, PAMB – Verified
WNA-RL-00653-GEN_Rev0_Verified	0	Common Q Software Release Record AC160 PC and DB Element Libraries Version 1.5/1
WNA-RL-00743-WBT_Rev5_Verified	0	Software Release Record for Watts Bar Unit 2 PAMS FPDS
WNA-VR-00284-GEN	0	Common Q Generic FPDS IV&V Summary Report

A review of WNA-VR-00283-WBT-P, Revision 5 found that it does not contain a complete listing of the Software Release Records applicable to the WBN Unit 2 PAMS. A partial listing of Software Release Records is also contained in WNA-LI-00058-WBT-P, Revision 3. Based on the reviews performed to respond to this question, the following actions will be performed:

1. WNA-LI-00058-WBT-P will be revised to replace the SRR list with reference to the SRR list in WNA-VR-00283-WBT-P. This change will be included in Revision 4.

2. Section 5 of the Phase Summary Report will be modified to include a comprehensive list of all software and corresponding Software Release Records related to the project.

i) *In Section 2.5.3, the statement is made that the code is maintained in a "locked" area of the configuration control system. Please provide further detail regarding the "locked" area of the configuration control system. (e.g., is the code stored on a removable media and physically locked somewhere? Or, is the code on an isolated computer or network and protected by software controls?).*

Westinghouse Response:

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j) *In Section 2.6 (and its subsections), testing activities are described in future-tense. Please provide a brief summary of the testing results as they pertain to security requirements for the system.(1) Do WNA-TR-02451-WBT (ML110950332) and WNA-VR-00283-WBT-NP, Rev4 (ML110770538) represent this evidence? If not, please provide references for the documents identified in Section 2.6.3 and submit on docket.(2)*

Westinghouse Response:

(1) With the exception of the data storm testing performed during the Factory Acceptance Test (FAT), WNA-TR-02451-WBT, Revision 0, "Test Summary Report for the Post Accident Monitoring System" and WNA-VR-00283-WBT, Revision 4 represent a summary for the testing performed.

(2) The FAT data storm testing is summarized in WNA-TR-02426-WBT, Revision 1, "Post-Accident Monitoring System Data Storm Test Report."

Attachment 3

WEC non-proprietary document CAW-12-3385, "Application for Withholding Information From Public Disclosure WBT-D-3769 P-Enclosure, "Watts Bar 2 Common Q PAMS Secure Development and Operational Environment SSER 23 Appendix HH Action Item 98 Requests for Additional Information," (Proprietary)," dated February 6, 2012 (Letter Item 1, SSER 23 Appendix HH Item Number 98)

Westinghouse Electric Company
Nuclear Services
1000 Westinghouse Drive
Cranberry Township, Pennsylvania 16066
USA

U.S. Nuclear Regulatory Commission
Document Control Desk
11555 Rockville Pike
Rockville, MD 20852

Direct tel: (412) 374-4643
Direct fax: (724) 720-0754
e-mail: greshaja@westinghouse.com
Proj letter: WBT-D-3769

CAW-12-3385

February 6, 2011

APPLICATION FOR WITHHOLDING PROPRIETARY INFORMATION FROM PUBLIC DISCLOSURE

Subject: WBT-D-3769 P-Enclosure, "Common Q PAMS Secure Development and Operational Environment SSER 23 Appendix HH Action Item 98 Requests for Additional Information" (Proprietary)

The proprietary information for which withholding is being requested in the above-referenced report is further identified in Affidavit CAW-12-3385 signed by the owner of the proprietary information, Westinghouse Electric Company LLC. The affidavit, which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR Section 2.390 of the Commission's regulations.

Accordingly, this letter authorizes the utilization of the accompanying affidavit by Tennessee Valley Authority.

Correspondence with respect to the proprietary aspects of the application for withholding or the Westinghouse affidavit should reference this letter, CAW-12-3385, and should be addressed to J. A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company, Suite 428, 1000 Westinghouse Drive, Cranberry Township, Pennsylvania 16066.

Very truly yours,

J. A. Gresham, Manager
Regulatory Compliance

Enclosures

CAW-12-3385

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF BUTLER:

Before me, the undersigned authority, personally appeared J. A. Gresham, who, being by me duly sworn according to law, deposes and says that he is authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC (Westinghouse), and that the averments of fact set forth in this Affidavit are true and correct to the best of his knowledge, information, and belief:

J. A. Gresham, Manager
Regulatory Compliance

Sworn to and subscribed before me
this 6th day of February 2012

Notary Public

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Cynthia Olesky, Notary Public
Manor Boro, Westmoreland County
My Commission Expires July 16, 2014
Member. Pennsylvania Association of Notaries

(1) I am Manager, Regulatory Compliance, in Nuclear Services, Westinghouse Electric Company LLC (Westinghouse), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rule making proceedings, and am authorized to apply for its withholding on behalf of Westinghouse.

(2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Commission's regulations and in conjunction with the Westinghouse Application for Withholding Proprietary Information from Public Disclosure accompanying this Affidavit.

(3) I have personal knowledge of the criteria and procedures utilized by Westinghouse in designating information as a trade secret, privileged or as confidential commercial or financial information.

(4) Pursuant to the provisions of paragraph (b)(4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.

(i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.

(ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitutes Westinghouse policy and provides the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

(a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of

Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

(b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.

(c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.

(d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.

(e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.

(f) It contains patentable ideas, for which patent protection may be desirable.

There are sound policy reasons behind the Westinghouse system which include the following:

(a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.

(b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.

(c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.

(d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.

(e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.

(f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.

(iii) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.390; it is to be received in confidence by the Commission.

(iv) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.

(v) The proprietary information sought to be withheld in this submittal is that which is appropriately marked in WBT-D-3769 P-Enclosure, "Common Q PAMS Secure Development and Operational Environment SSER 23 Appendix HH Action Item 98 Requests for Additional Information" (Proprietary), dated February 2012, for submittal to the Commission, being transmitted by Tennessee Valley Authority letter and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk. The proprietary information as submitted by Westinghouse is that associated with the Post Accident Monitoring System and may be used only for that purpose.

This information is part of that which will enable Westinghouse to:

(a) Continue to provide technical support for verification and validation services for the Post Accident Monitoring System.

(b) Remain competitive in the marketplace for support services.

Further this information has substantial commercial value as follows:

(a) Westinghouse plans to sell the use of similar information to its customers for the purpose of design verification and validation.

(b) Westinghouse can sell support and defense of licensing activities.

(c) The information requested to be withheld reveals the distinguishing aspects of a methodology which was developed by Westinghouse.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar calculations, analysis and licensing defense services for commercial power reactors without commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing documentation without purchasing the right to use the information.

The development of the technology described in part by the information is the result of applying the results of many years of experience in an intensive Westinghouse effort and the expenditure of a considerable sum of money.

In order for competitors of Westinghouse to duplicate this information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended.

Further the deponent sayeth not.

PROPRIETARY INFORMATION NOTICE

Transmitted herewith are proprietary and/or non-proprietary versions of documents furnished to the NRC in connection with requests for generic and/or plant-specific review and approval.

In order to conform to the requirements of 10 CFR 2.390 of the Commission's regulations concerning the protection of proprietary information so submitted to the NRC, the information which is proprietary in the proprietary versions is contained within brackets, and where the proprietary information has been deleted in the non-proprietary versions, only the brackets remain (the information that was contained within the brackets in the proprietary versions having been deleted). The justification for claiming the information so designated as proprietary is indicated in both versions by means of lower case letters (a) through (f) located as a superscript immediately following the brackets enclosing each item of information being identified as proprietary or in the margin opposite such information. These lower case letters refer to the types of information Westinghouse customarily holds in confidence identified in Sections (4)(ii)(a) through (4)(ii)(f) of the affidavit accompanying this transmittal pursuant to 10 CFR 2.390(b)(1).

COPYRIGHT NOTICE

Tennessee Valley Authority

Letter for Transmittal to the NRC

The following paragraphs should be included in your letter to the NRC:

Enclosed are:

1. __ copies of WBT-D-3769 P-Enclosure, "Common Q PAMS Secure Development and Operational Environment SSER 23 Appendix HH Action Item 98 Requests for Additional Information" (Proprietary)

2. __ copies of WBT-D-3769 NP-Enclosure, "Common Q PAMS Secure Development and Operational Environment SSER 23 Appendix HH Action Item 98 Requests for Additional Information" (Non-Proprietary)

Also enclosed is the Westinghouse Application for Withholding Proprietary Information from Public Disclosure CAW-12-3385, accompanying Affidavit, Proprietary Information Notice, and Copyright Notice.

As Item 1 contains information proprietary to Westinghouse Electric Company LLC, it is supported by an affidavit signed by Westinghouse, the owner of the information. The affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of Section 2.390 of the Commission's regulations.

Accordingly, it is respectfully requested that the information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR Section 2.390 of the Commission's regulations.

Correspondence with respect to the copyright or proprietary aspects of the items listed above or the supporting Westinghouse affidavit should reference CAW-12-3385 and should be addressed to J. A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company, Suite 428, 1000 Westinghouse Drive, Cranberry Township, Pennsylvania 16066.

Attachment 4

Excerpts of TVA document EDCR 53287, dated February 1, 2012 (Letter Item 3)

LEGIBILITY EVALUATED AND
ACCEPTED FOR ISSUE
Initials: HGandhi Date: 2/26/11
ALL PAGES - ADMIN 05

EDCR
EDRC COVER SHEET

GENERAL INFORMATION

EDCR TYPE (Check One Box Only)	☐ EDCR #		Rev.	
	☒ EDCR-2 #	53287	Rev.	A

☐ Check here if this is a Streamlined EDCR.
☐ Check here if this EDCR is for Documentation change only & No construction work is required.
☒ SR ☐ QR Check appropriate box if field material procurement quality requirements included.

See Page 2	AB	772'	SR	Elect	N/A
System	Building	Elevation	Quality Class	Lead Discipline	Code/Class

WORK SCOPE STATEMENT:

Replace 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 REAC MOV BD 2A1-A (2-MCC-212-A1-A). The existing MCC is located at Col. A12T, El. 772' in the Auxiliary Building and serves Unit 1 (Operating Unit) and Unit 2 loads.

PREPARED:			VERIFIED:		
[illegible]	865-632-7641	04/24/10	John Marando	PE 865-632-7107	4/25/2010
Design Engineer	Phone	Date	Lead Engineer	Phone	Date

APPROVALS:		INTER-DISCIPLINE REVIEWS:	
R.C. [illegible]	4-23-10	C.D. BOSE	4/23/10
Civil DDS	Date	Civil Engineer	Date
DALE MATHER	4-24-10	JEFFERY S. DAVIES	4-24-10
I&C DDS	Date	I&C Engineer	Date
Anil C. Bangalore (for MOHAN BALI)	4/25/10	ANIL C BANGALORE	4/25/10
Electrical DDS	Date	Electrical Engineer	Date
Boshellia Goines	4/24/2010	N/A 4/24/10	
Mechanical DDS	Date	Mechanical Engineer	Date
N/A		N/A	
Plant Design DDS	Date	Plant Design Engineer	Date
J.D. [illegible]	4/25/10	N/A	
Project Engineering Manager	Date	DELETED	Date

ACCEPTANCE:		OTHER ORGANIZATIONS:	
[illegible]	4-25-10	[illegible]	4-25-10
Maintenance/Mods Superintendent	Date	Signature/Org'n.:	Date
Teddy Taylor (TEDDY TAYLOR)	04-25-10	N/A	
Field Engineer	Date	Signature/Org'n.:	Date
E E Freeman	4-25-10	N/A	
TVA Engineering Manager	Date	Signature/Org'n.:	Date

ADMIN 05 HGandhi 2/26/11

Refer to the electronic documents in TVA Business Support Library (BSL) for current revision.

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Affected Systems:

3, 26, 31, 62, 63, 67, 68, 70, 72, 74, 77, 213

1.0 EDCR-2 # 53287 PURPOSE

The purpose of the EDCR-2 53287 is to provide Motor Control Center (MCC) bucket (combination of breaker, starter and other devices) replacements, feeder breaker (breaker only) replacements and internal control wiring modifications to the existing MCC compartments for the 480V REAC MOV BD 2A1-A as indicated in the Drawing Revision Authorizations (DRAs). The changes are necessary to incorporate U1 change paper into the Unit 2 MCCs and to replace obsolete components with new, reliable and up-to-date components for the WBN Unit 2 Completion Project. Appendix R requirements for specific compartments are also provided as part of this EDCR-2 scope of work.

2.0 SCOPE OF WORK

Unit 2 compartments which are being replaced are identified by cross hatching on Unit 2 Control Configuration (CC) single line diagrams. Design input is taken from Unit 2 As Designed (AD) connection diagrams and compared against Unit 1 As Constructed (AC) connection diagrams to identify differences. Unit 1 change paper, for corresponding Unit 2 components, is implemented in this EDCR-2 package.

The scope of work for this EDCR-2 53287 covers the modifications performed on Safety Related, Class 1E equipment for the Unit 2 MCC which located in the Auxiliary Building for:

480V REAC MOV BD 2A1-A (2-MCC-213-A1-A)
See Single Line Diagram drawings 2-45W751-1, -2, -3 and -13

The detail work for all MCC compartments is shown on the drawings (DRA's) of the Single LineDiagrams, the Internal Connection Diagrams and the Schematic Diagrams.

EDCR Procedure 25402-3DP-G04G-00081, Rev 007 has been reviewed and no corrections need to be made to this in-process EDCR to comply with the technical requirements of the revised procedure.

In general, the modifications covered under this EDCR-2 are as follows:

2.1 Provide replacement of the existing Safety Related, Class 1E Motor Control Center (MCC) buckets (motor starters, circuit breakers, fuse assemblies, indicating lights, handswitches, relays for control or monitoring, and other related devices in the buckets) with new Safety Related, Class 1E MCC buckets in the existing compartments of the Unit 2 Safety Related, Class 1E equipment for 480V REAC MOV BD 2A1-A (2-MCC-213-A1-A).

2.2 Provide replacement of the existing obsolete feeder breakers (breaker only without starter) in the indicated compartments with new high fault current circuit breakers (Seimens Type ED63). Breakers are equipped with or without shunt trips as indicated on the drawings (DRAs). Breaker retrofit kits including brackets are provided for new breaker installations. The current limiting fuses connected in the series with the existing EF3 model breakers are no longer required and are not provided for the new ED63 circuit breaker. The existing fuse deletions have been coordinated with the Master Fuse Program.

2.3 The existing MCC, 2-MCC-213-A1-A, supplies power to some of the existing Unit 0 ,Unit 1 (Operating Unit) & Unit 2 loads which are under Unit 1 control. All work performed on this MCC under this EDCR-2 require scheduling and implementation through Work Control / Work Management Procedures with the concurrence of Unit 1 Operations.

2.4 The existing Safety Related, Class 1E MCC buckets (to be replaced) shall be de-energized and disconnected from the existing power and control cables. The existing MCC buckets shall be removed from the existing MCC compartments. Personnel performing work on MCC's must wear proper personnel protective equipment (PPE) per NFPA 70E and OSHA guidelines.

2.5 This EDCR-2 includes de-terminating, lifting, taping, identifying the existing power/control cables and re-landing the power cables after the new MCC bucket or feeder breaker has been replaced. For internal MCC wires between the bucket and the existing rear panel terminal blocks, the wiring is to be de-terminated at the bucket and re-terminated on the appropriate terminal points of the new pull-apart terminal block(s) in the replacement bucket per the associated connection diagram DRAs.

For the feeder breakers with shunt trips, the control wiring shall be de-terminated from the old breaker's shunt trip and re-terminated on the corresponding terminals of the new feeder breaker shunt trip unit.

2.6 Terminations of new power or control cables scoped in other design packages (DCNs or EDCRS) are not within the scope of this EDCR-2 unless otherwise noted. The other system design packages will provide the complete termination information of these respective cables.

2.7 All the existing internal control wiring and the existing terminal blocks in the rear panel of the MCC compartment are to remain for reuse. Termination of the existing control wiring from the rear panel to the new terminal blocks in the new bucket are part of this EDCR-2 package. Any new internal MCC wiring required by this EDCR-2 package is identified on the DRAs and is to be terminated accordingly.

2.8 Power feeder cable resizing, cable replacements and external cable rerouting are not part of this EDCR-2 package. The disconnection of the power feeders from the existing MCC starters and the re-connections of power feeders to the new MCC starters are part of this EDCR-2 package.

2.9 Before de-terminating any power/control cables or internal wiring, the Constructor shall label each wire (if not already adequately labeled) to help facilitate the correct re-termination of each conductor.

2.10 The design details, wiring configurations and technical requirements of the new MCC bucket (including the components such as starters, molded case circuit breakers, hand switches, relays and other devices) have been designed and built in accordance with the the WBN Unit 1 Single Line diagrams and compartment Internal Connection Diagrams. This is to ensure that the new safety related, Class 1E MCC buckets are compatible with the existing safety related, Class 1E MCC buckets in form, fit and function including racking-in and latching functions.

2.11 The new replacement circuit breakers are equipped with or without shunt trip accessories as indicated on the DRAs.

A. Breakers equipped with shunt trips (ST) is pre-wired to the MCC pull apart terminal blocks by the MCC bucket supplier. The shunt trips for the breakers are rated for 125V DC (shutdown power).

B. Breaker shunt trips (under Unit 1 Operation Control) provide a means to shed non-essential loads from the MCC and the diesel generator backed shutdown boards in the event of a Loss of Offsite Power (LOOP).

2.12 The new safety related MCC starter buckets are procured under Material Requisition (MR) No. 25402-011-MRA-ECM1-00001,and the feeder breakers (for compartment with breaker only) and other components are procured under the MR No. 25402-011-MRA-ECM1-00003.

2.13 All breaker ratings and settings are based on Unit 2, 480V Class 1E Protection, Coordination, and Thermal Overload Heater Calculation No.EDQ 00299920080004.

2.14 Table 1 (below) consists of a list of MCC compartment UNIDs, Load UNIDs and DRA numbers (connection diagram drawings) required for the indicated MCC bucket and feeder breaker replacements and the internal connection changes affected by this EDCR-2 modifications.

2.15 System engineer has changed motor size from 3 HP to be 1 1/2 HP to accommodate the load served for Motor, 2-MTR-031-0303/1 serving from MCC compartment 2-MCC-213-A1/18C-A. All technical data and electrical requirements for this motor on drawing 2-45W751-1, 45B2766-18C and 2-45W760-26-5 are revised accordingly. FCR 55769-A

2.16 BLOWN FUSE DETECTORS (BFDs):
In order to provide the power available for isolation valves at all time and control circuit indicating lights are monitoring limit switch positions (only). As solutions and actions to the PER 389663 (see Paragraph 24.0), Blown Fuse Detector Relays are removed from their BFD bases (BFDBs) and breaker shunt trips are disconnected from BFD NC contacts. These modifications are applicable for Unit 2 only and are not applicable to Unit 1 (Operating Unit). Modifications are provided for following Isolation Valves: 2-FCV-67-97-A and 2-FCV-67-89-A as depicted on connection diagram DRA Nos. 53287-5C,15D and schematic diagram DRA No. 53287-126 (issued under FCR No. 58217-A). BFDs are also removed from 2-MCC-312-A1-A compartment numbers 7D, 8D, 9D and 10D for isolation valve control circuits 2-FVC-63-80-A, 2-FCV-63-118-A, 2-FCV-70-100-A and 2-FCV-74-1-A connection diagram DRA Nos. 53287-7D, -8D, -9D and -10D, respectively (issued under FCR No. 58458-A). Their respective schematic diagrams are revised accordingly. FCR 58458-A FCR 58217-A

2.17 Starters of MCC bucket replacements have unused or spare contacts. These unused contacts will add the burden to the starter coils. To improve the starter coil pickup voltage performance, two auxiliary contacts from each starter coil are removed. This modification is typical for all starters of the MCC bucket replacement compartments 2C through 18E. The modifications are depicted on following connection diagram Drawing Nos. 53287-2C, -3E, -4E, -5C, -6D, -7A, -7B, -7D, -8A, -8B, -9A, -9B, -9D, -10A, -10B, -10D, -10F, -11A, -11B, -11D, -11E, -12A, -12B, -12D, -12E, -13A, -13B, -13E, -14A, -14B, -14D, -14E, -15D, -16A, -16B, -17B, -17C, -18C and -18E. Schematic diagrams for the respective MCC compartments are modified accordingly. FCR 55769-A

2.18 AC Auxiliary Power System Calculation WBN-EEB-EDQ000-999-2007-0002 identified a degraded voltage as a breakage at valve 2-FCV-72-39-A, served from compartment No.13E of the MCC (2-MCC-213-A1-A). The resolution to the breakage is to provide a **5.7** seconds time delay for the valve opening circuit, the time delay will allow the load line voltage to recover for the valve opening circuit. A time delay relay 2-62-072-39-A will be provided for this valve opening circuit and time delay is set at **5.7** seconds as indicated by the calculation. FCR 58458-A FCR 55769-A

2.19 I&C Set Point Calculation has revised the time delay relay settings for Thermal Barrier Booster Pump 2A-2 (2-MTR-70-131-A) Compartment No. 2C and Containment Spray Pump 2A-2 Recirculation Valve (2-FCV-72-34-A) compartment No. 10F. The I&C Set Points for Time delay relays 2-02-70-131B-A and 2-62-72-34-A are revised from 25 sec to be 35 sec and from 10 sec to be 13.5 sec in calculations WBN-EEB-00207051AA and WNB-EEB-2620720013,respectively. DRAs 53287-001, -130, -028 and -134 are revised to reflect these changes. FCR 55769-A

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2.19 TABLE 1 LIST OF MCC COMPARTMENTS REQUIRED COMPONENT REPLACEMENTS

2-MCC-213-A1-A, 480V REACTOR MOV BOARD UNIT 2 (MCC BUCKET STARTER, FEEDER BREAKER, DEVICES AND INTERNAL WIRING CHANGES)				
ITEM NO.	MCC COMPARTMENT UNID *(See Note 1)*	LOAD I.D.	CONNECTION DIAGRAM NO. *(See Note 2)*	DRA NO. *(See Note 2)*
	MCC BUCKETS			
1	WBN-2-MCCC-213-A001/2C -A	2-MTR-70-131-A	45B2766-2C	53287-001
2	WBN-2-MCCC-213-A001/3E -A	2-MTR-62-247-A	45B2766-3E	53287-005
3	WBN-2-MCCC-213-A001/4E -A	2-MTR-3-118D-A	45B2766-4E	53287-007
4	WBN-2-MCCC-213-A001/5C -A	2-FCV-67-97-A	45B2766-5C	53287-011
5	WBN-2-MCCC-213-A001/5F -A	SEE NOTE 5	45B2766-5F	53287-012
6	WBN-2-MCCC-213-A001/6A -A	SEE NOTE 6	45B2766-6A	53287-013
7	WBN-2-MCCC-213-A001/6D -A	2-FCV-68-333-A	45B2766-6D	53287-014
8	WBN-2-MCCC-213-A001/7A -A	2-FCV-62-63-A	45B2766-7A	53287-015
9	WBN-2-MCCC-213-A001/7B -A	2-FCV-62-90-A	45B2766-7B	53287-016
10	WBN-2-MCCC-213-A001/7D -A	2-FCV-63-80-A	45B2766-7D	53287-017
11	WBN-2-MCCC-213-A001/8A -A	2-FCV-62-98-A	45B2766-8A	53287-018
12	WBN-2-MCCC-213-A001/8B -A	2-LCV-62-132-A	45B2766-8B	53287-019
13	WBN-2-MCCC-213-A001/8D -A	2-FCV-63-118-A	45B2766-8D	53287-020
14	WBN-2-MCCC-213-A001/9A -A	2-LCV-62-135-A	45B2766-9A	53287-021
15	WBN-2-MCCC-213-A001/9B -A	2-FCV-63-177-A	45B2766-9B	53287-022
16	WBN-2-MCCC-213-A001/9D -A	2-FCV-70-100-A	45B2766-9D	53287-023
17	WBN-2-MCCC-213-A001/10A-A	2-FCV-63-1-A	45B2766-10A	53287-025
18	WBN-2-MCCC-213-A001/10B-A	2-FCV-63-3-A	45B2766-10B	53287-026
19	WBN-2-MCCC-213-A001/10D-A	2-FCV-74-1-A	45B2766-10D	53287-027
20	WBN-2-MCCC-213-A001/10F-A	2-FCV-72-34-A	45B2766-10F	53287-028
21	WBN-2-MCCC-213-A001/11A-A	2-FCV-63-7-A	45B2766-11A	53287-029
22	WBN-2-MCCC-213-A001/11B-A	2-FCV-063-8-A	45B2766-11B	53287-030
23	WBN-2-MCCC-213-A001/11D-A	2-FCV-063-26-A	45B2766-11D	53287-031
24	WBN-2-MCCC-213-A001/11E-A	2-FCV-063-39-A	45B2766-11E	53287-032
25	WBN-2-MCCC-213-A001/12A-A	2-FCV-63-47-A	45B2766-12A	53287-033
26	WBN-2-MCCC-213-A001/12B-A	2-FCV-063-72-A	45B2766-12B	53287-034
27	WBN-2-MCCC-213-A001/12D-A	2-FCV-063-93-A	45B2766-12D	53287-035
28	WBN-2-MCCC-213-A001/12E-A	2-FCV-063-152-A	45B2766-12E	53287-036
29	WBN-2-MCCC-213-A001/13A-A	2-FCV-063-156-A	45B2766-13A	53287-038
30	WBN-2-MCCC-213-A001/13B-A	2-FCV-72-44-A	45B2766-13B	53287-039
31	WBN-2-MCCC-213-A001/13E-A	2-FCV-72-39-A	45B2766-13E	53287-040
32	WBN-2-MCCC-213-A001/14A-A	2-FCV-72-40-A	45B2766-14A	53287-041
33	WBN-2-MCCC-213-A001/14D-A	2-FCV-74-12-A	45B2766-14D	53287-042
34	WBN-2-MCCC-213-A001/14E-A	2-FCV-74-33-A	45B2766-14E	53287-043
35	WBN-2-MCCC-213-A001/15D-A	2-FCV-67-89-A	2-45B2766-15D	53287-044
36	WBN-2-MCCC-213-A001/16A-A	2-MTR-31-265	45B2766-16A	53287-045
37	WBN-2-MCCC-213-A001/16B-A	2-MTR-77-129	45B2766-16B	53287-046
38	WBN-2-MCCC-213-A001/17B-A	2-FCV-26-240-A	45B2766-17B	53287-049
39	WBN-2-MCCC-213-A001/17C-A	2-FCV-26-242-A	45B2766-17C	53287-050
40	WBN-2-MCCC-213-A001/18C-A	2-MTR-31-303/1-A	45B2766-18C	53287-053
41	WBN-2-MCCC-213-A001/18E-A	2-FCV-26-243-A	45B2766-18E	53287-054

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2-MCC-213-A1-A, 480V REACTOR MOV BOARD UNIT 2 (MCC BUCKET STARTER, FEEDER BREAKER, DEVICES AND INTERNAL WIRING CHANGES)					
ITEM NO.	MCC COMPARTMENT UNID *(See Note 1)*	LOAD I.D.	CONNECTION DIAGRAM NO. *(See Note 2)*	DRA NO. *(See Note 2)*	
51	WBN-2-MCCC-213-A001/14B-A	SEE NOTE 8	45B2766-14B	53287-057	FCR 55769-A
	FEEDER BREAKERS				
42	WBN-2-MCCC-213-A001/2E1-A	2-FCV-63-1-A	45B2766-2E1	53287-002	
43	WBN-2-MCCC-213-A001/2F2-A	2-FCV-062-98-A	45B2766-2F2	53287-003	
44	WBN-2-MCCC-213-A001/3F2-A	2-FCV-63-118-A	45B2766-3F2	53287-006	
45	WBN-2-MCCC-213-A001/4F-A	THERMAL OVERLOAD BYPASS 2A1	45B2766-4F	53287-008 53287-009	FCR 55769-A
46	WBN-2-MCCC-213-A001/5B-A	2-FCV-74-1-A	45B2766-5B	53287-010	
47	WBN-2-MCCC-213-A001/9F-A	SEE NOTE 7	45B2766-9F	53287-024	
48	WBN-2-MCCC-213-A1/16F2-A	2-TB-31-303B	45B2766-16F2	53287-048	FCR 55769-A
49	WBN-2-MCCC-213-A001/17E-A	PWR OUTLETS	45B2766-17E	53287-024	
50	WBN-2-MCCC-213-A1/17F2-A	2-FCV-63-80-A	45B2766-17F2	53287-052	

NOTES for Table 1:

(1) MCC compartments required for MCC bucket and feeder breaker replacements for Unit 2, 2-MCC-213-A1-A.
(2) All the internal wiring of the MCC buckets and feeder breakers are shown in Connection Diagram Drawing Revision Authorizations (DRAs) and are attached with this EDCR-2.
(3) For MCC replacement buckets see TRENTEC drawings on Purchase Order No. 78698. For the existing original MCC see ITE Drawings from the TVA Contract No. 74C5-84646.
(4) All breaker ratings and settings are based on Unit 2, 480V Protection Calculation No. EDQ 00299920080004, Rev. 001.
(5) Compartment 5F is being spared and valve 2-FCV-62-275-A is not used. The replacement bucket purchased for Compartment 5F will be placed in storage.
(6) Compartment 6A is an existing spare compartment.
(7) Compartment 9F is being spared.
(8) The Compartment 14B load is relocated to the Compartment 7D 480V Control and Auxiliary Building Vent Board 2A1-A under EDCR 53290. The starter bucket of Compt. 14B will be left in place as spare.

FCR 55769-A FCR 55769-A FCR 55769-A FCR55769-A

2.20 Status Monitor Relays and 7KΩ Resistors

This package provides new status monitor relays, Potter & Brumfield (P & B) Model KUIP relay, and a 7 KΩ resistor in the rear of compartments as indicated on the internal connection diagram DRAs.

The P & B relays provide valve position input status to the Emergency Response Facility Data System Integrated Computer System (ICS) Data Acquisition Panels 2A1 as follows:

Normal, Power is ON and Power is available to the load
Position, Valve is Open or Closed

The resistor is rated 7KΩ and 8 Watts. The resistor is used as a current divider to maintain the relay coil burden operating range for circuit lengths exceeding 600 ft.

Install the status monitor relays and the resistor in the rear panel of the MCC per mounting detail as indicated on the DRAs. Make field adjustments for the relay and resistor space as required.

For resistor terminations, Field shall solder the indicated WJG-6 SIS wires to the resistor terminals using Procedure MAI - 3.5 and G-28 Field Soldering. Provide the material via FMR. The soldering shall be Sn60 (60% tin & 40% lead), Sn62 (62% tin & 38% lead) or Sn63 (63% tin & 37% lead) of Federal Specification QQ-S-571.

2.21 Unit 1/Unit 2 Interface Points
DCN 54703 and DCN 56336 are pre-requisites to the work on this EDCR-2 package. Both DCNs establish separation boundaries, transfer control of existing interface points to Unit 2 startup and operations in accordance with procedure TI-12.08, Control of Unit Interfaces, and allow modification work to be implemented under this EDCR-2 package.

2.22 MCC Appendix R Breakages from WITEL/PER's

A. Appendix R breakages from WITEL

MCC compartments 5C, 6D, 7B, 7D, 8B, 8D, 9A, 10D, 11B, 11D, 12A, 12B, 12D, 12E, 13A, 13B, 13E, 14A, 14D, 14E, and 15D, are affected by the Appendix R changes. To meet these requirements, wiring of limit switches and control cables in the rear panels of compartments were modified. Compartments 8A and 10D have added notes to indicate that the valves are locked in either the open or closed position with the breaker locked open based on the Appendix R Analysis.

FCR 58967-A

B. PER# 178013 - Adhesive Backed Cable Support Mounts(ABCSM)

In accordance with licensing commitment NCO PER Action 178013-001, the constructor shall verify that all MCC compartments and the associated rear panels comply with ABCSM requirements:

TVA General Engineering Specification G-38 "Installation, Modification, and Maintenance of Cables Rated Up to 15,000 Volts", and

Modification/Addition Instruction, MAI-3.3, "Cable Terminating, Splicing, and Testing of Cables Rated Up to 15,000 Volts".

2.23 Obtain the Weights of all existing MCC buckets and feeder breakers (to be removed and replaced).

This EDCR-2 package includes a requirement for the Constructor to weigh all MCC compartments being replaced. Each bucket (with door) and feeder breaker (with door) is to be weighed to an accuracy no less than +/- 0.5 lbs and this weigh shall be two party verified. The weighing scale must be part of the site calibration program and contain an up-to-date certified calibration sticker per site procedures.

This data is required as a design input for Civil Equipment Seismic Qualification calculations for Class 1E equipment necessary to verify compliance of the MCC structure 2-MCC-213-A1-A with the new MCC compartments.

2.24 AFFECTED CORRECTIVE ACTION PROGRAM CODES

CP3.1 Licensing Verification; CP3.3.1 Civil Baseline Calculations; CP3.3.2 Electrical Baseline Calculations; CP3.3.3 Instrumentation Baseline Calculations; CP3.3.4 Mechanical/Nuclear Baseline Calculations; CP5.3 Contact and Coil Rating of Electrical Devices; CP5.4 Torque Switch and Overload Relay Bypass; CP5.5 Adhesive Backed Cable Support Mounts; CP5.7 Thermal Overloads; CP5.8

Coordination; CP6 Equipment Seismic Qualification; CP7.1 10 CFR50.48/Appendix R; CP16 Seismic Analysis; CP17 Vendor Information; SP5 Master Fuse List.

2.25 SETPOINT LOGIC CHANGES

Logic for the time delay relay 2-02-70-131B-A is modified by this EDCR (DRA 53287-159). Furthermore, the setpoint of the time delay relay is changed from 25 seconds to 35 seconds to support existing calculation WBN-EEB-00207051AA. Logic for the time delay relay 2-62-72-34-A is modified by this EDCR (DRA 53287-160). Furthermore, the setpoint of the time delay relay is changed from 10 seconds to 13.5 seconds to support existing calculation WBN-EEB-2620720013. FCR 55769-A

2.26 THERMAL OVERLOAD (TOL) BYPASS RELAY CONTROL

PER 363755 addresses R-series relays located in Auxiliary Instrumentation Room missing UNID numbers. As a continuation to this PER finding, 480V RMOV Boards 2A1-A, 2A2-A, 2B1-B and 2B2-B have some relays without UNIDs including Relays K1 through K9 of the TOL Bypass Relay Control 2A1. As one of solutions/actions to the PER and as part of the QA program required by 10 CFR 50 Appendix B, MEL packages are provided to add UNID numbers as depicted on DRAs. ICRDS for cable 2M980A UNID is also revised to its respective system. FCR 58458-A

3.0 WORK SCOPES NOT COVERED

A. The work scope does not include replacing any Unit 2 MCC compartments that are under U1 control, any spare/future compartments or any compartments that become spare by other EDCRs.

B. The work scope does not include adding, replacing or landing external cables which are installed under other packages (DCNs or EDCRs).

C. Fuses for the MCC buckets as indicated on DRAs for EDCR-2 53287 are documented and are procured under the EDCR 54797. The Master Fuse List Program provides MEL packages for system 213 fuses. Fuse installations are provided under the system start up scope of work.

D. Thermal Overload (TOL) Heaters for the MCC buckets as indicated on DRAs for EDCR-2 53287 are documented and are procured under the EDCR 54587. TOL installations for all MCC buckets are provided under the system start up scope of work. TOL settings are in accordance with calculation EDQ00299920080004.

E. Fuses and TOLs for MCC compartments are not procured and are not installed under EDCR-2 53287 package. This package also does not turn over any downstream system loads to Startup or Operations. ADMIN 04

4.0 GENERAL TECHNICAL REQUIREMENTS

The modifications under this EDCR-2 package technical design and evaluations are performed in accordance with the requirements of the latest revision of following procedures:

A. Engineering Department Procedure 25402-3DP-G04G-00081, "ENGINEERING DOCUMENT CONSTRUCTION RELEASE (EDCR)".

B. WBN Unit 0, 1 Technical Instruction 0-TI-2, "CRITERIA FOR ISSUING ENGINEERING DOCUMENT CONSTRUCTION RELEASES POTENTIALLY IMPACTING WBN UNIT 0 AND/OR UNIT 1 DESIGN (EDCR-2)".

5.0 HISTORICAL WATTS BAR UNIT 1 DESIGN CHANGE NOTICES (DCNs)

Prior to the initiation of this EDCR-2 package, a comprehensive review and scoping of all U1 change paper, Historical Watts Bar Unit 1 Design Change Notices (DCNs) was performed. This ensures that the Unit 1 (Operating Unit) and WBN Unit 2 design configurations are identical as possible and U1 design changes are incorporated. Any differences identified as the result of the review are addressed and documented in the Unit Differences form included within this package.

6.0 SEISMIC QUALIFICATION REVIEW

All MCC compartments and components of the existing 480V REAC MOV BD 2A1-A (2-MCC-213-A1-A), are classified as safety related, Class 1E, seismic category 1. All the replacement MCC buckets and the other components installed as part of this package are procured as seismically qualified category 1, safety related, Class 1E equipment under MR No. 25402-011-MRA-ECM1-00001, under MR No. 25402-011-MRA-ECM1-00003 and MR No. 25402-011-MRA-ECM1-00005. FCR 55769-A

7.0 EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW

The existing MCC, 2-MCC-213-A1-A, is located in the Auxiliary Building, elevation 772, column A12T, 480V Board Room 2A which is classified as a mild environment area. Therefore equipment qualification in accordance with IEEE 323-1974 and 10CFR50.49 for all MCC equipment and components is not required.

8.0 APPENDIX R ZONE AND AUXILIARY BUILDING SECONDARY CONTAINMENT ENCLOSURE (ABSCE) REVIEW

This EDCR-2 scope of work is confined to the motor control center structure and its internals. Any external activities such as cable additions, deletions or changes and cable rerouting associated with Appendix R requirements or Appendix R Fire Zones is not part of the scope of this EDCR.

Also since all work associated with this package is internal to the MCC, any work that could possibly cross or breach the Auxiliary Building Secondary Containment Enclosure (ABSCE) boundary line is not covered under this EDCR-2. Therefore, this EDCR-2 modification work has no impact to the ABSCE.

9.0 ALARA SCREENING CHECKLIST

An ALARA Screening Checklist is performed for this EDCR-2 package. The ALARA Checklist verifies the scope of this EDCR-2 does not affect ALARA. The MCC buckets, feeder breakers and relay replacements, and internal wiring modifications are performed inside the motor control center (in the Auxiliary Building) in a mild environmental area. This location is outside of the Radiological Controlled Area (RCA). Therefore, this EDCR-2 modification has no radiological impact to the surrounding area.

10.0 HUMAN FACTORS ENGINEERING (HFE)

A Human Factors Engineering (HFE) review is performed and attached to this EDCR-2.

11.0 MASTER EQUIPMENT LIST (MEL) PACKAGE

MEL UNID list of the components is provided with this EDCR-2 package. All modified component UNIDs have been reviewed with the drawings and are identified for its status as add, modify or delete as applicable.

12.0 MATERIAL REQUISITION (MR)

Material Requisitions (MR) have been issued for the procurement for the new safety related, Class 1E equipment, MCC buckets (starters, breakers and other devices) under the MR 25402-011-MRA-ECM1-00001 and for feeder breakers (breakers only) and other components under the MR 25402-011-MRA-ECM1-00003 which are referenced in the EDCR-2 package.

Field Material Requisitions (FMR), shown on the BOM, are to be issued by the site for items such as internal MCC panel wiring, terminal blocks, bolt/washer/nut fastener material as needed, etc. These materials need to be ordered as Class 1E, safety related.

Project QA has reviewed material.

13.0 ICARDS REPORTS

No ICRDS Report is required. All wiring modifications are internal to the MCC compartments. No external cabling is required.

14.0 CHANGE REVIEW BY ELECTRIAL AND I & C (CHECKLIST)

Change Review by Electrical and I&C (Checklist) is performed and included within the package to identify any calculations impacted by this EDCR-2 modification.

15.0 FIRE PROTECTION REVIEW

A fire protection review is performed to insure that all combustible materials such as bucket materials, feeder breaker materials, control cable insulation added as a result of this modification are properly addressed in the affected combustible materials calculations. Refer to Combustible Loading Calculation EPMDOM012990 (Mechanical).

16.0 DESIGN REVIEW MEETINGS

The following design review meetings are noted as follows:

A. The initial (10%) Design Review meeting is waived.

B. Design Review Board (DRB) meeting is waived.

C. The 50% Design Review meetings is waived.

D. The final Design Review meeting is waived.

The meeting waiver form is attached to this EDCR-2 Package.

17.0 WALK-DOWN

The Final Constructability Walkdown for this package to ensure that the design modifications are constructible and can be implemented by the Constructor was performed on April 9, 2010 as part of this EDCR-2 process. The 62 constructability comments have been reviewed, resolved and incorporated. The Constructability Walkdown signoffs are included in this package.

18.0 OPERATING EXPERIENCE (OE) DATABASES REVIEW

A review of Operating Experience (OE) database was performed to insure that any plant failure occurrences similar to changes to the electrical distribution equipment covered by this EDCR-2 package are addressed and corrected accordingly.

19.0 LICENSING IMPACT REVIEW

Screening for Impact to Licensing was performed to insure that the licensing basis is implemented in the same manner as the Unit 1 and not invalidate or undo previous WBN Unit 1 licensing basis. A completed and signed off Appendix J form is included in this package.

20.0 CABLE TERMINATION, REPAIR AND MODIFICATION REQUIREMENTS

Lifting/re-landing of power or control cables as a result of the bucket and feeder replacements and any internal wiring changes shall be in accordance with the latest revision of the TVA General Engineering Specification G-38 "Installation, Modification, and Maintenance of Cables Rated Up to 15,000 Volts" and Modification/Addition Instruction, MAI-3.3, "Cable Terminating, Splicing, and Testing of Cables Rated Up to 15,000 Volts". Soldering of the 7K ohm resistors shall be performed in accordance with MAI-3.5 "Field Soldering". Installation of relays, terminal blocks and other electrical components shall be in accordance with MAI-3.8 "Installation of Electrical Components".

21.0 TESTING REQUIREMENTS

A. Continuity testing and insulation resistance testing for power and control cables, which is required for cables, is not within the scope of this package. See the latest revision of TVA General Engineering Specification G-38, Sections 19.1 and 19.3 for requirements concerning these tests.
B. Prior to installing each feeder breaker, NEMA AB-4 breaker testing shall be performed or verified as having been performed by the vendor.
C. Functional system checks and Post Modification Testing shall be performed by the System SU group and is not part of the scope of this package.
D. Prior to shipment the MCC supplier (Trentec) is performing functional tests on each bucket and the components within each bucket in accordance with the pre-approved test procedures.

E. EMI/RFI testing of Macromatic model PLP480 phase monitoring relays/blown fuse detector (BFD) has been performed by TVA corporate. The BFD passed the EMI/RFI test. However, the BFD relay is no longer needed for the isolation valve control circuit. The BFD relay shall be removed from the BFD base (BFDB) sockets, and the relay will be stored at TVA warehouse. The valve control circuit modification is provided for complete circuit connections.

FCR 58217

22.0 DRAWING REVISION AUTHORIZATION (DRA) PACKAGE

Drawing Revision Authorization (DRA) sheets show all work related to this EDCR-2 package for replacement of all MCC buckets, feeder breakers, rear panel devices and internal wiring modifications required to implement the U1 change paper into the U2 equipment. The DRA sheets are included in this package.

23.0 CONCLUSIONS

A. The EDCR-2 53287 modification activities are related to the Unit 2 safety related, Class IE, seismic category 1 components which are permanently installed in the existing safety related, Class 1E equipment for Unit 2 motor control centers 2-MCC-213-A1-A that contain Unit 0 and/or Unit 1 components (Operating Unit). Some of the existing loads are serving and controlled by Unit 1, therefore, the work activities under this EDCR-2 require scheduling and implementation through Work Control / Work Management Procedures under the Unit 1 Operations.

B. These EDCR-2 modifications do not adversely impact any requirements or capabilities of any system protecting safety related structures, systems or components (SSC). There are no impacts to Final Safety Analysis Report (FSAR), System Description (SD), and Design Criteria (DC), Technical Specification (TS) and/or Technical Requirement (TR).

C. The preparation of this EDCR-2 53287 is in accordance with the latest revision of Procedure 25402-DP-G04G-00081, Engineering Document Construction Release (EDCR) and in conjunction with WBNP Unit 0, 1 Technical Instruction 0-TI-2, Criteria for Issuing Engineering Document

EDCR COVER SHEET (CONTINUED)

EDCR-2 # 53287 Rev. A

A. Construction Releases (EDCR-2) Potentially Impacting WBN Unit 0 and/or Unit 1 Design. These modifications (or changes) are in compliance with U.S. Nuclear Regulatory Commission (NRC) requirements. Therefore, these modifications or changes are acceptable for nuclear safety considerations.
B. It is anticipated that Field Change Requests (FCRs) will be initiated for any revisions to Trentec vendor drawings.

24. PER RESOLUTION:

PER 172596 – This PER addresses existing cable routing for valves – capable of Appendix R - safe shut down paths and identifies all control wiring modifications required to prevent spurious valve operation due to fire damage. This PER impacts many other EDCRs but valves mentioned in table 1 have been modified in this EDCR.

PER 144120 – This PER addresses the electrical circuit for the Thermal Barrier Booster Pump (TBB) that had been designed such that the pump starts immediately upon receiving a safety injection signal coincident with a loss of offsite power instead of being delayed 25 seconds as required by logic diagram for TBB pumps.

This EDCR 53287 addresses the PER 144120 and introduces a time delay relay to achieve the time delay and modifies the time as required by the revised set point calculations for the motor WBN-2-MTR-070-0131-A. This PER is mentioned in EDCR 53292.

PER 389663 – This PER identifies operational concerns related to use of BFDs for safety-related MCC control circuits for isolated valves. The BFDs will cause loss of valve position indicating lights.

EDCR-2 53287 addresses this PER issue to remove BFDs from BFD bases (BFDBs) and revise connection diagrams, schematic diagrams and single line diagrams to restore the function of indicating lights to indicate limit switch positions. The work will apply to following 2-MCC-213-A1-A compartments:

Compt. No.	Loads
5C	2-FCR-67-97-A
7D	2-FCR-63-80-A
8D	2-FCR-63-118-A
9D	2-FCR-70-100-A
10D	2-FCR-74-1-A
15D	2-FCV-67-89-A

PER 441913 - The PER addresses discrepancy of TOL bypass relay contact assignments from various change papers for Table 1 on drawing 2-45W760-270-2. Related DRA modifications from various design packages are required to coordinate with this Table 1. 2-MCC-213-A1-A compartment No. 16F2 on drawing 45B2766-16F added a shunt trip to this breaker, and however the single line diagram has not yet been revised to add the shunt trip.

EDCR-2 53287-A addresses actions/solutions to the PER 441913 by providing design coordination and revises DRAs 53287-008, 009 and 150 to correct any discrepancies and to coordinate with Table 1 on drawing 2-45W760-270-2 (a coordinated Table 1 is issued on DRA 53288-093). DRA 53288-093 is a co-requisite to other change papers from various design packages. Single line diagram on DRA 53287-155 is revised to add a shunt trip to the breaker at compartment No. 16F2.

BA 2/9/12

FCR 56023-A (AA-13)

EDCR COVER SHEET (CONTINUED)

EDCR-2 # 53287 **Rev.** A **Page No.** 12a

25.0 In compliance with 10CFR50 Appendix R, Engineering Program Management (EPM) Inc. has performed an Appendix R Safe Shutdown Analysis for ~~WBN~~ Unit 2. The analysis identified valve modifications to reduce Operator Manual Actions for the Unit 2, and one of recommendations is to activate valve 2-FCV-63-39-A. This is to provide a second path of isolation valve from a Boron Injection Tank. The analysis also recommended that power and control conductors of the valve to be disconnected from 480V Reactor RMOV Board 2A1-A/11E. The valve 2-FCV-63-39-A power and control conductors will be re-connected to 480V Control & Aux. Bldg Control Vent board 2A2-A/5C under EDCR-2 53290-A package.

VOID

BA 2/9/12

Valve 2-FCV-63-39-A power and control conductors are disconnected from 480V Reactor RMOV Board 2A1-A/11E under this EDCR-2.

26.0 As part of the EPM's Appendix R Safe Shutdown Analysis for WBN Unit 1 and Unit 2, the analysis identified and recommended valve control circuit modifications to prevent spurious valve operations due to fire damage to operating coil cables and/or at limit switches. The recommendation is to rewire safe shutdown MCC buckets with limit switches below operating coils and indicating lights. Local hand switches and local indicating lights are also removed. Unit 2 related work is implemented under TVA WBN Unit 2 Completion project, and Unit 1 related work is implemented under TVA WBN Unit 1 work maintenance program. This EDCR-2 53287-A implements modification to Unit 2 related work only. Following MCC compartments are implemented under this EDCR-2 package:

A. Appendix R: 2-MCC-213-A1-A with MCC bucket replacements that have Appendix R wiring configurations modified prior to shipment by QUALTECH (Equipment Vendor) are for compartment numbers 5C, 6D, 7B, 7D, 11D, 12B, 13B, 13E and 15D.

B. Appendix R (Hot Shorts): 2-MCC-213-A1-A with MCC bucket replacements that have been shipped to the WBN Unit 2 site and they have **not** yet been modified to meet the Appendix R (Hot Shorts) wiring configurations are for compartment numbers **8B, 11B, 12D, 14D and 14E**.

Construction shall performed all these MCC bucket replacements for Appendix R (Hot Shorts) wiring modifications and as well as all rear panel wiring modifications as depicted on connection and schematic diagram DRAs under this EDCR-2 design change package.

Wires 11BC3 & 11BO7 for compartment 11B and wires 12DO3 & 12DC3 for compartment 12D are routed from the MCC to MCR separately from other valve control cable and conduit routings. These new cable and conduit routings are provided under EDCR-2 55233-A. Local control hand switches for Compartment No. 12D control wires shall be disconnected at both MCC and at the local switches, and local switches are abandoned in place.

EDCR-2 53287-A scope of work is limited to modification internal to the MCC only. For Power and control connection diagrams that are external to the motor control center, at any junction boxes, terminating points and at load connections, the work will be coordinated with system design changes. The external work outside MCC, design changes will be issued under system design change paper EDCR packages.

FCR 58967-A

TABLE 2.

LIST OF MCC COMPARTMENTS WITH HISTORICAL UNIT 1 CHANGE PAPER REQUIREMENTS

ITEM NO.	MODIFICATION DOCUMENTS	HISTORICAL UNIT 1 DESCRIPTION OF CHANGES RELATED TO UNIT 2 REQUIREMENTS
Compartment 2C		
1	DCN-M-11943-A	Added Relay 62X (1-62X-70-131C-A), Potter&Brumfield, KUIP Series Replace Relay 62 (1-62-70-131B-A), with Agastat Relay, ETR14I3C003
2	DCN-28376-A	Replace Relay 62 (1-62-70-131B-A), with Agastat Relay, ETR14I3D003, changed time delay pickup from 25 to 35 sec
3		Changed UNID description from Component Cooling System Booster Pump 1A-A to Thermal Barrier Booster Pump 1A-A
Compartment 3E		
4	DCN-M-14567-A	Deleted Cable 1PP557A to 1-BD-211-A/18-A, (GE. 0123D4593-1)
5	DCN-25807-A	Changed Motor UNID from 1-MTR-62-AOP-A to 1-MTR-62-247-A
6	DCN-5-21226-A	Replaced obsolete breaker WBN-1-BKR-062-247-A per N3G-933, Generic Substitution Datasheet 3018
7	DCN-5-14152-A WO 93-24912-00	Replaced Agastat Relay 7014 with E7014 per N3G-933, Generic Substitution Datasheet 3001
Compartment 4E		
8	DCN-P-03392-A	Added Cable 1V3964A, to 2-MCC-214-A1/4E-A, (45B2770-4E) Added Cable 1V3965A, to 2-MCC-214-A1/6E-A, (45B2770-6E) Added Cable to Compartment 4F, Sheet 2, (45B1766-4F-2)
9	DCN-33955-07	Disconnected Cable 1SR1025
Compartment 4F		
10	DCN-A-05222-A	Added Cable 1V3960A, to 1-MCC-214-A1/4E-A, (45B1770-4E) Added Cable 1V3961A, to 1-MCC-214-A1/6E-A, (45B1770-6E)
11	DCN-M-12212-A	Changed Breaker Catalog Number from EF3-B020 to ED63-B020
12	DCN-M-13725-A	Deleted Cable Terminations on terminals 48 and 49 labeled TO COMPT 9F Deleted Cable Terminations on terminals 58 and 59 labeled TO COMPT 14B
13	DCN-M-13725-A	Added Cable 1V7206A on terminals 48 and 49 to 1-MCC-214-A1/7E-A, (45B1770-7E) Added Cable 1V7205A on terminals 58 and 59 to 1-MCC-214-A1/7D-A, (45B1770-7D)
14	ECN-E110010	Added Relay K9 and associated wiring.
Compartment 5C		
15	DCN-M-11413-E	Changed Load UNID from 1-FCV-67-105-A to 1-FCV-67-97-A
Compartment 5F		
16	DCN-S-12809-A	Revised Load Description and UNID to "Positive Displacement Recirc. VLV. 1-FCV-62-275-A". Deleted power (1V3300A) and control cable connections (1V3301A) for previous UNID Positive Displacement Recirc. VLV 1-FCV-87-17-A.
17	DCN-S-21226-A	Replaced obsolete breaker WBN-1-BKR-062-0275-A per N3G-933, Generic Substitution Datasheet 3018
Compartment 6D		
18	DCN-S-31907-A	Replaced breaker WBN-1-BKR-068-0333-A per N3G-933, Generic Substitution Datasheet 3018
19	DCN-50301-A	Revised coordination reference for cable 1SR7
Compartment 7A		
20	DCN-50301-A	Revised coordination reference for cable 1SR25 and 1SR26

TABLE 2.

LIST OF MCC COMPARTMENTS WITH HISTORICAL UNIT 1 CHANGE PAPER REQUIREMENTS

ITEM NO.	MODIFICATION DOCUMENTS	HISTORICAL UNIT 1 DESCRIPTION OF CHANGES RELATED TO UNIT 2 REQUIREMENTS
21	WO-93-06062-05	Replaced obsolete breaker WBN-1-BKR-062-0063-A per N3G-933, Generic Substitution Datasheet 3018
22	DCN-P-04663-A	Removed Local Hand Switch
Compartment 7B		
23	DCN-50301-A	Revised coordination reference for cable 1SR27 and 1SR28
24	DCN-S-21226-A	Replaced obsolete breaker WBN-1-BKR-062-0090-A per N3G-933, Generic Substitution Datasheet 3018
25	DCN-P-04663-A	Removed Local Hand Switch
Compartment 7D		
26	DCN-P-03225-A	Deleted Fuses for the Status Monitoring Relays – 1-FU-213-A17/40 and A17/39
27	DCN-P-01667-C	Replaced Breaker, motor size reduced from 19.5 – 6.6 hp
28	DCN-D50301-A	Revised the connection drawing of 1SR75 and 1SR76 to 1-45W1697-6C
Compartment 8A		
29	DCN-M-16213-A	New Power Cable installed between MCC Compartments 8A and 2F2
30	DCN-D50301-A	Revised the connection drawing of 1SR29 and 1SR30 to 1-45W1697-6C
31	DCN-S-21226-A	Replaced obsolete breaker WBN-1-BKR-062-0098B-A per N3G-933, Generic Substitution Datasheet 3018
32	DCN-P-04663-A	Removed Local Hand Switch
Compartment 8B		
33	DCN-P-03226-A	Deleted Fuses for the Status Monitoring Relays – 1-FU-213-A18/20 and A18/19
34	DCN-D50301-A	Revised the connection drawing of 1SR31 and 1SR32 to 1-45W1697-6C
35	DCN-S-21226-A	Replaced obsolete breaker WBN-1-BKR-062-0132-A per N3G-933, Generic Substitution Datasheet 3018
36	DCN-P-04663-A	Removed Local Hand Switch
Compartment 8D		
37	DCN-P-03225-A	Deleted Fuses for the Status Monitoring Relays – 1-FU-213-A18/40 and A18/39
38	DCN-D50301-A	Revised the connection drawing of 1SR77 and 1SR78 to 1-45W1697-6C
Compartment 9A		
39	DCN-P-03226-A	Deleted Fuses for the Status Monitoring Relays – 1-FU-213-A19/10 and A19/09
40	DCN-D50301-A	Revised the connection drawing of 1SR33 and 1SR34 to 1-45W1697-6C
41	DCN-S-21226-A	Replaced obsolete breaker WBN-1-BKR-062-0135-A per N3G-933, Generic Substitution Datasheet 3018
Compartment 9B		
42	DCN-S-21226-A	Replaced obsolete breaker WBN-1-BKR-063-0177-A per N3G-933, Generic Substitution Datasheet 3018
43	DCN-P-04663-A	Removed Local Hand Switch
Compartment 9D		No change papers in the folder
Compartment 10A		
44	DCN-P-03225-A	Deleted Fuses for the Status Monitoring Relays – 1-FU-213-A110/10 and A110/09
45	DCN-D50301-A	Revised the connection drawing of 1SR55 and 1SR56 to 1-45W1697-6C
Compartment 10B		
46	DCN-P-03225-A	Deleted Fuses for the Status Monitoring Relays – 1-FU-213-A110/20 and A110/19
47	DCN-D50301-A	Revised the connection drawing of 1SR57 and 1SR58 to 1-45W1697-6C
48	DCN-S-21226-A	Replaced obsolete breaker WBN-1-BKR-063-0003-A per N3G-933, Generic Substitution Datasheet 3018

TABLE 2.

LIST OF MCC COMPARTMENTS WITH HISTORICAL UNIT 1 CHANGE PAPER REQUIREMENTS

ITEM NO.	MODIFICATION DOCUMENTS	HISTORICAL UNIT 1 DESCRIPTION OF CHANGES RELATED TO UNIT 2 REQUIREMENTS
49	DCN-P-04663-A	Removed Local Hand Switch
Compartment 10D		
50	DCN-P-03224-A	Deleted Fuses for the Status Monitoring Relays – 1-FU-213-A110/40 and A110/39
51	DCN-M-05836-C	Added control cable 1V983A
52	DCN-M-12070-A	Revised control cables 1V1272A and 1V1213A
53	DCN-24370-A	Deleted control cable 1V2785A
54	DCN-D50301-A	Revised the connection drawing of 1SR47 and 1SR48 to 1-45W1697-6C
55	DCN-S-21226-A	Replaced obsolete breaker WBN-1-BKR-074-0001B-A per N3G-933, Generic Substitution Datasheet 3018
Compartment 10F		
56	DCN-P-03367-A	Deleted Fuses for the Status Monitoring Relays – 1-FU-213-A110/60 and A110/59
57	DCN-D50301-A	Revised the connection drawing of 1SR41 and 1SR42 to 1-45W1697-6C
58	DCN-S-21226-A	Replaced obsolete breaker WBN-1-BKR-072-0034-A per N3G-933, Generic Substitution Datasheet 3018
59	DCN-P-04663-A	Removed Local Hand Switch
Compartment 11A		
60	DCN-P-03225-A	Deleted Fuses for the Status Monitoring Relays – 1-FU-213-A111/10 and A111/09
61	DCN-D50301-A	Revised the connection drawing of 1SR59 and 1SR60 to 1-45W1697-6C
62	DCN-S-21226-A	Replaced obsolete breaker WBN-1-BKR-063-0007-A per N3G-933, Generic Substitution Datasheet 3018
63	DCN-P-04663-A	Removed Local Hand Switch
Compartment 11B		
64	DCN-P-03225-A	Deleted Fuses for the Status Monitoring Relays – 1-FU-213-A111/20 and A111/19
65	DCN-D50301-A	Revised the connection drawing of 1SR61 and 1SR62 to 1-45W1697-6C
66	DCN-S-26009-B	Replaced obsolete breaker WBN-1-BKR-063-0008-A per N3G-933, Generic Substitution Datasheet 3018
67	DCN-P-04663-A	Removed Local Hand Switch
Compartment 11D		
68	DCN-P-03224-A	Deleted Fuses for the Status Monitoring Relays – 1-FU-213-A110/40 and A110/39
69	DCN-D50301-A	Revised the connection drawing of 1SR59 and 1SR60 to 1-45W1697-6C
70	DCN-S-26009-B	Replaced obsolete breaker WBN-1-BKR-063-0007-A per N3G-933, Generic Substitution Datasheet 3018
71	DCN-P-04663-A	Removed Local Hand Switch
Compartment 11E		
72	DCN-P-03225-A	Deleted Fuses for the Status Monitoring Relays – 1-FU-213-A111/50 and A111/49
73	DCN-26538-A	Deleted control wiring cables 1SR69 and 1SR70
Compartment 12A		
74	DCN-P-03225-A	Deleted Fuses for the Status Monitoring Relays – 1-FU-213-A112/10 and A112/09
75	DCN-D50301-A	Revised the connection drawing of 1SR67 and 1SR68 to 1-45W1697-6C
76	DCN-S-21226-A	Replaced obsolete breaker WBN-1-BKR-063-0047-A per N3G-933, Generic Substitution Datasheet 3018
77	DCN-P-04663-A	Removed Local Hand Switch
Compartment 12B		
78	DCN-P-03225-A	Deleted Fuses for the Status Monitoring Relays – 1-FU-213-A112/20 and A112/19
79	DCN-D50301-A	Revised the connection drawing of 1SR71 and 1SR72 to 1-45W1697-6C

TABLE 2.

LIST OF MCC COMPARTMENTS WITH HISTORICAL UNIT 1 CHANGE PAPER REQUIREMENTS

ITEM NO.	MODIFICATION DOCUMENTS	HISTORICAL UNIT 1 DESCRIPTION OF CHANGES RELATED TO UNIT 2 REQUIREMENTS
80	DCN-M-13725-A	Revised the wiring for Appendix R control concerns.
81	DCN-P-04663-A	Removed Local Hand Switch
Compartment 12D		
82	DCN-P-03225-A	Deleted Fuses for the Status Monitoring Relays – 1-FU-213-A112/40 and A112/39
83	DCN-D50301-A	Revised the connection drawing of 1SR73 and 1SR74 to 1-45W1697-6C
Compartment 12E		
84	DCN-P-03225-A	Deleted Fuses for the Status Monitoring Relays – 1-FU-213-A112/50 and A112/49
85	DCN-D50301-A	Revised the connection drawing of 1SR65 and 1SR66 to 1-45W1697-6C
86	DCN-S-21226-A	Replaced obsolete breaker WBN-1-BKR-063-0152-A per N3G-933, Generic Substitution Datasheet 3018
87	DCN-P-04663-A	Removed Local Hand Switch
Compartment 13A		
88	DCN-P-03225-A	Deleted Fuses for the Status Monitoring Relays – 1-FU-213-A113/10 and A113/09
89	DCN-D50301-A	Revised the connection drawing of 1SR35 and 1SR36 to 1-45W1697-6C
90	DCN-S-21226-A	Replaced obsolete breaker WBN-1-BKR-063-0156-A per N3G-933, Generic Substitution Datasheet 3018
91	DCN-P-04663-A	Removed Local Hand Switch
Compartment 13B		
92	DCN-P-03367-A	Deleted Fuses for the Status Monitoring Relays – 1-FU-213-A113/20 and A113/19
93	DCN-M-13725-A	Revised the wiring for Appendix R control concerns.
94	DCN-D50301-A	Revised the connection drawing of 1SR39 and 1SR40 to 1-45W1697-6C
95	DCN-S-21226-A	Replaced obsolete breaker WBN-1-BKR-072-0044-A per N3G-933, Generic Substitution Datasheet 3018
96	DCN-P-04663-A	Removed Local Hand Switch
Compartment 13E		
97	DCN-P-03367-A	Deleted Fuses for the Status Monitoring Relays – 1-FU-213-A113/50 and A113/49
98	DCN-D50301-A	Revised the connection drawing of 1SR43 and 1SR44 to 1-45W1697-6C
99	DCN-D52834-A	Added Time Delay Relay 2 to allow the voltage to the valve, 1-FCV-72-39A, to build up so that the valve will not stall when commanded to open.
100	DCN-P-04663-A	Removed Local Hand Switch
Compartment 14A		
101	DCN-P-03367-A	Deleted Fuses for the Status Monitoring Relays – 1-FU-213-A114/10 and A114/09
102	DCN-D50301-A	Revised the connection drawing of 1SR45 and 1SR46 to 1-45W1697-6C
103	DCN-P-04663-A	Removed Local Hand Switch
Compartment 14D		
104	DCN-P-03367-A	Deleted Fuses for the Status Monitoring Relays – 1-FU-213-A114/40 and A114/39
105	DCN-D50301-A	Revised the connection drawing of 1SR51 and 1SR52 to 1-45W1697-6C
106	DCN-P-04663-A	Removed Local Hand Switch
Compartment 14E		
107	DCN-P-03224-A	Deleted Fuses for the Status Monitoring Relays – 1-FU-213-A114/50 and A114/49
108	DCN-D50301-A	Revised the connection drawing of 1SR53 and 1SR54 to 1-45W1697-6C
109	DCN-P-04663-A	Removed Local Hand Switch
Compartment 15D		
110	ECN-E110011	Added Breaker and Starter to Compartment for 1-FCV-67-113-A
Compartment 16A		

TABLE 2.

LIST OF MCC COMPARTMENTS WITH HISTORICAL UNIT 1 CHANGE PAPER REQUIREMENTS

ITEM NO.	MODIFICATION DOCUMENTS	HISTORICAL UNIT 1 DESCRIPTION OF CHANGES RELATED TO UNIT 2 REQUIREMENTS
111	DCN-S-21226-B	Replaced obsolete breaker WBN-1-BKR-031-0265-A per N3G-933, Generic Substitution Datasheet 3018
Compartment 16B		
112	DCN-M-14484-B	Added Terminal Blocks for the shunt trip connections.
Compartment 17B		
113	DCN-M-12212-A	Replaced Breaker and Heater
Compartment 17C		
114	DCN-M-12212-A	Replaced Breaker and Heater
Compartment 18C		
115	DCN-S-21226-B	Replaced obsolete breaker WBN-1-BKR-031-0303A-A per N3G-933, Generic Substitution Datasheet 3018
Compartment 18E		
116	DCN-P-04663-A	Removed Local Hand Switch
Breakers Only		
Compartment 2E1		
117	DCN-S-21226-A	Replaced obsolete breaker WBN-1-BKR-063-1-A per N3G-933, Generic Substitution Datasheet 3018
Compartment 2F2		
118	DCN-M-16213-A	Added jumper between Compartments 8A and 2F2. Added splice between load and breaker in 2F2.
Compartment 3F2		
119	DCN-S-21226-A	Replaced obsolete breaker WBN-1-BKR-063-118-A per N3G-933, Generic Substitution Datasheet 3018
Compartment 4F		
120	EDCR-54255-A	Revisions to Terminal Block control cable terminations
121	EDCR-54499-A	Revisions to Terminal Block control cable terminations
Compartment 5B		
122	DCN-14484-A	Termination coordination changes
123	DCN-24370-A	Termination coordination changes
124	ECN-110011	Termination coordination changes
Compartment 16F2		
125	DCN-26661-A	Revised wiring to Compartment 18E and Changed the Load UNID to 2-MTR-31-303/B
126	DCN-S-21226-A	Replaced obsolete breaker WBN-1-BKR-31-303B-A per N3G-933, Generic Substitution Datasheet 3018
Compartment 17F		
127	DCN-S-21226-A	Replaced obsolete breaker WBN-1-BKR-63-80-A per N3G-933, Generic Substitution Datasheet 3018

EDCR-2 UNIT DIFFERENCE FORM

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Operations Difference is identified as follows:

The operational differences between Unit 2 and Unit 1 design is that in Unit 1 Fusegaurd (FG) design shunt trips the associated breaker whereas the Blown Fuse Detector of unit 2 does not. This is to allow power flow from the other phases to the down-stream load to perform its safety function.

FCR 58217-A

SCStrickler for Tom Wallace 6/27/2011

Unit 2 TVA Operations Acceptance (Mgr or Designee): **Date:**

Maintenance Difference is identified as follows:

The existing motor control center ITE starters, contactors, relays, thermal overload relays, heaters, fuse guard and circuit breakers are being replaced with new Square D and Siemens equipment of the same type and ratings. This is due to the existing starters, breakers and associated components are obsolete. The new components are equivalent to the existing components in form, fit and function.

New vendor manuals will be provided for the new replacement MCC buckets and components as part of the procurement.

FCR 55769

FCR 55769

FCR 58217-A

SCStrickler for Brian Briody 6/27/2011

Unit 2 TVA Maintenance Acceptance (Mgr or Designee): **Date:**

FCR58217-A

Engineering Difference is identified as follows:

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. All 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.

FCR 55769

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EDCR-2 UNIT DIFFERENCE FORM

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 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.

Any differences between U1 and the corresponding U2 MCC components such as starter settings, breaker sizes, thermal overload relay heater sizes, fuse sizes, and etc. were determined by calculation (480V Class 1E Protection, Coordination and Thermal Overload Heater Calculation-Unit 2.No.EDQ00299920080004) sure adequacy to the load being served.

The Unit 2 blown fuse detector (BFD) is no longer used for Unit 2. The BFD relay is removed from its sockets or base (BFDB) and shall be stored in the TVA warehouse. The BFD for Unit 2 will not trip the up-steam circuit breaker like the Fuseguard (FG) does for the Unit 1 upon a blown fuse condition. This is to provide power to the load to perform its safety function. The control circuit indicating lights for the valves will not be turned off by the BFD. The control circuit indicating lights for the valves will not be turned off by the BFD. Indicating lights will perform their original functions in monitoring the valve limit switch status.

FCR 58217-A

Carl C. Lyke — 6/27/11

Unit 2 TVA Engineering Acceptance (Mgr or Designee): **Date:**

Choochart Sompao — 6/23/11

Prepared By: **Date:**

FCR58217-A

Streamlined EDCR approved by TVA Oversight_____

SESG TO ROUTE A COPY OF THIS COMPLETED FORM TO TVA TRAINING MANAGER AND TO UNIT 2 LICENSING.

Attachment 1
Page 1 of 24
Technical Evaluation Considerations of 0-TI-2

This attachment provides topics to be considered when evaluating the technical and safety aspect of changes being implemented in WBN Unit 0 and/or Unit 1 by the EDCR-2 process; see Reference 5.0A. It is not intended to be an all inclusive list of items to be considered. It is to be used as an aid in determining attributes that should be addressed in a technical evaluation. Information is also provided to aid in determining coordination interfaces. These are minimum guidelines which are primarily excerpts from SPP-9.3. It should be recognized that many topics and changes involve multiple disciplines and organizations and technical considerations must be coordinated accordingly. All parts of Attachment 1 must be considered for applicability for the associated EDCR-2.

Attachment 1
Page 2 of 24
Technical Evaluation Considerations of 0-TI-2

GENERAL:

☐ YES	☒ NO	1.	Are the nuclear safety functions, protective safety functions, Class IE requirements, or Seismic Category I or I(L) requirements of a design criteria, system description, FSAR, Technical Specification (Bases), or Technical Requirements Manual (Bases) affected? ***The EDCR-2 scope of work is to replace the existing obsolete safety related, Class 1E MCC buckets, feeder breakers and other components (i.e. relays, switches, etc.) with new safety related, Class 1E, Seismic Category 1 equipment and rework the internal wiring of the MCC compartments. The replacement MCC components are seismically qualified and compatible with or better than the existing MCC components in form, fit and function. Seismic qualification of the MCC is provided in calculation WCGACQ0446. Appendix R modifications to eliminate spurious valve operation during a fire are incorporated by rewiring limit switch connections from the high side to the low side of the contactor coils and indication lights where required.*** ***EDQ00299920080004, "480V Class 1E Protection, Coordination, and Thermal Overload Heater Calculation-Unit 2" addresses the protection of the 480V electrical loads against overload, short circuit conditions, and to assure selective coordination of protection devices. EDQ00299920080003,"Class 1E MCC Control Circuit Voltage Analysis and Transformer Sizing" analysis ensure proper CPT sizing and use of the P&B and Agastat relays.*** ***These EDCR-2 package modifications do not affect nuclear safety functions, the Design Criteria, System Description (Design Basis Document), the Final Safety Analysis Report (FSAR) or the Technical Specifications (TS).***
☐ YES	☒ NO	2.	Is there an operational/configuration change? Is a component being added to or removed from the plant? Is a component being disabled or abandoned in place? Is the normal or accident position of a valve changing? Is an electrical isolation device being added or deleted? Is a portion of the system being rerouted? ***There are no operational / configuration changes being made in this EDCR-2 package. The modifications to the MCC feeder breakers, buckets (starters), relays and internal wiring are due to replacement of the obsolete parts with new models for which replacement parts are available. No electrical devices are being disabled or abandoned in place. No electrical isolation devices are being added or deleted. All work is internal to the MCC structure and no parts of the system are being rerouted by this EDCR-2 package.*** ***Obsolete MCC compartments being replaced with new components have been analyzed for Adequacy in EDQ00299920080003,"Class 1E MCC Control Circuit Voltage Analysis and Transformer Sizing"*** ***Appendix R Breakages Resolutions depicted in EDQ00099920090012, App. J for loads powered from the 2-MCC-213-A1-A were addressed by updating system schematics and MCC connection drawings.*** ***MCC compartments and breakers with abandoned loads are not replaced as part of this EDCR and will be spared.***

GENERAL:			
☐ YES	☒ NO	3.	Could the change affect the basic function of a structure, system or component that performs or supports the performance of a safety function (deleting or changing logic interlocking, additional pumps, etc.)? Is the most limiting operating condition or design criteria imposed on the change, or by the change, evaluated? Include effects by or on Safety Related or Non-Safety Related systems in their various possible configurations. Does the change meet or exceed design criteria or other SSCs in similar applications? ***The safety functions of Structures, Systems or Components (SSC) are not affected by the modifications of this EDCR-2 package. No equipment deletion, changing of interlocking logic, additional pumps, etc. is implemented in this EDCR-2 package. The modifications covered under this EDCR-2 package have no adverse effects on the basic safety function of the SSCs.***
☐ YES	☒ NO	4.	Could the change affect environmental conditions such as pressure, temperature, humidity, flooding, corrosiveness, site elevation, nuclear radiation (both rate and total integrated dose), and duration of exposure in either harsh or mild areas? ***The changes being made under this EDCR-2 package will not affect environmental conditions. All components including the feeder breaker and bucket starter replacements are inside the existing MCC structure. The physical dimensions and characteristics of the new replacement components are compatible with the existing components. The existing MCC is located in a mild environment in the Auxiliary Building. Any external activities that could affect environmental conditions are not part of this EDCR-2 package.*** If "YES", the change shall be coordinated with the Lead Electrical/I&C Engineer, and if applicable, with ME/NE for potential revisions to the EQ/MEQ Binders.
☐ YES	☒ NO	5.	Could the change involve relocating or reorienting a device or system which could impact location-specific dose calculation or shielding analyses or place the device or system in an area with different environmental conditions? ***The changes being made by this EDCR-2 package are internal to the MCC structure and are located in the Auxiliary Building. This EDCR-2 package does not involve relocating devices or systems which could impact location-specific dose calculations or shielding analysis and does not place devices in locations with different environmental conditions.*** If YES, coordinate with ME/NE to revise the affected location specific dose calculation, environmental drawings, and EQ/MEQ documentation.
☐ YES	☒ NO	6.	Are Security Systems modified? ***There are no Security Systems affected by the modifications of this package.***
☐ YES	☒ NO	7.	Does the modification add quantities of chemicals that may have an impact on control room habitability? ***The scope of work is to replace the existing obsolete MCC feeder breakers, buckets (starters), relays and other electrical components including internal wiring modifications. No chemicals are being added and control room habitability is not being impacted by this modification.***

Attachment 1
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Technical Evaluation Considerations of 0-TI-2

GENERAL:			
			If YES, evaluate impact on control room habitability per NRC Reg. Guide 1.78.
☒ YES	☐ NO	8.	Has the component being added or modified been evaluated for proper physical orientation? Components that require consideration are: capacitors, relays, check valves, steam traps, flow and level measuring devices, pressure switches, and solenoid valves. Other components may require consideration based on special applications, unique circumstances or vendor/manufacturer's recommendations. ***The replacement feeder breakers and the MCC bucket configurations are in the same orientation as the existing equipment. The relays do not require special orientation to perform their function and are not a special application or unique circumstance. All Thermal Overload Heater Relays are required to be mounted vertically in the front panel of MCC buckets in accordance with vendor requirements.***

GENERAL:

☐ YES ☒ NO 9. Based on the following considerations does the change create an operating unit difference?

☐ YES ☒ NO The change being made creates operational differences that would affect actions by the Operations staff.

The changes to the MCC, 2-MCC-213-A1-A covered under this package are identical in configuration and function to the changes made to the Unit 1 MCC, 1-MCC-213-A1-A.

Therefore, the changes will not create any operational differences that would affect actions by the Operations Staff.

If YES, coordinate with Operations to ensure impacts on training are considered.

☐ YES ☒ NO The change being made creates operational differences that would affect the simulator.

The changes to the MCC, 2-MCC-213-A1-A covered under this package are identical in configuration and function to the changes made to the Unit 1 MCC, 1-MCC-213-A1-A.

Therefore, the changes will not create any operational differences that would affect actions by the simulator.

If YES, coordinate with Operations to ensure simulator is updated.

☐ YES ☒ NO The change being made creates unit differences that are economically feasible and would improve the operation or maintenance of the other unit or units.

If YES, initiate the appropriate package for Technical Review Committee.

☒ YES ☐ NO 10. Have considerations for mounting, connecting, and positioning of components included an evaluation of the required robustness of associated elements? Has the evaluation for robustness considered the need for protection from bumping, jarring, vibration, etc?"

The replacement MCC buckets are designed and fabricated as direct replacements of the original buckets. The replacement buckets are installed in the same existing MCC compartment space.

Mounting, connecting, positioning of the new components (MCC buckets, feeder breakers, relays, etc.) and the robustness of the associated components have been evaluated by Civil ESQ. A seismic test of the prototype MCC bucket with components is being performed for Class 1E qualification of the components in accordance to IEEE Standards 323 and 344.

GENERAL:			
☐ YES	☒ NO	11.	Is this modification subject to vibration, thermal movement, and/or leaks on trip sensitive equipment? (i.e., replace carbon steel piping with stainless steel piping, modify routing such that thermal flexibility is reduced, modify support or support locations to resist thermal expansion, process and/or pneumatic leaks.) If yes, develop and incorporate a monitoring plan. ***The MCCs are located in the Auxiliary Building at locations not subject to mechanical vibration, thermal movement or leaks. No piping is routed through or is supported on the MCC structure to cause any movement due to thermal expansion or pneumatic leaks. No trip sensitive components are mounted within the MCC.***

Attachment 1
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Technical Evaluation Considerations of 0-TI-2

CIVIL			
☐ YES	☒ NO	1.	Does the change potentially impact pipe break considerations, pipe whip, or jet impingement? Consideration should include changes to operating modes, the addition or rerouting or high energy pipe greater than 1 inch nominal diameter, or change or modify pipe rupture protection devices. Does the change relocate or add potential targets such as electrical components, equipment, conduits, instruments or air lines to compartments containing fluid systems? The change may be evaluated generically rather than on a case-by-case basis as described in Civil Design Guide DG-C1.2.10. ***Changes being made are not in the area of high or moderate energy piping. Civil calculation WCGACQ0446 is issued to address seismic qualification.***
☐ YES	☒ NO	2.	Does the change affect piping vibration or testing requirements? Was there a mass change? Were supports added/deleted? Was an orifice, valve, or other flow device added or deleted? Was there an operational or configuration change? ***No piping, valves or components to piping are being added, deleted or modified.***
☒ YES	☐ NO	3.	Are Seismic Category I or I(L) components added, deleted, or modified? Are components in a Seismic Category I structure added, deleted, or modified? Does the change affect the seismic or dead weight analyses? ***Some of the weights of the new MCC components (bucket starters, feeder breakers, and other devices) are different from the existing MCC components (to be removed or replaced). The effect of this change in weight is evaluated in Civil Calculation WCGACQ0446. Seismic testing is required under MR 25402-011-MRA-ECM1-00001. Completion of the seismic testing, submittal and approval of seismic test report is conducted under the procurement process.***
☒ YES	☐ NO	4.	Does the change involve an existing attachment on a Seismic Category I structure/civil feature (e.g., new loads generated, revise loads previously approved, physical modification required at interface points) or the addition of an attachment to and/or penetration of a Seismic Category I structure(s)? **See Response to Question 3 above (Civil).** Does the change affect the attachment or add attachments of engineered features to masonry block walls in a Seismic Category I structure? Does the change impact the fire resistance rating of a fire barrier? ***No attachment to masonry block walls is being made. No changes are being made to any fire resistant ratings of any fire barriers.***
☐ YES	☒ NO	5.	Could the change affect WBN Probable Maximum Precipitation (PMP) site drainage (i.e. add or obstruct surface to water flow, divert or reroute a flow path, change ground surface contours, change from vegetation to concrete or pavement, etc.). If YES is the response to any of these questions, consult Civil Engineering.

Attachment 1
Page 8 of 24
Technical Evaluation Considerations of 0-TI-2

ELECTRICAL/INSTRUMENTATION & CONTROLS:			
☒ YES	☐ NO	1.	Does the change affect breaker alignment, electrical loads, or electrical separation/isolation? ***Obsolete Type EF3 feeder breakers are being replaced by new Type ED63 breakers of the same rating unless otherwise specified. Unit 2 Electrical Calculations- AC Auxiliary Power System Analysis (EDQ00099920080003) and 480V Class 1E Protection and Coordination Calculation (EDQ00299920080004) are used to verify the required ratings of the replacement MCC buckets and feeder breakers, and coordination of the protective devices supplying the designated downstream loads. Control Power Transformer (CPT) sizing was obtained from Electrical calculation EDQ00299920080003.*** ***In order to facilitate replacement work for Unit 2 MCC buckets and feeder breakers, Unit 2 loads are isolated from operating Unit 1, as shown by notes and unit interface points on the single line drawings. This process is shown in DCN 54703, which is a prerequisite for work done under this EDCR-2 package.*** ***The installation of new equipment in 2-MCC-213-A1-A to supply power for auxiliary loads meets existing design standards and guidelines for Safety Related Systems in Nuclear Plants.***
☒ YES	☐ NO	2.	Is any low or medium voltage (V3, V4, or V5) electrical containment penetration protector (circuit breaker or fuse) involved? ***Penetration protection devices (breakers and fuses) are coordinated in accordance with penetration protection calc EDQ00299920080018 "Electrical Penetration Study Voltage Level V4 and V5 – Unit 2".***
☐ YES	☒ NO	3.	Has any electrical load classification changed (non-1E to 1E)? Is the Class 1E classification for a fuse on the Fuse Tab changing?
☒ YES	☐ NO	4.	Does the change involve instrument set points, instrument/relay settings or other instrument information found in EMPAC? Is the change consistent with N-specs (e.g., instrument line slopes and installation)? Has reset and deadband been evaluated? **Time delay setting of 2-02-70-131B-A is changed in accordance with Demonstrated Accuracy Calculation for Diesel Generator Sequencing Relays.** **Time delay setting of 2-62-72-34-A is changed in accordance with Time Delay Relays for Flow Valves 2-FCV-72-13 and 2-FCV-72-34.**
☐ YES	☒ NO	5.	Does the change alter, add, or delete Post Accident Monitoring (PAM) equipment or affect the type, category, or operating time of existing equipment? (See Design Criteria for the list of PAM variables.) If YES, coordinate with M/N, EE, Operations and Licensing to ensure continued Reg. Guide 1.97 compliance.

FCR 55768-A

FCR 55769-A

ELECTRICAL/INSTRUMENTATION & CONTROLS:			
☒ YES	☐ NO	6.	Does the change involve instrument ratings? (Relay or solenoid coil ratings, contact ratings, duty cycles, etc.) ***The relay replacement changes being made by this EDCR-2 package provide for adequate ratings for coil and contacts for the new relays being used. The relay contacts are used to switch 48VDC for DAS Panel 2A1 in ICS for 480V REAC MOV BD 2A1-A status monitoring. The relay contacts for the P & B Type KUIP relay are rated for the service and high isolation design with 8mm contact to coil spacing for safety purposes. There is no change in the AC coil rating.***
☐ YES	☒ NO	7.	Does the change challenge the capacity of another system (Air conditioning system heat load, control air load, electrical load)? ***The MCC bucket replacement and feeder breaker changes of this package will not impact the capacity of either the air conditioning system heat load or the electrical system load. The plant air conditioning system's electrical heat load for motor control centers is based on a conservative 200 watts/per vertical section as described in electrical calculation WBN EEB-MS-TI09-0041. There is no change to the existing electrical heat load analysis as no new MCC sections are added or deleted as part of this design change package.***
☐ YES	☒ NO	8.	Does the change affect the operating or accident environment or instrumentation? Is the electrical equipment or instrumentation required to operate in the affected environment? Have potential operating and accident environments of equipment been considered?
☒ YES	☐ NO	9.	Have the effects of EMI/RFI been considered? ***The MCC bucket, feeder breaker, status monitor relay replacements, and internal wiring changes in the respective compartments and rear panels do not produce any adverse EMI/RFI effect on any sensitive devices in the vicinity.*** ***The evaluation of the Macromatic model PLP480 blown fuse detector/phase loss relay for sensitivity to EMI/RFI is identified as an open item.***
☒ YES	☐ NO	10.	Is the logic of system operation changed? Are new or modified interfaces (physically or electrically) with safety related or important to safety equipment created? ***Logic for time delay relay 2-02-70-131B-A is modified by EDCR 53287 (DRA 53287-065)*** ***Logic for time delay relay 2-62-72-34-A is modified by FCR 55769 (DRA 53287-066)***

ELECTRICAL/INSTRUMENTATION & CONTROLS:			
☐ YES	☒ NO	11.	Does the change affect, add, or delete equipment within the scope of 10CFR 50.49 (EQ)? Review appropriate documents such as MEL, Essentially Mild Calculations, Category & Operating Times Calculations, and/or equipment in a harsh environment? Cable must be considered (e.g., mild to harsh environment). ***Motor control center 2-MCC-213-A1-A is located in a mild environment area in the Auxiliary Building on elevation 772', Col. A12T. The feeder breaker and the MCC bucket replacements have been evaluated for the normal service environment including normal radiation doses and have been determined to meet the service conditions.*** ***Due to Historical DCN 03220, this EDCR-2 package replaces Crydom relays and their associated fuses with new P & B relays for status monitoring. Per Historical DCN 04663 this package makes wiring changes including jumper wires additions for various compartments which results in the removal of selected EQ components - such as hand switches.*** If "YES", the change shall be coordinated with the EQ and MEQ Program Engineers for potential revisions to EQ/MEQ Binders.
☐ YES	☒ NO	12.	Could the change affect materials such as lubricants, seals and O-rings, which could impact Qualification Maintenance Data Sheet (QMDS) requirements and qualification analyses, and invalidate test data, or could the change affect special maintenance (QMDS) and/or administrative requirements and controls that might impact the qualification of an item? If YES, coordinate with the responsible discipline on revisions to the QMDS.
☐ YES	☒ NO	13.	Does the change involve a power, control, or instrumentation circuit for a 10CFR50.49 component either by direct connection or relay logic or involve a non-10CFR50.49 power control or instrumentation circuit which have a credible circuit interaction failure mode with 10CFR50.49 power control or instrumentation circuit? ***The replacement of obsolete MCC buckets (starters, feeder breakers, relays and other devices), feeder breakers (only) and internal wiring connection changes as a result of the EDCR-2 package modifications will not cause any credible interaction failure mode with any 10CFR50.59 power, control or instrumentation circuit.*** If YES, perform an analysis in accordance with SPP-9.2, Appendix I for any safety-related cables or components located in a harsh environment that are designated as Category C (i.e. not required to be addressed in the EQ program).
☐ YES	☒ NO	14.	Does the change upgrade the function of an existing device/cable such that additional QA records and documentation are needed to support 10CFR50.49 Qualification in accordance with 10CFR50, Appendix B manufacturing, procurement, installation, etc.)? If YES, provided additional documentation as required.
☐ YES	☒ NO	15.	Does the modification affect components/equipment that require periodic testing of electrical test points.

Attachment 1
Page **11** of **24**
Technical Evaluation Considerations of 0-TI-2

ELECTRICAL/INSTRUMENTATION & CONTROLS:			
			If YES, provide appropriate test jacks which are accessible to prevent accidental contact with adjacent electrical terminations during testing.
☐ YES	☒ NO	16.	Does the modification change functional logic which has the potential of affecting design characteristics? If YES, evaluate PER/NER history on the equipment being modified to determine if problems have previously been identified.
☐ YES	☒ NO	17.	Does the modification involve a programmatic or digital logic controller? If YES, has the addition of uninterruptible power supplies been considered?
☐ YES	☒ NO	18.	Does the modification involve fault tolerant non-safety-related equipment important to operation such that the need for redundant power sources should be considered (such as CERPI control room devices)?
☐ YES	☒ NO	19.	Does the design or modification impact an Integrated Computer System (ICS) data point that is also an Emergency Response Data System (ERDS) data point? If YES, coordination with Site Licensing is required in accordance with 10CFR50 Appendix E.
☐ YES	☒ NO	20.	Does the design or modification impact off site power capability or ability to meet 10CFR50 Appendix A Criterion-17 requirements? If YES, coordinate with Electrical Lead Engineer.

MECHANICAL:

Ensure EQ requirements addressed for ancillary subcomponents (e.g., Limit Switches on Mechanical only valves). Coordinate with Electrical EQ Engineer as necessary.

☐ YES	☒ NO	1.	Does the change affect design conditions or requirements such as process pressure, temperature, chemistry or operating cycles? Is the change affected by operation of other systems, either Safety Related or Non-Safety Related in any of their various operating configurations? If YES, ensure the evaluation encompasses all aspects of the affected system, including impacts on interfacing systems. Coordinate with MEQ Program Engineer for potential revisions to affected MEQ documentation.
☐ YES	☒ NO	2.	Does the change affect ECCS, decay heat removal systems, or MPC cooling ancillary equipment? Ensure that any changes are consistent with the safety analyses for the plant including WBN SAR Chapter 15 NPSH minimum flow requirements, diesel loading sequencing, and ultimate heat sink limits.
☐ YES	☒ NO	3.	Is the Auxiliary Building Secondary Containment Enclosures (ABSCE) as defined in WBN2-30AB-4001, affected by this change? Does this change modify any cable, cable tray, conduit, duct, pipe, or instrument tubing penetrating secondary containment? Consult 46W501 drawing series for the locations of the ABSCE Boundary, and discuss proposed changes with the NSSS EGS. A justification for the "Yes/No" is required. ***The activities are internal to the MCC. There are no external cables, cable trays, conduit, ducts, pipes or instrument tubing being affected by this EDCR-2.***
☐ YES	☒ NO	4.	Does the change involve potential heating, ventilation, and air-conditioning (HVAC) system impacts resulting from adding heat loads, altering air flow or ductwork etc.? ***No airflows or ductwork is altered by this EDCR-2 package. The existing electrical heat load for motor control centers is based on a conservative 200 watts/per vertical section and is not affected since the existing MCC bucket size is not being changed and no vertical sections are being added or deleted by this design change package.***
☐ YES	☒ NO	5.	Does this change make any alterations or configuration changes to Motor Operated Valves (MOVs) or Air Operated Valves (AOVs)? Does this change impact any MOV or AOV Program documents? Impacts that should be considered include changes to instrumentation or control circuits, power supplies, or change system operating or design conditions such as pressure and flow rate.
☐ YES	☒ NO	6.	Does this change involve replacement of a complete valve or valve internals which are located in a system that interfaces directly with the Reactor Coolant System (RCS)? Procurement requirements should evaluate valve and valve internals replacements that are located in or interfaces with the Reactor Coolant System (RCS) for hard faced components that are non-cobalt bearing. Hard facing alternatives include NOREM Nitronic 60 and may include other non-cobalt materials as approved by Engineering. Cobalt bearing hand materials is a concern in fluid systems that contain radioactive materials.

Attachment 1
Page **13** of **24**
Technical Evaluation Considerations of 0-TI-2

MECHANICAL:			
☐ YES	☒ NO	7.	Does the modification add a new check valve or impact an existing check valve? Ensure the valve is sized properly, proper type for required service, properly oriented, located suitable distance from upstream components that cause turbulent flow.
☐ YES	☒ NO	8.	Does the modification add, delete, or reroute components in a mechanical piping system? If Yes, will the added components come in contact with borated water or some other harsh environmental area?
☐ YES	☒ NO	8a.	Does the modification affect the ASME Section III Code (Class 1, 2, and 3) boundary? If "YES", ensure that the materials and installations meet the applicable ASME Code.
☐ YES	☒ NO	9.	Does this modification introduce material into the containment that could become dislodged during LOCA or other events and contribute to Emergency Core Cooling system (ECCS) sump screen or strainer blockage? Does this modification affect protective coatings inside the containment?
☐ YES	☒ NO	10.	Does the modification increase the possibility of flooding from a Moderate Energy Line Break?
☐ YES	☒ NO	11.	Does the modification affect the power uprate?
☐ YES	☒ NO	12.	Are there NUREG-0612 impacts? Does the change add, delete, or alter a permanent handling system? Does the change move a heavy load path over safe shutdown equipment or move safe shutdown equipment into a heavy load path?
☐ YES	☒ NO	13.	Does the change affect barriers such as walls, doors, penetrations, relief panels, and ducts which could affect HVAC flow paths, fire barriers, or environmental conditions in either harsh or mild areas? **All work activities are internal to the MCC and do not include any external cabling.** If the answer to any of the above questions is "YES", the change shall be coordinated with the Mechanical EGS.
☐ YES	☒ NO	14.	Is a new material being added and does the change affect components susceptible to Flow Accelerated Corrosion (FAC) or Microbiologically Induced Corrosion (MIC)?
☐ YES	☒ NO	15.	Does the modification increase the susceptibility for cavitation?
☐ YES	☒ NO	16.	Could the change affect location or operation of high energy piping systems, location or operation of radioactive piping systems, operation of environmental control systems, or environmental barriers such as walls, doors, relief panels, piping/other thermal insulation, and ducts which could affect environmental conditions in either harsh or mild areas? If YES, coordinate with ME for potential revision to the environmental drawings/design criteria and coordinate with EE for potential impact to EQ of equipment.

MECHANICAL:

☐ YES ☒ NO 17. Does the change involve any valve tabulation information?

If YES, include the completed MEL Data Entry Sheet in the EDCR-2 Package.

☐ YES ☒ NO 18. Does this change affect the Seismic Category I boundary?

If YES, the applicable Seismic Category I Boundary calculations must be revised.

NOTE Issuing a design calculation in accordance with NEDP-2 is the means of assuring that the applicable Seismic Category I Boundary calculation is revised.

☐ YES ☒ NO 19. Does the modification change ventilation, cooling requirements for electronic equipment?

The modifications do not change ventilation or cooling requirements, since no additional electrical equipment has been added in any new bucket. Bucket loading and components are not changed.

If YES, coordinate with Mechanical Engineering for determination of impact on HVAC coolant.

☐ YES ☒ NO 20. Does the modification involve strainers for a raw water supply?

If YES, proper strainer selection should be based on industry guidelines (Fluid Controls Institute Std 89-1) and specific site criteria. Major consideration should be given to the following: type of strainer, redundant strainer capability, materials/housing, perforations number and arrangement, mesh size & free area, capacity and pressure loss, fluid type, particle weight & shape, macro fouling and aquatic debris potential, operating parameters, filtration versus separation, blow down line sizing, vendor recommendations, automatic back flushing and the necessity of a bypass line.

NOTE: Contact the appropriate program coordinator in the Mechanical Programs group (or in Plant Design for MOV questions) if any Engineering Design Program(s) are impacted by the proposed modification.

MECHANICAL:

☒ YES ☐ NO 21. Does the change directly or indirectly impact Mechanical or Electrical Appendix R equipment, or cables, required for safe-shutdown per 10CFR50 Appendix R (TI-277 at WBN)? (If the answer to any of the following questions is "YES", then the answer to Question 22 is "YES".)

☒ YES ☐ NO Does the modification involve a system, component or structure required for Appendix R safe shutdown capability?

Yes. Systems 62, 63, 67, 68, 72, 74 and 213 are required for Appendix R. Changes to the MCC compartments powering the listed system loads have been evaluated and will not adversely affect the ability to achieve safe shutdown following a fire.

Appendix R breakages were reviewed and evaluated for this MCC. The Appendix R breakages are limited to implementing modifications to the internal compartments. Modifications include wiring changes, re-wiring limit switch connections, and indicating lights 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 cables will not cause spurious valve closure and some breakers placed in the open postion to eliminate spurious valve operation and Appendix R hot shutdown requirements.

Compartment Breakers will be administratively controlled in the open position to prevent spurious valve actions for Flow Control Valves that are required to be locked in the open or closed positions as a result of the Appendix R Analysis.

FCR 58967-A

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☐ YES ☒ NO Does the modification involve a fire rated barrier (includes fire door, fire damper, fire wrap, walls, floors, ceilings, penetration seals, etc.)?

☐ YES ☒ NO Does the modification affect a suppression system, the detection system, or Appendix R required lighting, including the illumination path?

Attachment 1
Page **16** of **24**
Technical Evaluation Considerations of 0-TI-2

MECHANICAL:		
☒ YES	☐ NO	Does the modification introduce or remove combustible material or fire source in the area? ***Combustible loading is affected by this EDCR-2. Combustible Loading Data (CLD) calculation EPMDOM012990 has been revised (Rev 047) to account for the minor increase in plastic material (three pull apart terminal blocks per bucket) in the MCCs as a result of the bucket replacement activities.*** ***During construction activities, adherence to SPP-10.10 "Control of Transient Combustible" provides requirements and controls for the use of combustible materials during construction activities. These requirements are part of the defense in depth fire protection philosophy for safety related systems, structure and components.*** If YES, contact the 10CFR 50 Appendix R Program Engineer.

Attachment 1
Page **17** of **24**
Technical Evaluation Considerations of 0-TI-2

OPERATIONS/HUMAN FACTORS:			
☐ YES	☒ NO	1.	Does the change involve compensatory measures or require an increase in operator staffing to complete newly required actions?
☐ YES	☒ NO	2.	Does the change affect the main control room or the backup control areas (Environment, workspace, controls and displays)? If YES, human factors must be addressed.
☒ YES	☐ NO	3.	Are OSHA considerations included? Whenever replacement or major repair, renovation, or modification of a machine or equipment is performed, and whenever new machines or equipment are installed, energy isolating devices for such machines or equipment must be designed to accept a lockout device. This applies to mechanical and electrical devices. ***For new installations, major repairs, equipment removal, and modification activities, OSHA considerations are taken into account as part of conduct of Maintenance and plant procedures. OSHA considerations are considered since the replacement buckets and feeder breakers are provided with a locking device and provisions to padlock the breaker in the open or closed position.***
☐ YES	☒ NO	4.	Does the modification affect valves listed in the locked valve checklist maintained by Operations and the locked position shown on design output? If YES, ensure that design output (DRAs/drawings) agree with the locked position of applicable valves or coordinate a revision to the locked valve checklist, if necessary.

OTHER:

☐ YES ☒ NO 1. Does the change affect equipment diversity, failure modes, single failure criteria (DS-E2.0.2, "Single Point Failure For Power Generation Reliability"), equipment redundancy, or equipment reliability?

☐ YES ☒ NO Does the modification install redundant equipment?

If YES, utilization of redundant attendant equipment (e.g., power from alternate sources) shall be considered and addressed.

☐ YES ☒ NO 2. Does the modification change System 18, 43, 66, 77, or 90, or potentially impact the plant Chemistry Organization (i.e., sampling, procedures, training, spare parts, chemical treatments, etc.)?

☐ YES ☒ NO 3. Does the change involve environmental impacts? (If ANY of the Below questions are answered "YES", then question 3 must be answered "YES".)

☐ YES ☒ NO Will the modification require new Chemicals (as defined in SPP-5.4) to be used anywhere onsite or result in a change in plant chemical storage or usage?

☐ YES ☒ NO Will the modification generate any new wastes? (Solid, Liquid, Hazardous, Universal, Used Oil, Radioactive, etc.) or result in the release of any new or different substances to the land, air, or water?

NOTE This does not include consumables used to facilitate the installation of the modification.

☐ YES ☒ NO Will the modification change the existing flow path or characteristics of any discharge to the land, air, or water?

☐ YES ☒ NO Will the modification involve any equipment containing PCBs, Mercury, or Asbestos?

☐ YES ☒ NO Will the modification result in all upgrade or alteration to any pollution control equipment?

☐ YES ☒ NO Will the modification affect the waters of the U.S. (e.g., dredging or discharging to the river)?

☐ YES ☒ NO Will the modification involve storage or use of oil or hazardous substance in an amount equal to or greater than 55 gallons?

If Question 3 is answered "YES", contact Environmental Staff to ensure that the applicable Environmental Review (in accordance with SPP-5.5 and TVA National Environmental Policy Act (NEPA) Process or chemical traffic control review are initiated/performed.

OTHER:

If Question 3 is answered "YES", Environmental shall be a Core Review group at the initial and final meetings. If the meetings are waived, then Environmental is required to review the EDCR-2 and sign the coversheet as an "Other Organization".

☐ YES ☒ NO 4. Does the modification affect the Radiological Emergency Plan (for example, radiation monitors, meteorological instrumentation, onsite emergency sirens, or onsite telephone system) or does the modification affect any equipment, boundaries, or plant structures in a manner that will affect any of the Emergency Action levels (EALs) in EPIP-1 or the REP Appendix A, B, or C?

If either question is YES, contact Radiological Emergency Plan Staff to ensure that a Plan Effectiveness Determination is initiated/performed (in accordance with 10CFR50.54 and EPIL-1, Emergency Preparedness Instruction Letter, "Procedures, Maps, and Drawings") to determine if NRC prior approval is required prior to any REP revision.

If NRC approval is required prior to any REP revision (i.e., EPIP changes), then document this in the Work Scope Statement on the "EDCR Cover Sheet."

☐ YES ☒ NO 5. Does this modification impact the fire protection system or equipment of an insured building?

If YES, coordinate with the 10CFR50 Appendix R Program Engineer to have the EDCR-2 documents reviewed by the insurance carrier.

☒ YES ☐ NO 6. Does the change affect information in the Q-List? (If the answer to any of the following questions is "YES", then the answer to Question 6 is "YES".)

☐ YES ☒ NO Are any attributes as defined in Limited QA appendix of NEDP-4 added, deleted, or modified?

☒ YES ☐ NO Is the UNID for a component in MEL altered?

MEL package information is being updated for feeder breakers, MCC compartments and relays to include the new replacement components and the load served.

☒ YES ☐ NO Is the MEL evaluation for the proposed modification adequate and complete?

☒ YES ☐ NO Is a UNID being added or modified in the MEL?

For any new relays being added, UNIDs are added to the MEL. For components being replaced MEL is being updated to include the new manufacturer and model numbers as appropriate.

☐ YES ☒ NO 7. Does the modification change functional logic which has the potential of affecting design characteristics or change/impact an item listed in the Equipment Performance Information Exchange (EPIX) system?

OTHER:			
			If YES, evaluate PER/NER history and EPIX on the equipment being modified to determine if problems have previously been identified and are appropriately addressed in the EDCR-2 Package. Ensure appropriate coordination with affected organizations is performed such as Operations, Maintenance, Environmental, Chemistry, and Emergency Preparedness.
☐ YES	☒ NO	8.	Does the change substitute, change, add or modify materials, components or chemical treatments not previously evaluated to the system parameters or application? If YES, an evaluation for material compatibility shall be performed.

10CFR50 APPENDIX R AND OTHER FIRE PROTECTION IMPACTS: (Contact the Program Owner)			
☒ YES	☐ NO	a.	Does the change directly or indirectly impact Mechanical or Electrical Appendix R equipment, or cables, required for safe-shutdown (This includes manual actions required for safe shutdown.)? **An Appendix R review has been completed and the Appendix R changes have been incorporated on the appropriate DRAs.**
☐ YES	☒ NO	b.	Does the change impact Appendix R component availability in any fire area/zone?
☐ YES	☒ NO	c.	Have any Appendix R equipment parameters (e.g., flow rate, pressure, setpoints, load limitations, electrical load, interface with other components) changed?
☐ YES	☒ NO	d.	Have Appendix R cable tag/UNID numbers or cable fire area/zone routings changed?
☒ YES	☐ NO	e.	Have Appendix R cables been added/deleted or Appendix R control circuit logics been changed? **The work scope of the EDCR does not include any cabling activities. However, Appendix R comments have been incorporated into the appropriate DRAs.**
☐ YES	☒ NO	f.	Does the change involve a non-Appendix R circuit which interferes with an Appendix R Circuit (e.g., re-wiring to create associated circuits)?
☐ YES	☒ NO	g.	Does the change impact the use of Appendix R equipment in any fire area/zone?
☐ YES	☒ NO	h.	Has component been installed or relocated which obstructs the light pattern of an existing Appendix R emergency light?
☐ YES	☒ NO	i.	Has an Appendix R component been added, deleted, or relocated which would affect Appendix R light placement, including ingress/egress lights?
☐ YES	☒ NO	j.	Has an Appendix R component been installed or relocated in the same fire area/zone as its functionally redundant safe shutdown train/system? (This includes instrument sensing lines.) Note: The functionally redundant train is not necessarily the redundant divisional train.)
☐ YES	☒ NO	k.	Does the change affect in-plant communication systems?
☐ YES	☒ NO	l.	Does the change affect fire barriers, fire doors, fire dampers or fire wraps, or affect electrical or mechanical penetrations through fire rated walls, floors, ceilings or cable fire stops? **The work scope of the EDCR is internal to the MCC does not include any external activities.**
☐ YES	☒ NO	m.	Does the change affect structural steel, raceway supports or raceway fire-proofing material?

10CFR50 APPENDIX R AND OTHER FIRE PROTECTION IMPACTS: (Contact the Program Owner)			
☒ YES	☐ NO	n.	Does the change result in the addition or deletion of in-situ combustibles in a fire area/zone (e.g., panels, new cable trays, components with oil sumps, grease plastics)? (Note: Exclude cables routed entirely in conduits. Also exclude cables routed in existing trays without exceeding the tray fill capacity. Exclude combustibles less than 0.5 gallons oil, 4 lbs. plastic, 4 lbs. grease or equivalent amount of other combustible materials.) If yes, combustible loading calculation may be affected. Check with the 10CFR50 Appendix R Program Owner. **Combustible loading is affected by this EDCR-2. Combustible Loading Data (CLD) calculation EPMDOM012990 has been revised (Rev 047) to account for the minor increase in plastic material (three pull apart terminal blocks per bucket) in the MCCs as a result of the bucket replacement activities.**
☐ YES	☒ NO	o.	Does the change affect any of the fire protection systems (HPFP, SFFF, Halon, or CO_2) or affect any of the fire detection systems (e.g., smoke or heat)?
☐ YES	☒ NO	p.	Does the change impact the Fire Protection Reports? If "YES", then a DCN must be issued.
☐ YES	☒ NO	q.	Does the change impact the property insurance carrier fire protection standards and/or associated commitments?
☐ YES	☒ NO	r.	Does the change involve the reactor coolant pump oil collection system?
☐ YES	☒ NO	s.	Does the modification introduce or remove combustible material or fire source in the area?
			If ANY of the above questions are answered "YES", contact the 10CFR50 Appendix R Program Engineer.

SINGLE POINT FAILURE/FAILURE MODES AND EFFECTS/RELIABILITY:

Checklist of questions to ask vendors of large scale systems, and our own designer(s) in regards to single point failures and margin to operation/trip/runback. The following questions should be considered when dealing with vendor supplied packaged solutions.

This section may be considered Not Applicable (N/A) if the Unit 2 change for this EDCR-2 is the same as the Unit 1 installed design.

☐ If this section is N/A, check this box.

☐ YES	☒ NO	a.	What are the system failure modes for the entire package (i.e., output fail-as-is, fail high or low, oscillate, trip system/plant, run back system plant, consider loss of motive power such as electric or control air, etc.)? ***The scope of this EDCR-2 package is the replacement of selected MCC buckets and feeder breakers due to component obsolescence considerations for Safety Related application at WBN2. Determination of failure modes is not in the scope of this EDCR-2 package. The scope of work also includes incorporating U1 change paper into Unit 2 MCCs (i.e. wiring changes, relay changes, etc.). Failure mode analysis for these changes was performed when U1 changes were done.***
☐ YES	☒ NO	b.	What are the failure modes of the individual components which were considered, and what was their effect on the overall system (i.e., consider failures of the digital control systems related to the hardware and softloss of CPU, loss of communication connection, loss of an entire I/O board, etc.)?
☐ YES	☒ NO	c.	Will these system and/or component failures directly or indirectly via transient cause a plant trip or runback? If YES, 1. What is the reliability of the individual components and system? 2. How can testing be performed to detect failure modes, miss configurations, and precursors to imminent failures? 3. What alarms or indications provide timely precursor indication of impending component/system failure? 4. What are bases for alarm, runback, trip, and operator action points. 5. What are the margins between normal operation and these alarm, runback, trip, and operator action points? 6. What redundancy is there in the alarms, indications, runback, or trip functions? 7. Which trips and runbacks are absolutely necessary? Which can be changed to alarms and what operator response is needed for the alarms? 8. Are digital systems developed in accordance with SPP-2.6 and SS-E18.15.01 software requirements for real time data acquisition and control computer systems? 9. Are there any reasons why redundancy was not considered in alarm, trip, runback systems, and can redundancy be added?

DIGITAL SYSTEM UPGRADES/MODIFICATIONS:			
☐ YES	☒ NO		Does the change involve a digital system, component or upgrade? (If "NO", then leave Questions 1-7 below blank.)
☐ YES	☐ NO	1.	Have the requirements of SPP-2.6, SS-E18.15.01, and the guidelines of DG-E18.1.25 been considered?
☐ YES	☐ NO	2.	Does the change involve and in-house modification? If so, implement in accordance with SPP-2.6.
☐ YES	☐ NO	3.	Does the change involve a vendor performed modification? If so, implement in accordance with SS-E18.15.01.
☐ YES	☐ NO	4.	Is the digital modification associated with a Safety Related Protection System upgrade? Has the potential for common cause software failure been considered? IF "YES", use DG-E18.1.25 and SS-E18.15.01 for guidance and requirements. NOTE: For digital upgrades, refer to NRC RIS 2002-2 which endorses NEI 01-01, Rev. 1.
☐ YES	☐ NO	5.	Has the method and level of configuration control needed for the digital application been addressed? NOTE: The configuration control method should be implemented using approved design control processes such as SPP-2.6 and/or an EDCR-2 (i.e., design output). This may involve the need to maintain configuration control of both the software and hardware revision levels. The level of control needed shall be based upon the application function (i.e., Safety Related, Quality Related, Critical to Plant Operations), capability to modify software such as software versus firmware, software and hardware revision compatibility, etc. Safety Related system configuration control must ensure that V&V qualification remains valid so prescriptive configuration control methods would be required. For Non Safety Related software, the configuration control may be less restrictive with focus on plant reliability and day to day operation. Firmware/Software includes both the Operating/Platform System firmware/software and the application specific firmware/software along with any configuration parameters such as setpoints, constants, scaling, etc.
☐ YES	☐ NO	6.	Has a Cyber Security Assessment been completed to address NEI 04-04 requirements? Contact the Computer Engineering Group for instructions.
☐ YES	☐ NO	7.	Is there a communication network interfaces such as an ICS interface? If "YES", implement design of this interface per the guidelines addressed in DG-E18.1.25.

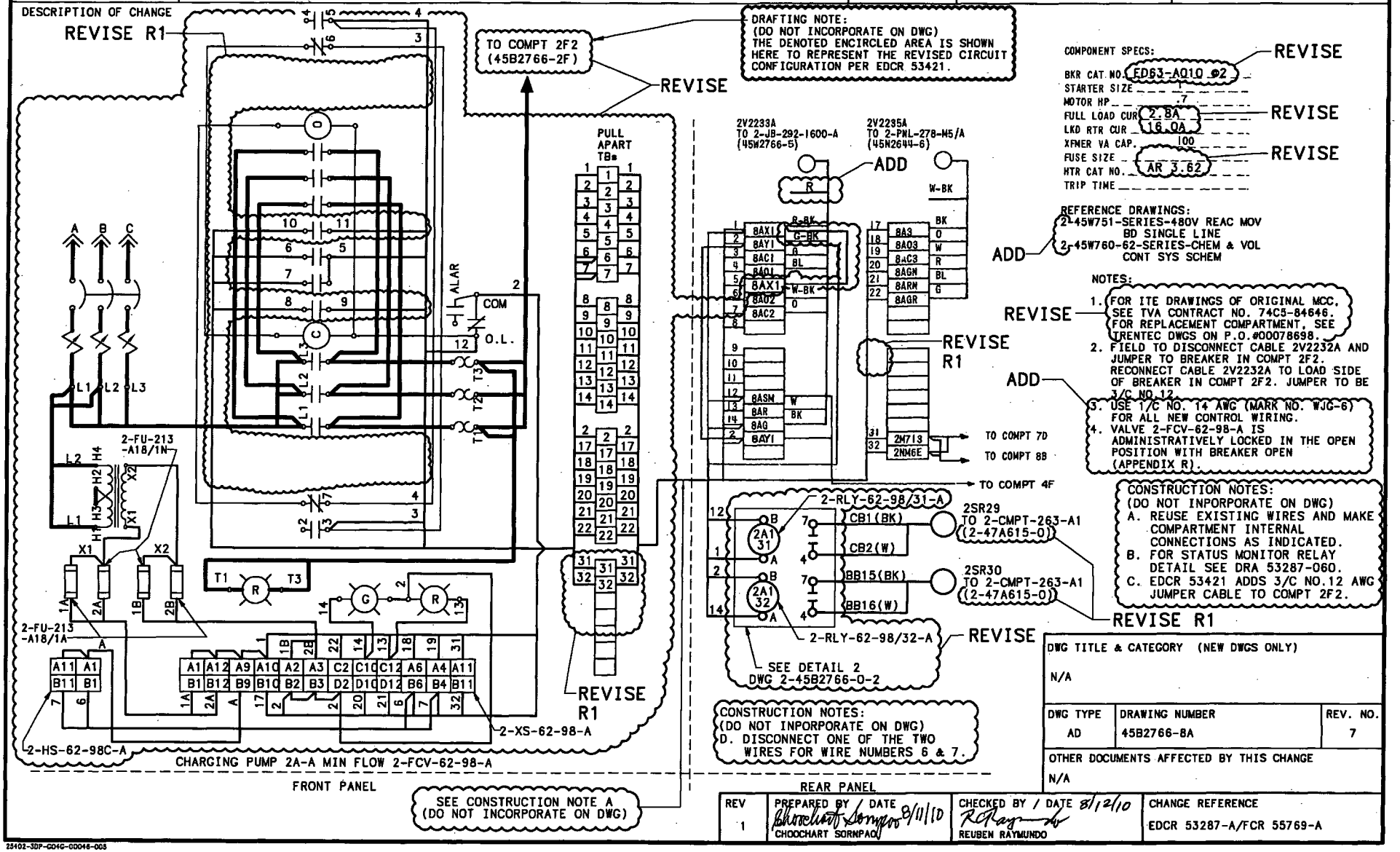
Based on the above Technical Evaluation considerations and responses listed above, the modifications described in this EDCR-2 53287-A package do not have any adverse effects on Nuclear Safety.

DRAWING REVISION AUTHORIZATION (DRA)

JOB NUMBER	DRA NUMBER 53287-018	FCR NUMBER 55769-A
25402	PAGE 1 OF 1	PAGE 116
		EDCR NUMBER 53287-A
		PAGE 156

DESCRIPTION OF CHANGE

REVISE R1



DWG TITLE & CATEGORY (NEW DWGS ONLY)		
N/A		
DWG TYPE	DRAWING NUMBER	REV. NO.
AD	45B2766-8A	7
OTHER DOCUMENTS AFFECTED BY THIS CHANGE		
N/A		

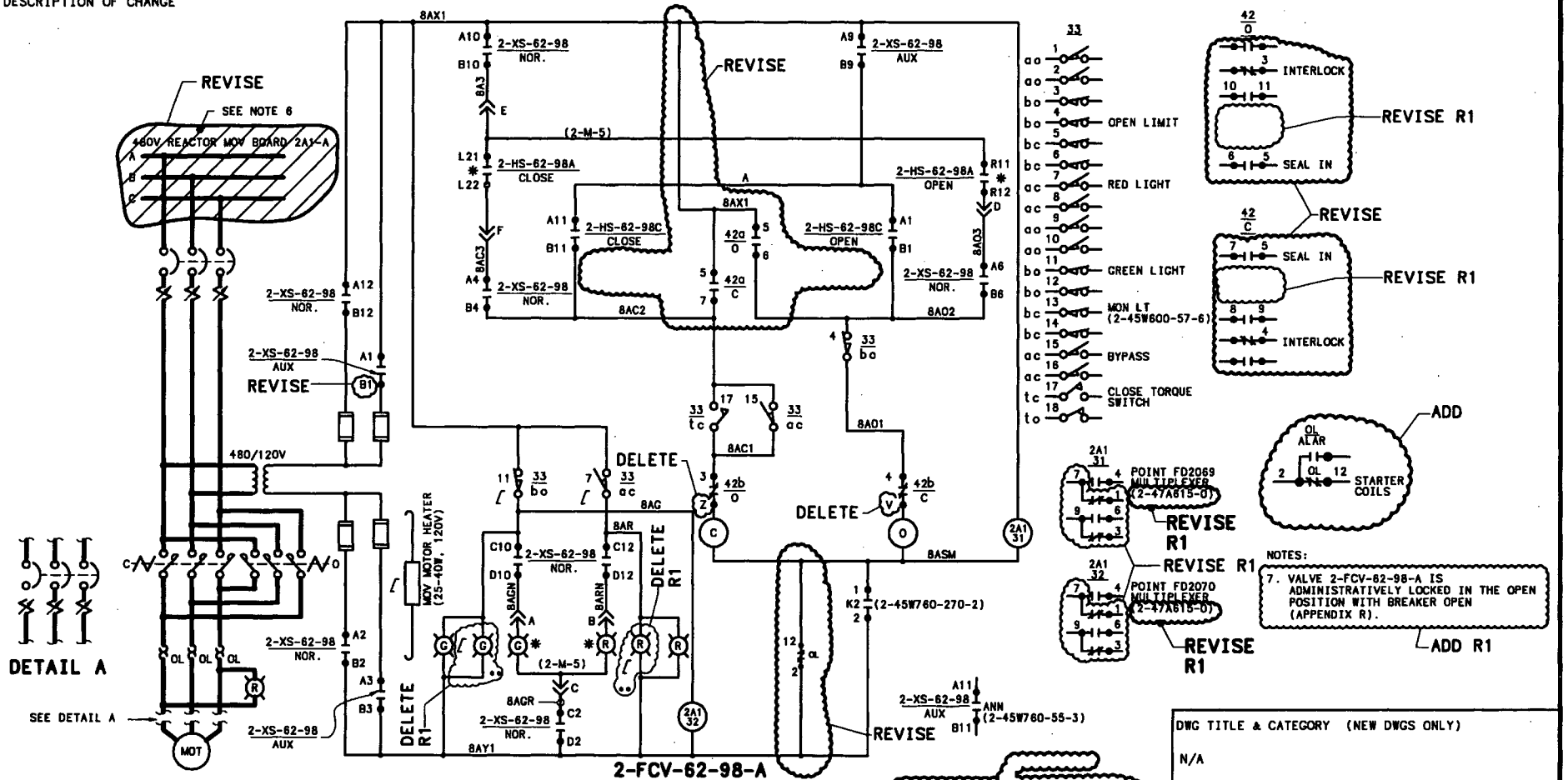
REV	PREPARED BY / DATE	CHECKED BY / DATE	CHANGE REFERENCE
1	CHOOCHART SORNPAO 8/11/10	REUBEN RAYMUNDO 8/12/10	EDCR 53287-A/FCR 55769-A

25402-3DP-G04C-00048-005

DRAWING REVISION AUTHORIZATION (DRA)

JOB NUMBER	DRA NUMBER	FCR NUMBER	EDCR NUMBER
25402	53287-092	55769-A	53287-A
	PAGE 1 OF 1	PAGE 160	PAGE 202

DESCRIPTION OF CHANGE



NOTES:

7. VALVE 2-FCV-62-98-A IS ADMINISTRATIVELY LOCKED IN THE OPEN POSITION WITH BREAKER OPEN (APPENDIX R).

COMPONENT ID NO.	VLV NO.	NOMENCLATURE	BOARD	WIRE PREFIX	CONTROL SWITCH	AUXILIARY SWITCH	FUSE IDENTIFICATION NO. NOR.	FUSE IDENTIFICATION NO. AUX
2-FCV-62-98-A	8110	CHARGING PUMP 2A-A MINIMUM FLOW VALVE	2A1-A	8A	2-HS-62-98A, B, C	2-XS-62-98	2-FU-213-A18/1N	2-FU-213-A18/1A

DELETE

REVISE R1

*NOTE TO DRAFTER
ADD THE FOLLOWING AS THE NEXT AVAILABLE NOTE:

*THE TERMINAL NUMBERS SHOWN FOR MCC-INTERNAL COMPONENTS ARE THE MCC-TERMINAL BLOCK/INTERNAL WIRE NUMBERS RATHER THAN THE ACTUAL DEVICE TERMINAL NUMBERS.

ADD

DWG TITLE & CATEGORY (NEW DWGS ONLY)

N/A

DWG TYPE	DRAWING NUMBER	REV. NO.
CC	2-45W760-62-3	0

OTHER DOCUMENTS AFFECTED BY THIS CHANGE

SEE INDEX

REV	PREPARED BY / DATE	CHECKED BY / DATE	CHANGE REFERENCE
1	CHOOCHART SORNPAO 8/11/10	REUBEN RAYMUNDO 8/11/10	EDCR 53287-A/FCR 55769-A

Attachment 5

Excerpts of TVA document EDCR 53292 dated October 10, 2011 (Letter Item 3)

LEGIBILITY EVALUATED AND ACCEPTED FOR ISSUE.

3/4/10

SIGNATURE All Pages Rev A DATE

EDCR COVER SHEET

GENERAL INFORMATION			Page No. 1
EDCR TYPE (Check One Box Only)	☐ EDCR #		Rev.
	☒ EDCR-2 #	53292	Rev. A

☐ Check here if this is a Streamlined EDCR.
☐ Check here if this EDCR is for Documentation change only & No construction work is required.
☐ SR ☐ QR Check appropriate box if field material procurement quality requirements included.

SEE PAGE 2	AB	772'	SR	Elect	N/A
System	Building	Elevation	Quality Class	Lead Discipline	Code/Class

WORK SCOPE STATEMENT:

Replace 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 REAC MOV BD 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.

PREPARED:

Kurt Roskopf 7109 3/3/10
Design Engineer Phone Date

APPROVALS:

Civil EGS — 02/20/10 Date

Tommy R Tindall / Tommy R Tindall / Lee V. Lotspeich 2/20/10
I&C EGS Date

for Anil Kumar / Anil C. Bangalore 3/3/10
Electrical EGS Date

N/A
Mechanical EGS Date

N/A
Plant Design EGS Date

3/3/10
Project Engineering Manager Date

ACCEPTANCE:

CB Thorn 2/20/10
Responsible Superintendent Date

2/26/2010
Field Engineer Date

EE Freeman 3-4-10
TVA Engineering Manager Date

VERIFIED:

Naquisha E. Causey Naquisha E Causey 3/3/10
Engineer Date

INTER DISCIPLINE REVIEWS:

Robert L Brewer 2/20/2010
Civil Engineer Date

Joshua Rodriguez 02-20-2010
I&C Engineer Date

3/3/10
Electrical Engineer JASON P. CURAS Date

N/A
Mechanical Engineer Date

N/A
Plant Design Engineer Date

Material Only
S.A. Yoder Sarah A. Yoder 3/3/10
Project QA Manager Date

OTHER ORGANIZATIONS:

N/A
Signature/Org'n.: Date

N/A
Signature/Org'n.: Date

N/A
Signature/Org'n.: Date

Refer to the electronic documents in TVA Business Support Library (BSL) for current revision.

25402-3DP-G04G-00081-005 ADMIN 01 BA 1/24/11

ADMIN 02 BA 1/24/11

EDCR COVER SHEET (CONTINUED)

EDCR-2 # 53292 **Rev.** A **Page No.** _____

Affected Systems:

3, 26, 31, 62, 63, 68, 70, 72, 74, 213

1.0 OVERVIEW

Overview of EDCR-2 53292 Package Modifications: Replaces Class 1E Motor Control Center (MCC) starter buckets and feeder breakers for 480V REAC MOV BD 2B1-B; Replaces and adds relays in the rear panel of MCC compartments; Modifies internal wiring for shunt trips, overload bypass control relays, removal of handswitches; Incorporates Appendix R requirements and adds drain (shunt) resistors across P&B relay coils as required in the rear panel of the MCC compartments; Moves the operating function of two compartments from 2-MCC-213-B1-B to 2-MCC-214-B1-B due to Appendix R requirements, see EDCR-2 53290 for replacement compartments. The existing two compartments will become spares; Places administrative controls on breaker position with power normally removed to elminate spurious operation due to Appendix R requirements. Compartments with abandoned downstream loads will have a hard interface point.

2.0 SCOPE OF WORK

Unit 2 compartments which are being replaced are identified by crosshatch on Control Configuration (CC) single line diagrams. Design input is taken from Unit 2 As Designed (AD) connection diagrams and compared against Unit 1 As Constructed (AC) connection diagrams to mark differences. Unit 1 change paper will be implemented for corresponding Unit 2 components in this EDCR-2 53292 package for the WBN Unit 2 Completion Project.

The scope of work for this EDCR-2 53292 package covers the modifications performed on Safety Related, Class 1E equipment for the Unit 2 MCCs which is located in the Auxiliary Building, elevation 772 for:

480V REAC MOV BD 2B1-B (2-MCC-213-B1-B)
See Single Line Diagram 2-45W751-7, 8, 9 and 14

The detail work for all MCC compartments is shown on the attached drawing review authorizations (DRAs) of Internal Connection Diagrams and Schematic Diagrams and Single Line Diagrams.

See Table 1 "480V REACTOR MOV BOARD Unit 2 MCC 2-MCC-213-B1-B (BUCKET, FEEDER BREAKER, & SHUNT TRIP REPLACEMENTS, RELAY AND INTERNAL WIRING CHANGES)," for bucket replacements and internal changes affected by these modifications.

2.1 DCN 54598, 54703,and 56336 is a prerequisite for the installation of the Unit-2 Bucket and feeder breaker replacements. DCN 54598, 54703, and 56336 establishes the Unit-1/Unit-2 interfacing points to allow the modification work to be implemented under this EDCR-2. The existing MCC, 2-MCC-213-B1-B supplies power to some of the existing Unit-0, Unit-1 (Operating Unit) which are under Unit-1 control. All work performed on the MCC under this EDCR-2 require scheduling and implementation through Work Control / Work Management Procedures with the concurrence of Unit-1 Operations.

2.2 DCN 53387 is a prerequisite to EDCR 53292

FCR 56127

2.3 The functional design, technical details and configuration of the molded case circuit breakers and MCC starters buckets are in accordance with the most up-to-date Unit-1 single line drawings and internal connection diagrams, to insure that the new buckets perform the same circuit function as the old buckets. In addition the new buckets are being designed to rack into the existing MCCs without any issues and latch into place in a manner equal or better than the existing buckets.

The new safety related, Class 1E MCC buckets are procured under Material Requisition (MR) No. 25402-011-MRA-ECM1-00001 and shall be replaced in the existing MCC bucket compartments. For TRENTEC drawings of the starter buckets see Purchase Order No. 78698.

2.4 The existing safety related, Class 1E MCC buckets and feeder breaker replacements with or without shunt trips shall be disconnected from the existing power and control conductors, removed, replaced and reconnected to the existing power and control conductors.

The compartments with only breakers (compartment without starter bucket) will have the existing obsolete ITE feeder breakers (breaker without starter) in the indicated compartments replaced with new breakers (Siemens Model ED63). The replacement feeder breaker is electrically interchangable, but requires retrofit installation brackets (ED63 Retro) to make it mechanically interchangable.

2.5 All the internal bucket control wiring shall be new and terminated at the inboard portion pull apart terminal block which is included in the MCC bucket. All the existing control wiring and the existing terminal blocks in the rear panel of the MCC bucket are to remain as is for reuse. The existing control wiring from the rear panel terminal blocks is to be disconnected from the components in the existing buckets and reconnected to the outboard portion of the pull apart terminal blocks in the replacement bucket. The outboard portion of the pull apart terminal blocks will be connected to the inboard portion after the MCC bucket is installed.

2.6 NOT USED.

2.7 This EDCR-2 package does not cover power cable resizing that may be due to cable breakages or any external cable rerouting or replacements that may be required due to Appendix R issues or any other programmatic issues. Cable terminations in the rear panel are not included in this EDCRs scope, unless the cable terminations have been coordinated with another DCN/EDCR. This EDCR-2 requires lifting and re-landing of all affected power and control cables as a result of the bucket, feeder breaker, and relay replacements. If another EDCR/DCN package installs cables prior to the bucket/feeder breaker replacement, this EDCR will land those cables. However, if this EDCR precedes cable installation from bulk pull or other EDCR/DCNs, the other package will land and terminate the cable.

2.8 Compartments 8A and 8B of 2-MCC-213-B1-B have cable termination changes in this EDCR DRAs 53292-004 and 53292-010, which has been coordinated with EDCR 53421.

2.9 This EDCR-2 makes the same internal control wiring changes to the MCC rear panel based on historical changes to the Unit-1 MCC.

2.10 MCC compartment starter buckets that are not needed for Unit-2 operation are designated as spares and are not being replaced by this EDCR. Other items that were deleted by Unit-1 change paper are determinated and abandoned in place.

2.11 **Status Monitor Relays and 7KΩ Resistors.**

A. This package provides status monitor relays, Potter & Brumfield (P &B) Model KUIP11A15-120, and a 7 KΩ resistor in the rear of Compartments as required to act as a drain resistor due to capacitive leakage current for long cable lengths. The resistor (Ohmite Model No. B8J7K0) is rated at 7KΩ and 8 Watts. The P&B relays provide the load circuit power condition status inputs to the Integrated Computer System as follows:

Normal- power is on and is available to the load.
Alarm- loss of power source to the load

B. Install the status monitor relays and the resistor in the rear panel of the MCC per mounting detail as indicated on the DRAs. Make field adjustments for the relay and resistor space as required.

C. Resistor terminations-Field shall solder the indicated WJG-6 SIS wiring to the resistor terminals using Procedure MAI -3.5 Field Soldering. Use ROHS solder composition 96% Sn, 3.5% Ag, & 0.5%CU per manufacturer documentation to solder the wire to the Ohmite resistor terminal.

2.12 **MCC Appendix R Breakages**

A. Appendix R breakages were reviewed and evaluated for this MCC. The Appendix R is limited to implementing modifications to the internal compartments. Modifications include wiring changes and the re-wiring 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 and some breakers placed in the open position to eliminate spurious valve operation. See Table 1 attached for compartments affected by these modifications.

2.13 **PER's**

No. 1 **PER # 141706 Details:** Historical issue. Wiring Diagram 1-45B2768-14E Rev 0 for 2-FCV-72-45-B shows the open coil and close coil connected with a jumper that is connected to terminal block 12. Wiring schematic 1-45W760-72-3 Rev 10 does not show the open and close coils jumpered.
PER # 141706 Resolution: The jumper across coils on 45B2768-14E was removed on the DRA 53292-035 in this package, due to an Appendix R issue.

No. 2 **PER # 178013 Details:** Addresses the issue of inadequacy of adhesive-backed cable support mounts (ABSCM) for wiring inside safety-related panels and boards identified by the NRC. Unit-1 inspected the 6.9kV boards, MCC's and M-Panels and reworked ABSCMs by using screws to hold ABSCMs to the board. Spec G-38, Section 12.6 and MAI-3.3, was revised to provide acceptable methods of attaching ABSMs.
PER # 178013 Resolution: For the Safety Related Unit-2 MCCs, a Construction Note was include on drawing 45B2754-0 for construction to verify that all adhesive-backed cable support mounts (ABSCM) installed within the MCCs (typically in the rear section) are secured in accordance with:

A. TVA General Engineering Specification G-38 "Installation, Modification, and Maintenance of Cables Rated Up to 15,000 Volts", Section 12.6, and

B. Modification/Addition Instruction, MAI-3.3, "Cable Terminating, Splicing, and Testing of Cables Rated Up to 15,000 Volts".

2.14 Starter of MCC bucket replacements have unused or spare contacts. These unused contacts add mechanical burden to the starter coils. To improve the starter coil pick up voltage performance, two auxiliary contacts from each starter coil are removed. This modification is typical for all starters of the MCC bucket replacement compartments.

In order to provide power for the isolation valves at all times, Unit 2 Blown Fuse Detector (BFD) Relays are removed from their bases (BFDBs) and shunt trips are disconnected from the breakers. Indicating lights at control switches in the control room will monitor status of limit switches only.

The design modification is a result of an action/solution to PER 389663 (see Paragraph 2.17 of this EDCR-2 package, below). Valve control circuits have been revised to reflect design changes are for following loads: 2-FCV-74-9-B (Compt. 5C), 2-FCV-62-61-B (Compt. 6D), 2-FCV-63-67-B (Compt. 7D), 2-FCV-63-98-B (Compt. 8D) and 2-FVC-74-2-B (Compt. 10D).

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2.15 **AFFECTED CORRECTIVE ACTION PROGRAM CODES**

CP3.1 Licensing Verification; CP3.3.1 Civil Baseline Calculations; CP3.3.2 Electrical Baseline Calculations; CP3.3.3 Instrumentation Baseline Calculations; CP3.3.4 Mechanical/Nuclear Baseline Calculations; CP5.3 Contact and Coil Rating of Electrical Devices; CP5.4 Torque Switch and Overload Relay Bypass; CP5.5 Adhesive Backed Cable Support Mounts; CP5.7 Thermal Overloads; CP5.8 Coordination; CP6 Equipment Seismic Qualification; CP7.1 10 CFR50.48/Appendix R; CP16 Seismic Analysis; CP17 Vendor Information; SP5 Master Fuse List.

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2.16 **PER RESOLUTION**

PER 172596 – This PER addresses existing cable routing for valves – capable of Appendix R – safe shut down paths and identifies all control wiring modifications required to prevent spurious valve operation due to fire damage. This PER impacts many other EDCRs but valves mentioned in table 1 have been modified in this EDCR.

PER 144120 – This PER addresses the electrical circuit for the Thermal Barrier Booster Pump (TBB), that was designed such that the circuit allows the pump to start immediately upon receiving a safety Injection signal coincident with a loss of offsite power instead of being delayed 25 seconds as required by logic Diagram for the TBB pumps.

The EDCR 53292 DRAs 026 and 053 addresses the PER 144120 and introduces a time delay and modifies the time as required by the revised set point calculations for motor WBN-2-MTR-0130-B.

PERs 172596 and 144120 are in addition to the PERs mentioned and addressed in section 2.13 of this EDCR.

PER 424384 – This PER addresses a cross-reference typo on DRA 53292-070 for showing TOL Bypass relay "K9" contact A2X-A2Y used for 2-FCV-67-87 instead of 2-FCV-67-89. This is Doc change only, no field work is required.

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2.17 PER 389663 – This PER identifies operational concerns related to use of BFDs for safety-related MCC control circuits for isolated valves. The BFDs will cause loss of valve position indicating lights.

EDCR-2 53292 addresses this PER issue to remove BFDs from BFD bases (BFDBs) and revise connection diagrams, schematic diagrams and single line diagrams to restore the function of indicating lights to indicate limit switch positions.

For the PER solution/action, the work will apply to following 2-MCC-213-B1-B compartments:

Compt. No.	Loads
5C	2-FCR-74-9-B
6D	2-FCV-62-61-B
7D	2-FCV-63-67-B
8D	2-FCV-63-98-B
10D	2-FCV-74-2-B

Removal of all detectors for both Unit 1 and Unit 2 have been coordinated with Unit 1 Electrical Engineering Design Manager, Unit 2 Electrical Engineering Design Manager, Unit 1 Operation Personnel and Unit 2 Operation Personnel per meeting on 06/14/2011 held at EQB, 2nd floor Design engineering Conference Room at WBN facility. The Unit 1 related work will be implemented in later date under Unit 1 work program. This is to ensure that there are no Unit1 and Unit 2 design configurational and operational differences .

2.18 2-MCC-213-B1-B Compartment 14A, Time Delay Relay 2-02-72-2-B setting has been revised to be at 5.7 seconds in lieu of 5.0 seconds. This adjustment is required and this is based on the I & C Calculation 2-02-072-0002, "Demonstrated Accuracy Calculation for TDR 2-02-072-0002-B and -0039-A", Rev. 0.

2.19 **PER 363755** addresses R-series relays located in Auxiliary Instrumentation Room missing UNID numbers. As a continuation to this PER finding, some relays at 480V RMOV Boards 2B1-B/16D have no UNID numbers, including Relays K1 through K9 of the TOL Bypass Relay Control 2B1.

As solution/action to the **PER 363755,** this EDCR-2 53292-A addressed UNID issue for TOL relays K1 through K9 located at 480V RMOV BD 2B1-B/16D and assigned Relay UNID numbers. This is to comply with the QA program as required by 10 CFR 50 Appendix B.

MEL packages are issued to add UNID numbers for these relays. TOL Relay UNID numbers are depicted on DRAs. Any discrepancy found on existing hand switch UNID will be deleted and replaced with new one.

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3.0 HISTORICAL WATTS BAR UNIT 1 DESIGN CHANGE NOTICES (DCNs)

Prior to the initiation of this EDCR-2 package, a comprehensive search and review of all Unit-1 change paper per Historical Watts Bar Unit-1 Design Change Notices (DCNs) was performed. This was done to ensure that the Unit-1 (Operating Unit) and WBN Unit-2 design configuration remains as similar as possible, to assure that Unit-2 functionally mirrors Unit-1, and that all Unit-1 design changes are incorporated into Unit-2. Any differences identified as the result of the review are addressed and resolved accordingly in this EDCR and documented on a Unit Difference form. For list of DCN(s) used to determine the scope of changes for Watts Bar Unit -2 completion, See Table 1,"Modifications for Compartments per Unit-1 DCN's and Appendix R requirements."

4.0 WORK SCOPES NOT COVERED

A. The work scope does not include replacing any Unit 2 MCC compartments that are under U1 control, any spare/future compartments or any compartments that become spare by other EDCRs.

B. The work scope under this EDCR-2 package does not include adding, replacing, or landing external cables which are installed on other EDCRs unless specifically noted on DRAs.

C. This EDCR-2 package does not provide or install any fuses. The Master Fuse List Program will procure and issue MEL Packages for Sys. 213 fuses with EDCR 54797.

D. Thermal overload (TOL) heaters noted on the Connection Drawings are for documentation only and will not be procured or installed as part of this package. TOL settings of the affected compartments are in accordance with calculations EDQ00299920080004. EDCR 54587 is replacing the Thermal Overload heaters for Safety Related MCC Compartments.

E. This EDCR-2 package does not turn over any downstream system loads for start-up or Operations.

5.0 GENERAL TECHNICAL REQUIREMENTS

The modifications under this EDCR-2 package including the technical design and evaluations are performed in accordance with the requirements of the latest revision of following procedures:

A. Engineering Department Procedure 25402-3DP-G04G-00081, "ENGINEERING DOCUMENT CONSTRUCTION RELEASE (EDCR)."

B. WBN Unit 0, 1 Technical Instruction 0-TI-2, "CRITERIA FOR ISSUING ENGINEERING DOCUMENT CONSTRUCTION RELEASES POTENTIALLY IMPACTING WBN UNIT 0 AND/OR UNIT 1 DESIGN (EDCR-2)."

C. Prior to the initiation of this EDCR-2, a comprehensive search and review of all the Unit 1 change paper per Historical Watts Bar Unit 1 Design Change Notices (DCNs) was performed. This was done to ensure that the Unit 1 (Operating Unit) and WBN Unit 2 design configuration remains as similar as possible, to assure that Unit 2 functionally mirrors Unit 1, and that all Unit 1 design

changes are incorporated into Unit 2. Any differences identified as the result of the review are addressed and resolved accordingly in this EDCR and documented on a Unit Difference form. SeeTable 1 for a summary of DCN(s) used to determine the scope of changes for this EDCR-2 package.

6.0 TECHNICAL EVALUATION CONSIDERATIONS OF 0-TI-2 (ATTACHMENT 1)

The EDCR Technical Evaluation Considerations was performed to confirm that these modifications do not adversely affect nuclear safety and satisfy the requirements of SPP-9.3, Section 3.1.4, Design Development Appendix C, and the Technical Evaluation Considerations.

7.0 SEISMIC QUALIFICATION REVIEW

All the MCC compartments and components of the existing 480V REACTOR MOV BOARD 2B1-1 (2-MCC-213-B1-B), are classified as safety related, Class 1E Seismic Category 1. All replacement MCC buckets and their components are procured and seismically qualified as safety related, Class 1E Equipment by the vendor under MR No. 25402-011-MRA-ECM1-00001 and all feeder breakers and miscellaneous components are under MR No. 25402-011-MRA-ECM1-0003. Civil calculation WCG-ACQ-0446 has been revised to document the seismic qualification of the Reactor MOV Board 2B1-B buckets, relays, and components. Seismic testing for the new buckets will be performed by an independent laboratory and reports submitted under the procurement process. The results from this test will then be compared to Civil calculation WCGACQ0446, which has been revised to document the seismic qualification of the Unit 2 480 Reactor MOV Boards 2A2-A and 2B1-B due to replacement of the buckets, relays, and other electrical devices. The existing buckets will be weighed for comparison with the new buckets and the calculation above.

Weights of existing MCC buckets and feeder breakers:

The scope of this EDCR-2 package includes the obtainment of the weights of all existing MCC buckets and feeder breakers (to be removed and replaced) including the weight of the door. With the weights of the new buckets and breakers provided by TRENTEC the differential weights of the new and old buckets and breaker will provide ESQ design data input for Seismic Qualification calculations required for Class 1E equipment for MCC 2-213-B1-B. The weighing process shall be a two party verification and the scale shall be duly calibrated and certified according to the latest applicable standards for accuracy.

8.0 EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW

This EDCR-2 package is for Safety Related Unit 2 MCC (2-MCC-213-B1-B), located on elevation 772' in the Auxiliary Building, which is in a mild environment area. Therefore, Equipment Qualification in accordance with IEEE 323-1974 and 10CFR50.49 is not required.

9.0 MASTER EQUIPMENT LIST (MEL) PACKAGE

A Master Equipment List (MEL) Package includes all added, deleted and replaced devices/components and is attached to this EDCR.

For removal of the obsolete relay Filter Fuses, under system 213, the Master Equipment list will be updated under EDCR 54797. The Filter Fuses are located in the rear panel of the compartments.

10.0 APPENDIX R ZONE AND AUXILIARY BUILDING SECONDARY CONTAINMENT ENCLOSURE (ABSCE) REVIEW

This EDCR-2 scope of work includes work activities that are internal to the motor control center. Any external activities such as cable changes and cable rerouting, and raceways changes associated with

these modifications that could possibly cross Unit 0 and/or Appendix R Fire Zone and/or could breach the Auxiliary Building Secondary Containment Enclosure (ABSCE) boundary line are not covered under this EDCR-2. Therefore, this EDCR-2 modification work has no impact to the ABSCE.

11.0 ALARA SCREENING CHECK LIST

An ALARA Screening Checklist is performed in this EDCR-2 package. The ALARA screening checklist that verifies the scope of these modifications does not affect ALARA. The buckets, feeder breakers and relay replacements and wiring changes are inside the MCC (Auxiliary Building) which is located in a mild environment area subject to normal radiation levels only. Therefore, there is no radiological impact as a result of this EDCR modification.

12.0 HUMAN FACTORS ENGINEERING (HFE)

A Human Factors Engineering (HFE) review is performed and attached to this EDCR.

13.0 MATERIAL REQUISITION (MR)

Material Requisitions (MR) have been issued for procurement under separate packages for the new safety related, Class 1E equipment, MCC buckets (starters, breakers and other devices) under the MR No. 25402-011-MRA-ECM1-00001 and for feeder breakers (without starters), relays and other components under the MR No. 25402-011-MRA-ECM1-00003 and MR No. 25402-011-MRA-ECM1-00005. They are referenced in this EDCR-2 for information.

14.0 ICRDS REPORTS

No ICRDS Reports is required. All the wiring changes are internal to the MCC compartments. Any cable modifications required as a result of buckets moved from one compartment to another compartment are not included within the scope of this EDCR.

15.0 FIRE PROTECTION REVIEW

A Fire Protection Review is performed to insure that all combustible materials, such as bucket materials, feeder breaker materials and SIS wiring added as the result of this modification are properly addressed in the affected combustible materials calculations.

16.0 ELECTRICAL AND I & C (CHECKLIST) CHANGE REVIEW

Change Review by Electrical and I&C (Checklist) is performed to identify any calculations impacted by this EDCR. All breaker ratings and settings and thermal overload heaters depicted on indicated DRAs unless otherwise specified are based on Unit-2, 480 V Protection Calculation No. EDQ00299920080004, Rev. 003.

17.0 DESIGN REVIEW MEETINGS

The following design review meetings will be provided as follows:

A. The 50% Design Review meeting is waived.

B. Design Review Board (DRB) meetings is waived.

C. The final Design Review meeting is waived.

18.0 WALK-DOWNS

A Final Constructability Walk-down for this EDCR-2 was performed on 2/16/2010 to ensure that the completed design modifications can be executed as detailed in this EDCR-2 process.

19.0 LICENSING IMPACT REVIEW

Screening for Impact to Licensing is being requested to insure that the licensing basis is implemented in the same manner as the Unit 1 and not invalidate or undo previous WBN Unit 1 licensing basis requirements.

20.0 CABLE TERMINATIONS, REPAIRS AND MODIFICATIONS REQUIREMENTS

Lifting/re-landing or any repairs and modifications to the cables/wires as a result of the bucket and feeder breaker replacements and any internal wiring changes are required to be in accordance with the latest revision of the TVA General Engineering Specification G-38, "Installation, Modification and Maintenance of Insulated Cables Rated Up to 15,000 Volts" and Modification/Addition Instruction, MAI-3.3, "Cable Terminating, Splicing, and Testing for Cables Rated Up to 15,000 Volts".

21.0 TESTING REQUIREMENTS

A. The conductor continuity tests and insulation resistance tests for power and control conductors shall be performed for all new conductors. The tests shall be performed in accordance to the latest revision of TVA General Engineering Specification G-38, Sections 19.1 and 19.3. Interface points are established at the bucket connections under DCN 54598 to facilitate bucket replacement.

B. Prior to installing each feeder breaker, NEMA AB-4 breaker testing shall be performed or verified as having been performed by the vendor. Bucket testing in accordance with approved procedures is provided under MR 25402-011-MRA-ECM1-00001.

C. Functional system checks and Post Modification System Testing shall be performed by the System Engineer.

D. TRENTEC is providing the component fabrication, assembly, mounting, wiring, shop testing and seismic qualification for the new starter buckets.

E. Seismic testing for the new buckets will be performed by an independent laboratory. The results from this test will then be compared to Civil calculation WCGACQ0446, which has been revised to document the seismic qualification of the Unit 2 480 Reactor MOV Boards 2A2-A and 2B1-B due to replacement of the buckets, relays, and other electrical devices. The existing buckets will be weighed for comparison with the new buckets and the calculation above.

22.0 DRAWING REVISION AUTHORIZATION (DRA) PACKAGE

Drawing Revision Authorization (DRA) sheets show all work relating to this EDCR-2 for replacement of each MCC bucket and feeder breaker on associated Single Line Diagrams, Internal Connection Diagrams and Schematic Diagrams. All the above DRA sheets are included in this EDCR-2 package.

21.0 CONCLUSION

A. The EDCR-2 53292 modification activities are related to the Unit 2 safety related, Class IE components permanently installed in the existing safety related, Class 1E equipment for Unit-2, 2-MCC-213-B1-B that contain Unit 0 and/or Unit 1 components (Operating Unit). Some of the existing loads are serving and controlled by Unit 1, therefore, the work activities under this EDCR-2 require scheduling and implementation through Work Control / Work Management Procedures under the Unit 1 Operations. Interface points are established at the bucket connections under DCN 54598 to facilitate bucket replacement.

B. These EDCR-2 modifications do not adversely impact any requirements or capabilities of any system protecting safety related structures, systems or components (SSC). There are no impacts to Final Safety Analysis Report (FSAR), System Description (SD), and Design Criteria (DC), Technical Specification (TS) and/or Technical Requirement (TR).

C. The preparation of this EDCR-2 53292 is in accordance with the latest revision of Procedure 254023DP-G04G-00081, Engineering Document Construction Release (EDCR) and in conjunction with WBNP Unit 0, 1 Technical Instruction 0-TI-2, Criteria for Issuing Engineering Document Construction Releases (EDCR-2) Potentially Impacting WBN Unit 0 and/or Unit 1 Design. These modifications (or changes) are in compliance with U.S. Nuclear Regulatory Commission (NRC) requirements. Therefore, these modifications or changes are acceptable for nuclear safety consideration.

Procurement Specifications:

Field to procure safety related class 1E cable, TVA Mark # WJG-6 for internal wiring and WGC-52 for power connection to compartment 2E2.

TABLE 1

480V REACTOR MOV BOARD Unit 2 MCC 2-MCC-213-B1-B (BUCKET, FEEDER BREAKER, & SHUNT TRIP REPLACEMENTS, RELAY AND INTERNAL WIRING CHANGES)			
ITEM NO.	**MCC COMPT I.D.**	**LOAD I.D.**	**Modifications for Compartments per Unit 1 DCN's and Appendix R requirements**
1	2C	2-MTR-70-130 -B	1.) DCN 01664 added relay contacts due to drawing discrepancy. 2.) DCN 11943 replaced relay 62, AGASTAT 7000 series electro-pneumatic with an AGASTAT **ETR14I3D003** solid state relay, needed for proper generator timing sequence. Added 62X relay, PB **KUIP11A15-120** in parallel for instantaneous contact, where the replacement relay does not. 3.) DCN 24543 added contacts and wiring for 62X relay because it was installed improperly. 4.) DCN 28376 Revised timing sequence for the AGASTAT ETR relay from 25 TDPU to 35 TDPU. 5.) **Unit-2 change only:** Trentec 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 Calc.
2	3E	2-FCV-70-207-B (ABANDONED IN PLACE)	1.) DCN 21582 added interface points for COMPT 3E because the equipment was not needed for U1 operation. 2-FCV-70-207-B has been administratively locked in the closed position. (With Breaker Open) (Appendix R) **EDCR 54782 and its predecessor DCN 53413** confirmed that the U2 device is not needed for U2 Operation. The downstream valve 2-FCV-70-207-B is abandoned in place. The existing compartment will be abandoned in place and the procured replacement bucket placed in storage.
3	4A	2-HTR-63-36-B (SPARED)	1.) DCN 04277 changed downstream heater 1-HTR-63-36 -B to a SPARE. The equipment is not required to support plant operation. **EDCR 53036** has confirmed that the U2 device 2-HTR-63-36 -B is not needed for U2 operation and is removing the downstream heater. Abandon existing compartment equipment and bucket in place. A replacement bucket was not procured.

LIST OF MCC COMPARTMENTS REQUIRED COMPONENT REPLACEMENTS (CONTINUED)

4	4D	2-MTR-62-244 -B	1.) DCN 14567 makes wire changes that will allow the Centrifugal charging pump to start. (Interlocks from the lube oil pumps prevented the start up of the CCP motors) 2.) DCN 26687 makes wire changes to resolve a problem that occurs when the CCP is stopped; the AUX Oil pump keeps running. 1.) DCN 25807 identities a discrepancy between single line 45W751-7 and 45B1768-4D changed 1-MTR-62-AOP-B to 1-MTR-62-244-B.
5	5C	2-FCV-74-9 -B	2.) DCN 16653 added wire connection to Compartment 16D for thermal overload bypass control.
6	5E	2-FCV-68-332 -B	1.) DCN 03367 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. Adds 7k ohm drain resistor **(P/N B8J7K0)** across AC coils of replacement PB relays when a sufficiently long run of cable could provide a capacitive leakage current of 1 mA or higher. 2.) DCN 35957 Appendix R **Change per Calculation EDQ0009990012, App. J**: 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. (Resolution 5228)
7	6D	2-FCV-62-61 -B	1.) DCN 03226 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers.
8	7A	2-FCV-62-91 -B	1.) DCN 03226 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. 2.) DCN 04663 adds a jumper wire due to the removal of EQ Cutler Hammer hand switches. 3.) **Unit-2 change only per Calculation EDQ0009990012, App. J**: 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. (Resolution 5207).

LIST OF MCC COMPARTMENTS REQUIRED COMPONENT REPLACEMENTS (CONTINUED)

9	7B (2E2)	2-FCV-62-99 -B	1.) DCN 03226 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. 2.) DCN 04663 adds a jumper wire due to the removal of EQ Cutler Hammer hand switches. 3.) Appendix R requirement related to DCN 16213: 2-FCV-62-99 -B must not close if fire damage occurs to cables 2V2241B or 2V2243B which could spuriously close the valve. Modification to be made: Open Breaker to remove power during normal operation. The flow line to the FCV on the control diagram is need for Unit-2 operation and the valve is not going to be capped and flanged, therefore the Compartment is replaced rather then abandoned in place.
10	7D (16F2)	2-FCV-63-67 -B	1.) DCN 03225 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. 2.) **Unit-2 change only:** For Compartment 7D Trentec added a Phase monitor relay for the blown fuse detector to the starter bucket due to which increased the CPT capacity from the original 150VA to 200VA, per transformer sizing Calc.
11	8A	2-LCV-62-133 -B	1.) DCN 03226 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. 2.) DCN 12068 makes wiring and cable termination changes coordinated with **EDCR 53421** due to the addition of stem switches for Appendix R that requires one train of systems to achieve and maintain hot shutdown that is free of fire damage.

LIST OF MCC COMPARTMENTS REQUIRED COMPONENT REPLACEMENTS (CONTINUED)

12	8B	2-LCV-62-136 -B	1.) DCN 03226 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. 2.) DCN 12068 Wiring and cable termination changes coordinated with **EDCR 53421** due to the addition of stem switches for Appendix R that requires one train of systems to achieve and maintain hot shutdown that is free of fire damage.
13	8D (3F2)	2-FCV-63-98 -B	1.) DCN 03225 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. 2.) DCN 09914 replaces 150 VA CPT with 200 VA CPT due to calculation requirements. The CPT is supplied by Trentec as it is part of the starter bucket per transformer sizing Calc.
14	9A	2-FCV-62-138 -B	1.) DCN 03226 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers.
15	9B	2-FCV-63-172 -B	1.) DCN 03225 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. 2.) DCN 04663 adds a jumper wire due to the removal of EQ Cutler Hammer hand switches.
16	9F	2-FCV-72-13 -B	1.) DCN 03367 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. Added 7k ohm drain resistor **(P/N B8J7K0)** across AC coils of replacement PB relays where a sufficiently long run of cable could provide a capacitive leakage current of 1 mA or higher. 2.) DCN 12104 replaces relay 62 AGASTAT Model 7014AC with AGASTAT model ETR1413C003 because the previous time delay relay could not perform its safety related function. The new relay to be installed is AGASTAT model **ETR14I3C004**, with a new set point of 13.5 sec related to Unit-1 DCN 52834.

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LIST OF MCC COMPARTMENTS REQUIRED COMPONENT REPLACEMENTS (CONTINUED)

17	10A	2-FCV-63-4 -B	1.) DCN 03225 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. Added 7k ohm drain resistor **(P/N B8J7K0)** across AC coils of replacement PB relays where a sufficiently long run of cable could provide a capacitive leakage current of 1 mA or higher. 2.) DCN 04663 adds jumper wire added due to the removal of EQ Cutler Hammer hand switches.
18	10B	2-FCV-63-5 -B	1.) DCN 03225 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. Added 7k ohm drain resistor **(P/N B8J7K0)** across AC coils of replacement PB relays where a sufficiently long run of cable could provide a capacitive leakage current of 1 mA or higher. 2.) DCN 04663 adds a jumper wire due to the removal of EQ Cutler Hammer hand switches.
19	10D	2-FCV-74-2 -B	1.) DCN 03224 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. 2.) **Unit-2 change only:** For Compartment 10D Trentec added a Phase monitor relay for the blown fuse detector which increased the CPT capacity from the original 100VA to 150VA per transformer sizing Calc. 3.) Appendix R resolution # 5109: Valve is administratively locked in the closed position with the breaker open.
20	10F	2-FCV-72-21 –B (SPARE)	1.) The Function of Compartment 10F (45B2768-10F) in MCC-213-B1-B will be utilized in COMPT 7E (45B2772-7E) in MCC-214-B1-B due to DCN 13725 Appendix R hot shutdown requirements. The existing compartment 10F will be abandoned in place. See EDCR DRA 53290-011 for COMPT 7E. The cable connection from COMPT 7E (45B2772-7E) to COMPT 16D (45B2768-16D) will be cover under **EDCR 54851.**

LIST OF MCC COMPARTMENTS REQUIRED COMPONENT REPLACEMENTS (CONTINUED)

21	11A	2-FCV-63-6 -B	1.) DCN 03225 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. 2.) DCN 04663 adds a jumper wire due to the removal of EQ Cutler Hammer hand switches.
22	11B	2-FCV-63-11 -B	1.) DCN 03225 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. 2.) DCN 04663 adds a jumper wire due to the removal of EQ Cutler Hammer hand switches. 3.) **Unit-2 change only:** For Compartment 11B Trentec changed the CPT capacity from the original 100VA to 150VA to ensure all combined devices would function properly.
23	11D	2-FCV-63-22 -B	1.) DCN 03225 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. 2.) DCN 04663 adds a jumper wire due to the removal of EQ Cutler Hammer hand switches.
24	11E	2-FCV-63-25 -B	1.) DCN 03225 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. Added 7k ohm drain resistor **(P/N B8J7K0)** across AC coils of replacement PB relays where a sufficiently long run of cable could provide a capacitive leakage current of 1 mA or higher. 2.) DCN 04663 adds a jumper wire due to the removal of EQ Cutler Hammer hand switches. 3.) DCN 35957 Appendix R **Change per Calculation EDQ0009990012, App. J**: 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. (Resolution 5680).

LIST OF MCC COMPARTMENTS REQUIRED COMPONENT REPLACEMENTS (CONTINUED)

25	12A	2-FCV-63-40-B	1.) **DCN 26538** Subsequent design development determined that the valve (1-FCV-63-40-B) is not required to be normal closed and the valve be maintained locked open with power removed and will not be electrically tested. Therefore the inputs to annunciation F-131F and Emergency Response Facility Data System (ERFDS) will be deleted. (Because the FCV is in the locked open position no relay replacement or cables are needed to signal to the annunciation window. The BKR will be left in the open position and the circuit inoperable). 2.) **Obsolete changes:** DCN 03225 Crydom Solid State Relays are being replaced with Potter & Brumfield Relays because the relay is not compatible with the circuit causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. DCN 23025 (superseded by 26538) the valve (2-FCV-63-40-B) supplies a signal to annunciation window when the valves are open (normal position). Changed wiring so the input signal initiates when the valves are closed (not normal position).
26	12B	2-FCV-63-48 -B	1.) DCN 03225 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. Added 7k ohm drain resistor **(P/N B8J7K0)** across AC coils of replacement PB relays where a sufficiently long run of cable could provide a capacitive leakage current of 1 mA or higher. 2.) DCN 04663 adds a jumper wire due to the removal of EQ Cutler Hammer hand switches.
27	12D	2-FCV-63-73 -B	1.) DCN 03225 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. 2.) DCN 13725 Appendix R: **Change per Calculation EDQ0009990012, App. J**: 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. (Resolution 5037, 5951, 5426).
28	12E	2-FCV-63-94 -B	1.) DCN 03225 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers.

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LIST OF MCC COMPARTMENTS REQUIRED COMPONENT REPLACEMENTS (CONTINUED)

29	13A	2-FCV-63-153 -B	1.) DCN 03225 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. 2.) DCN 04663 adds a jumper wire due to the removal of EQ Cutler Hammer hand switches.
30	13B	2-FCV-63-157 -B	1.) DCN 03225 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. 2.) DCN 04663 adds a jumper wire due to the removal of EQ Cutler Hammer hand switches.
31	13D	2-FCV-63-175 -B	1.) DCN 03225 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. Added 7k ohm drain resistor **(P/N B8J7K0)** across AC coils of replacement PB relays where a sufficiently long run of cable could provide a capacitive leakage current of 1 mA or higher. 2.) DCN 04663 adds a jumper wire due to the removal of EQ Cutler Hammer hand switches.
32	14A	2-FCV-72-2 -B	1.) DCN 03367 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. 2.) **Unit-2 change only per Calculation EDQ0009990012, App. J**: 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. (Resolution 5397). 3.) Unit-1 DCN 52834 added an AGASTAT model ETR14I3B004 5 second time delay relay to delay the opening of the valve, allowing sufficient voltage to increase sufficiently to prevent the valve from stalling. Unit-2 Calculation EDQ00099920070002 requirement.
33	14D	2-FCV-72-41 -B	1.) DCN 03367 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers.

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LIST OF MCC COMPARTMENTS REQUIRED COMPONENT REPLACEMENTS (CONTINUED)

34	14E	2-FCV-72-45 –B	1.) DCN 03367 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. Added 7k ohm drain resistor **(P/N B8J7K0)** across AC coils of replacement PB relays where a sufficiently long run of cable could provide a capacitive leakage current of 1 mA or higher. 2.) DCN 13725 Appendix R **Change per Calculation EDQ0009990012, App. J**: 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. (Resolution 5033 and 5668)
35	15A	2-FCV-74-21 –B (SPARE)	1.) The Function of Compartment 15A (45B2768-15A) in MCC-213-B1-B will be utilized in COMPT 7D (45B2772-7D) in MCC-214-B1-B due to DCN 13725 Appendix R hot shutdown requirements. The existing compartment 15A will be abandoned in place. See EDCR DRA 53290-013 for COMPT 7D. The cable connection from COMPT 7D (45B2772-7D) to COMPT 16D (45B2768-16D) will be cover under **EDCR 52639.**
36	15B	2-FCV-74-24 -B	1.) DCN 03224 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. 2.) DCN 13725 adds wire changes to COMPT 14E due to Appendix R hot shut down requirements.
37	15D	2-FCV-74-35 -B	1.) DCN 03224 replaces Crydom Solid State Relays with Potter & Brumfield Relays because the relay is not compatible with the circuit, causing erroneous input to the Emergency Response Facility Data System (ERFDS) multiplexers. 2.) DCN 04663 adds a jumper wire due to the removal of EQ Cutler Hammer hand switches.
38	16A	2-MTR-31-266 -B	1.) DCN 09914 replaces 100 VA CPT with a 150 VA CPT due to calculation requirements. A 200VA CPT has been agreed upon and will be used and supplied by Trentec as part of the starter bucket per transformer sizing Calc. 2.) **Unit-2 change only:** Trentec 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 Calc.

LIST OF MCC COMPARTMENTS REQUIRED COMPONENT REPLACEMENTS (CONTINUED)

39	17A	2-HTR-62-228/3	Component Specs changes only. 1.) DCN 19745 has no affect for U2 as the wire modifications connect to COMPT 17F1 (BD 1B1-B) which is a common load and spare for (BD 2B1-B). 2.) U2 heater is on a U1 drawing and has an interface point to separate it from the common Boric Acid Batch Tank. The U2 Heater was not need for U1 operation. It had not been determined if the Common Boric Acid Tank needs the fourth heater if both Units are in operation as it currently has three heaters in operation. The starter bucket will be replaced if decided later that the downstream heater is needed for the combined operation of Units 1 and 2.
40	17B	2-FCV-26-241 -B	Component Specs changes only. DCN 36871 Added note: Valve administratively locked in open position with breaker open. The downstream valve is going to be locked in the open position with the breaker open due to Appendix R requirements. The downstream valve 2-FCV-26-241 -B is need for high pressure fire protection so the valve does not close. Confirmed by **EDCR 54903.**
41	17D	2-MTR-3-128D -B	Component Specs changes only
42	18C	2-MTR-31-324/1	Component Specs changes only. System engineer has changed the motor size from 3 HP to 1.5 HP.
Non Starter BKR and Shunt Trip Replacement Compartments Only			
43	2E2 (7B)	2-FCV-62-99 -B	Compartment wiring and cable changes incorporated under **EDCR 53421-A DRA 53421-284**
44	2F2 (11D)	2-FCV-63-22 -B	Breaker replacement, no wire changes
45	3F2 (8D)	2-FCV-63-98 -B	Breaker replacement, no wire changes
46	5B (10D)	2-FCV-74-2 -B (Shunt Trip)	1.) DCN 24370 Shunt trip not needed for Appendix R, has been disabled to prevent inadvertent disabling of valve operator (1-FCV-74-2-B)
47	16D	Overload Bypass Control	1.) DCN 03392 & DCN 19345 Added K9 relay and wiring modifications to provide overload bypass trips to COMPT 16E Power Outlets, Equivalent relay replacement for the ITE class J10C6012 (K9) is the **ALLEN BRADLEY 700-P600A1**. 2.) DCN 16653 Adds wiring to provide overload bypass trips to COMPT 5E and 2-MCC-214-B1/4E-B & 2-MCC-214-B1/6E-B, cables are excluded in this scope. 3.) DCN 13725 Added two cables for Appendix R hot shutdown requirements which will be provide in **EDCR 52639 and EDCR 54851.**

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LIST OF MCC COMPARTMENTS REQUIRED COMPONENT REPLACEMENTS (CONTINUED)

48	16E	BRK & Shunt Trip to Power Outlets	1.) DCN 03392 added wiring for the Thermal Overload bypass control. 2.) DCN 19345 modified wiring to provide under voltage trips for 480V MCC loads identified from U1 Calc WBN-EEB-MS-TI03-0013 and overload bypass trips to COMPT 17E Power Outlets.
49	16F2 (7D)	2-FCV-63-67 -B (BRK)	Breaker replacement, no wire changes
50	17E	BRK & Shunt Trip to Power Outlets	1.) DCN 19345 modified wiring for COMPT 16E and 17F2 to provide under voltage trips for 480V MCC loads identified from U1 Calc WBN-EEB-MS-TI03-0013.
51	17F2	2-MTR-31-324 -B (BRK)	1.) DCN 26661 indicated a discrepancy between HP ratings causing the equipment to be under sized for that actual HP for the motor. The equipment and cables had to be resized and a shunt trip added to the compartment 17F2. The BKR is being replaced, the shunt trip, wiring and a 12 PT terminal block is being added under this EDCR.
52	4C		1.) Under voltage relay and breaker is operating under Unit-1 Control.

EDCR UNIT DIFFERENCE FORM

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Operations Difference is identified as follows:

The operational differences between Unit 2 and Unit 1 design is that in Unit 1 Fusegaurd (FG) design shunt trips the associated breaker whereas the Blown Fuse Detector of unit 2 does not. This is to allow power flow from the other phases to the down-stream load to perform its safety function.

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SCStrickler SCStrickler for Tom Wallace 9/13/11
Unit 2 TVA Operations Acceptance (Mgr or Designee): **Date:**

Maintenance Difference is identified as follows:

The existing motor ITE starters overload relays, heaters and circuit breakers are replaced with new corresponding equipment type and rating by Square D, since the older types are now obsolete. Replacement of solid state status monitoring Crydom relays by electromechanical P & B relay, which are more reliable, will require less maintenance than the older obsolete relay. There will be new vendor manuals supplied for the new replacement MCC buckets and components referenced above.

SCStrickler for Brian Briody 9/13/11
Unit 2 TVA Maintenance Acceptance (Mgr or Designee): **Date:**

Engineering Difference is identified as follows:

The MCC replacement buckets contain components that are different from Unit 1 components due to obsolescence. All replacement 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. The breakers sizing and setting is according to 480V Class 1E Protection, Coordination and Thermal Overload Heater Calculation-Unit 2 No.EDQ00299920080004.

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 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 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.

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Unit-2 change only, per the Appendix R Calc: Compartment: 7A Load: 2-FCV-62-91-B Appendix R Resolution # 5207: Re-wires limit switch connections in the MCC compartment from the high side of the

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TECHNICAL EVALUATION CONSIDERATIONS OF 0-TI-2

This attachment provides topics to be considered when evaluating the technical and safety aspect of changes being implemented in WBN Unit 0 and/or Unit 1 by the EDCR process; see Reference 5.1. It is not intended to be an all inclusive list of items to be considered. It is to be used as an aid in determining attributes that should be addressed in a technical evaluation. Information is also provided to aid in determining coordination interfaces. These are minimum guidelines which are primarily excerpts from SPP-9.3. It should be recognized that many topics and changes involve multiple disciplines and organizations and technical considerations must be coordinated accordingly. All parts of Attachment 1 must be considered for applicability for the associated EDCR.

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TECHNICAL EVALUATION CONSIDERATIONS OF 0-TI-2

GENERAL:

☐ YES ☒ NO 1. Are the nuclear safety functions, protective safety functions, Class IE requirements, or Seismic Category I or I (L) requirements of a design criteria affected?

The EDCR-2 scope of work is to replace the existing obsolete safety related, Class 1E feeder breakers, buckets starters and other components (i.e. relays, switches, etc.) with new safety related, Class 1E seismic category equipment and rework the internal wiring of the MCC compartments. The replacement MCC components are seismically qualified category 1 and are compatible with or better than the existing MCC components in form, fit and function. Seismic qualification of the MCC is provided in calculation WCGACQ0446. Appendix R modifications to eliminate spurious valve operation during a fire are incorporated by rewiring limit switch connections from the high side to the low side of the contactor coils and indication lights where required.

EDQ00299920080004, "480V Class 1E Protection, Coordination, and Thermal Overload Heater Calculation-Unit 2" addresses the protection of the 480V electrical loads against overload, short circuit conditions, and to assure selective coordination of protection devices. EDQ00299920080003,"Class 1E MCC Control Circuit Voltage Analysis and transformer Sizing" analysis ensure proper CPT sizing and use of the P&B and Agastat relays.

These EDCR-2 modifications do not affect nuclear safety functions, the Design Criteria, System Description (Design Basis Document), Final Safety Analysis Report (FSAR) or Technical Specification (TS).

☐ YES ☒ NO 2. Is there an operational/configuration change? Is a component being added to or removed from the plant? Is a component being disabled or abandoned in place? Is the normal or accident position of a valve changing? Is an electrical isolation device being added or deleted? Is a portion of the system being rerouted?

There are no operational /configuration changes being made in this EDCR-2. The modifications to the MCC feeder breakers, buckets (starters), relays and internal wiring are due to replacement with new models of the obsolete parts for which replacement parts are not available. No electrical devices are being disabled or abandoned in place. No electrical isolation devices are being added or deleted. All work is internal to the MCC structure and no parts of the system are being rerouted by this EDCR-2 work package.

Obsolete MCC compartments being replaced with new components have been analyzed for Adequacy in EDQ00299920080003,"Class 1E MCC Control Circuit Voltage Analysis and Transformer Sizing".

Appendix R Breakages Resolutions depicted in EDQ00099920090012, App. J for loads powered from the 2-MCC-213-B1-B were addressed by updating system schematics and MCC connection drawings.

MCC compartments and breakers with abandoned loads are not replaced as part of this EDCR and will be spared.

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TECHNICAL EVALUATION CONSIDERATIONS OF 0-TI-2

GENERAL:			
☐ YES	☒ NO	3.	Could the change affect the basic function of a structure, system or component that performs or supports the performance of a safety function (deleting or changing logic interlocking, additional pumps, etc.)? ***The safety functions of Structures, Systems or Component (SSC) are not affected by these modifications of this EDCR-2 package. No deletion, changing of logic interlocking, additional pumps etc. are implemented in this EDCR-2 package. The modifications covered under this EDCR-2 package have no adverse effects on the basic safety function of the SSCs.***
☐ YES	☒ NO	4.	Could the change affect environmental conditions such as pressure, temperature, humidity, flooding, corrosiveness, site elevation, nuclear radiation (both rate and total integrated dose), and duration of exposure in either harsh or mild areas? ***The changes being made under this EDCR-2 package will not affect environmental conditions, and all components including the feeder breaker and bucket starter replacements are inside the existing MCC structure. The physical dimensions and characteristics of the new replacement components are compatible with the existing components. The existing MCC is located in a mild environment in the Auxiliary Building. Any external activities that could affect environmental conditions are not part of this EDCR-2.*** If the answer to any of the above questions is "YES", the change shall be coordinated with the Lead Electrical/I&C Engineer, and if applicable, with ME/NE for potential revisions to the EQ/MEQ Binders.
☐ YES	☒ NO	5.	Could the change involve relocating or reorienting a device or system which could impact location-specific dose calculation or shielding analyses or place the device or system in an area with different environmental conditions? ***The changes being made by this EDCR-2 package are internal to the MCC structure and are located in the Auxiliary Building. This EDCR-2 package does not involve relocating devices or systems which could impact location-specific dose calculations or shielding analysis and does not place devices in locations with different environmental conditions.*** If YES, coordinate with ME/NE to revise the affected location specific dose calculation, environmental drawings, and EQ/MEQ documentation.
☐ YES	☒ NO	6.	Are Security Systems modified? ***There are no Security Systems affected by these modifications of this EDCR-2 package.***
☐ YES	☒ NO	7.	Does the modification add quantities of chemicals that may have an impact on control room habitability? ***The scope of work is to replace the existing obsolete MCC feeder breakers, buckets (starters), relays and other electrical components including internal wiring modifications. No chemicals are being added and control room habitability is not being impacted by this modification.***

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TECHNICAL EVALUATION CONSIDERATIONS OF 0-TI-2

GENERAL:

If YES, evaluate impact on control room habitability per NRC Reg. Guide 1.78.

☒ YES ☐ NO 8. Has the component being added or modified been evaluated for proper physical orientation? Components that require consideration are: capacitors, relays, check valves, steam traps, flow and level measuring devices, pressure switches, and solenoid valves. Other components may require consideration based on special applications, unique circumstances or vendor/manufacturer's recommendations.

The replacement feeder breaker and the MCC bucket configurations are in the same orientation as the existing equipment. The relays being added do not require special orientation to perform their function and are not a special application or unique circumstance. All Thermal Overload Heater Relays are required to be mounted vertically in the front panel of MCC buckets in accordance with vendor requirements.

☐ YES ☒ NO 9. Based on the following considerations does the change create an operating unit difference?

☐ YES ☒ NO The change being made creates operational differences that would affect actions by the Operations staff.

The changes to the MCC, 2-MCC-213-B1-B covered under this package are identical in configuration and function to the changes made to the Unit 1 MCC, 1-MCC-213-B1-B.

Therefore, the changes will not create any operational differences that would affect actions by the Operations Staff.

If YES, coordinate with Operations to ensure impacts on training are considered.

☐ YES ☒ NO The change being made creates operational differences that would affect the simulator.

The changes to the Unit 2 MCC, 2-MCC-213-B1-B covered under this EDCR-2 package are identical in configuration and function to the changes made to the Unit 1 MCC, 1-MCC-213-B1-B.

Therefore, the changes will not create any operational differences that would affect the simulator.

If YES, coordinate with Operations to ensure simulator is updated.

☐ YES ☒ NO The change being made creates unit differences that are economically feasible and would improve the operation or maintenance of the other unit or units.

If YES, initiate the appropriate package for Technical Review Committee.

☒ YES ☐ NO 10. Have considerations for mounting, connecting, and positioning of components included an evaluation of the required robustness of associated elements? Has the evaluation for robustness considered the need for protection from bumping, jarring, vibration, etc.

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TECHNICAL EVALUATION CONSIDERATIONS OF 0-TI-2

GENERAL:

The replacement MCC buckets and feeder breakers are the same size as the existing obsolete MCC buckets and the feeder breakers. The replacement components are installed in the same existing MCC compartment space.

Mounting, connecting, positioning of the new components (MCC buckets, feeder breakers, relays etc.) and the robustness of the associated components have been evaluated by Civil/ESQ. A seismic test of the prototype of the MCC bucket with components is being performed for Class 1E qualification of the components in accordance to IEEE Standards 323 and 344.

☐ YES ☒ NO 11. Is this modification subject to vibration, thermal movement, and/or leaks on trip sensitive equipment? (i.e., replace carbon steel piping with stainless steel piping, modify routing such that thermal flexibility is reduced, modify support or support locations to resist thermal expansion, process and/or pneumatic leaks.) If yes, develop and incorporate a monitoring plan.

The MCCs are located in the Auxiliary Building at locations not subject to mechanical vibration, thermal movement or leaks. No piping is routed through or is supported on the MCC structure to cause any movement due to thermal expansion or pneumatic leaks. No trip sensitive components are mounted within the MCC.

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TECHNICAL EVALUATION CONSIDERATIONS OF 0-TI-2

CIVIL			
☐ YES	☒ NO	1.	Does the change potentially impact pipe break considerations, pipe whip, or jet impingement? Consideration should include changes to operating modes, the addition or rerouting or high energy pipe greater than 1 inch nominal diameter, or change or modify pipe rupture protection devices. Does the change relocate or add potential targets such as electrical components, equipment, conduits, instruments or air lines to compartments containing fluid systems? The change may be evaluated generically rather than on a case-by-case basis as described in Civil Design Guide DG-C1.2.10. **Changes being made are not in an area of high or moderate energy piping. Civil calculation WCGACQ0446 is issued to address seismic qualification.**
☐ YES	☒ NO	2.	Does the change affect piping vibration or testing requirements? Was there a mass change? Were supports added/deleted? Was an orifice, valve, or other flow device added or deleted? Was there an operational or configuration change? **No piping, valves or components attached to piping are being added deleted or modified.**
☒ YES	☐ NO	3.	Are Seismic Category I or I (L) components added, deleted, or modified? Are components in a Seismic Category I structure added, deleted, or modified? Does the change affect the seismic or dead weight analyses? **Some of the weights of the new MCC components (bucket starters, feeder breakers and other devices) are different from the existing MCC components (to be removed and replaced). The effect of this change in weight is evaluated in civil calculation WCGACQ0446 Rev. 3. Seismic testing is required under MR 25402-011-MRA-ECM1-00001. Completion of seismic testing, submittal, and approval of test reports is conducted under the procurement process**
☒ YES	☐ NO	4.	Does the change involve an existing attachment on a Seismic Category I structure/civil feature (e.g., new loads generated, revise loads previously approved, physical modification requried at interface points) or the addition of an attachment to and/or penetration of a Seismic Category I structure(s)? **See Response to Question 3 (Civil).** Does the change affect the attachment or add attachments of engineered features to masonry block walls in a Seismic Category I structure? Does the change impact the fire resistance rating of a fire barrier? **No attachment to masonry block wall will be made.**
☐ YES	☒ NO	5.	Could the change affect WBN Probable Maximum Precipitation (PMP) site drainage (i.e. add or obstruct surface to water flow, divert or reroute a flow path, change ground surface contours, change from vegetation to concrete or pavement, etc.). If YES is the response to any of these questions, consult Civil Engineering.

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TECHNICAL EVALUATION CONSIDERATIONS OF 0-TI-2

ELECTRICAL/INSTRUMENTATION & CONTROLS:

☒ YES ☐ NO 1. Does the change affect breaker alignment, electrical loads, or electrical separation/isolation?

Obsolete Type EF3 feeder breakers are being replaced by new Type ED63 breakers of the same rating unless otherwise specified. Unit 2 Electrical 480V Class 1E Protection and Coordination Calculation (EDQ00299920080004) are used to verify the required ratings of the replacement MCC buckets and feeder breakers, and co-ordination of the protective devices supplying the designated downstream loads. Control Power Transformer (CPT) sizing was obtained from Electrical calculation EDQ00299920080003 to ensure adequate control circuit voltage. Thermal overload heater ratings are documented in EDQ0029992008004.

In order to facilitate replacement work for Unit 2 MCC buckets and feeder breakers, Unit 2 loads have to be isolated from operating Unit 1, by designating interface points. This process is established in DCN #54598, which is a prerequisite for work done under this EDCR-2 package.

The provision made for supply of power to the auxiliary loads from the new equipment to be installed in 2-MCC-213-B2-B meets existing design standard and guidelines for Safety Related Systems in Nuclear Plants.

☒ YES ☐ NO 2. Is any low or medium voltage (V3, V4, or V5) electrical containment penetration protector (circuit breaker or fuse) involved?

Penetration protection devices (breakers and fuses) are coordinated in accordance with penetration protection calc EDQ00299920080018 "Electrical Penetration Study Voltage Level V4 and V5 – Unit 2".

☐ YES ☒ NO 3. Has any electrical load classification changed (non-1E to 1E)? Is the Class 1E classification for a fuse on the Fuse Tab changing?

☒ YES ☐ NO 4. Does the change involve instrument setpoints, instrument/relay settings or other instrument information found in EMPAC? Is the change consistent with N-specs (e.g., instrument line slopes and installation)? Has reset and deadband been evaluated?

The set point for a replaced relay in Compartment 2C, which powers the Thermal Barrier Booster Pump 1B-B (2-MTR-70-130-B), is changed from 25 to 35 seconds following the same change made in Unit 1. These relay setting changes have been implemented and analyzed in EDQ00099920080014. "Diesel Generator Loading Analysis" U2 baseline calc, no revision is required per this EDCR-2.

Logic for time delay relay 2-02-70-130B-B is modified as 35 Sec (DRA 53292-026).

Logic for time delay relay 2-62-72-13-B is modified as 13.5 Sec (DRA 53292-027).

Logic for time delay relay 2-02-72-2-B is added with 5.0 Sec (DRA 53292-030).

☐ YES ☒ NO 5. Does the change alter, add, or delete Post Accident Monitoring (PAM) equipment or affect the type, category, or operating time of existing equipment? (See Design Criteria for the list of PAM variables.)

If YES, coordinate with M/N, EE, Operations and Site Licensing and include appropriate changes within the DCN Package to ensure continued Reg. Guide 1.97 compliance.

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TECHNICAL EVALUATION CONSIDERATIONS OF 0-TI-2

ELECTRICAL/INSTRUMENTATION & CONTROLS:

☒ YES	☐ NO	6.	Does the change involve instrument ratings (Relay or solenoid coil ratings, contact ratings, duty cycles, etc.)? ***The relay replacement changes being made by this EDCR-2 package provide for adequate ratings for coil and contacts for the new relays being used. The relay contacts are used to switch 48VDC for DAS Panel 2B1 in ICS for 480V REAC MOV BD 2B1-B status monitoring. The relay contacts for the P & B Type KUIP relay are rated for the service and high isolation design with 8mm contact to coil spacing for safety purposes. There is no change in the AC coil rating.***
☐ YES	☒ NO	7.	Does the change challenge the capacity of another system (Air conditioning system heat load, control air load, electrical load)? ***The MCC bucket replacement and feeder breaker changes of this package will not impact the capacity of either the air conditioning system heat load or the electrical system load. The plant air conditioning system's electrical heat load for motor control centers is based on a conservative 200 watts/per vertical section as described in electrical calculation WBN EEB-MS-TI09-0041. There is no change to the existing electrical heat load analysis as no new MCC sections are added or deleted as part of this design change package. The electrical system load is not affected as none of the end device electrical loads that are powered by the new MCC replacement buckets are being changed as part of this package.***
☐ YES	☒ NO	8.	Does the change affect the operating or accident environment or instrumentation? Is the electrical equipment or instrumentation required to operate in the affected environment? Have potential operating and accident environments of equipment been considered?
☒ YES	☐ NO	9.	Have the effects of EMI/RFI been considered? ***The MCC bucket, feeder breaker, and status monitor relay replacements and internal wiring changes in the respective compartments and rear panels will not have any adverse EMI/RFI effects on any sensitive device in the vicinity.***
☒ YES	☐ NO	10.	Is the logic of system operation changed? Are new or modified interfaces (physically or electrically) with safety related or important to safety equipment created? ***Logic for time delay relay 2-02-70-130B-B is modified as 35 Sec (DRA 53292-026)*** ***Logic for time delay relay 2-62-72-13-B is modified as 13.5 Sec (DRA 53292-027)*** ***Logic for time delay relay 2-02-72-2-B is added with 5.0 Sec (DRA 53292-030)***
☒ YES	☐ NO	11.	Does the change affect, add, or delete equipment within the scope of 10CFR 50.49 (EQ)? Review appropriate documents such as MEL, Essentially Mild Calculations, Category & Operating Times Calculations, and/or equipment in a harsh environment? Cable must be considered (e.g., mild to harsh environment). ***Due to Historical DCN 04663, this EDCR-2 package adds jumper wires for various compartments which result in the removal of selected EQ components- Cutler Hammer hand switches.***

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TECHNICAL EVALUATION CONSIDERATIONS OF 0-TI-2

ELECTRICAL/INSTRUMENTATION & CONTROLS:			
			Motor control center 2-MCC-213-B1-B is at column-row line, located in a mild environment area in the Auxiliary Building on elevation 772'. The feeder breaker and the MCC bucket replacements have been evaluated for the normal service environment including normal radiation doses and have been determined to meet the service conditions. If the answer to any of the above questions is "YES", the change shall be coordinated with the Lead Electrical/I&C Engineer, and if applicable, with ME/NE for potential revisions to EQ/MEQ Binders.
☐ YES	☒ NO	12.	Could the change affect materials such as lubricants, seals and O-rings, which could impact Qualification Maintenance Data Sheet (QMDS) requirements and qualification analyses, and invalidate test data, or could the change affect special maintenance (QMDS) and/or administrative requirements and controls that might impact the qualidication of an item? If YES, coordinate with the responsible discipline on revisions to the QMDS.
☐ YES	☒ NO	13.	Does the change involve a power, control, or instrumentation circuit for a 10CFR50.49 component either by direct connection or relay logic or involve a non-10CFR50.49 power control or instrumentation circuit which have a credible circuit interaction failure mode with 10CFR50.49 power control or instrumentation circuit? ***The replacement of the obsolete MCC buckets (starters, feeder breakers, relays and other devices), feeder breakers (only) and internal wiring connection changes as a result of the EDCR-2 modifications will not cause any credible interaction failure mode with any 10CFR50.59 power, control or instrumentation circuits.*** If YES, perform an analysis in accordance with SPP-9.2, Appendix I for any safety-related cables or components located in a harsh environment that are designated as Category C (ie. not required to be addressed in the EQ program).
☐ YES	☒ NO	14.	Does the change upgrade the function of an existing device/cable such that additional QA records and documentation are needed to support 10CFR50.49 Qualification in accordance with 10CFR50, Appendix B manufacturing, procurement, installation, etc.)? If YES, provided additional documentation as required.
☒ YES	☐ NO	15.	Does the change involve any instrument tabulation information? ***MEL UNID data sheets for all MCC compartments, feeder breakers and relays with add, delete or modify UNID status is attached to this EDCR-2 package.*** If YES, evaluate MEL to determine if the Instrument Tabulation information for the affected system(s) is not being maintained in MEL. If the information is bieng maintained in MEL, provide normal changes for I-Tab and include the completed MEL data entry sheets in the EDCR Package.

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TECHNICAL EVALUATION CONSIDERATIONS OF 0-TI-2

ELECTRICAL/INSTRUMENTATION & CONTROLS:			
			NOTE: Since the information on the instrument tabulation drawings is now maintained in MEL for affected systems the instrument tabulation drawings for these systems have been superseded and are no longer updated. If the information is not being maintained in MEL, continue to process the drawing.
☐ YES	☒ NO	16.	Does the modification affect components/equipment that requires periodic testing of electrical test points? If YES, provide appropriate test jacks which are accessible to prevent accidental contact with adjacent electrical terminations during testing.
☐ YES	☒ NO	17.	Does the modification change functional logic which has the potential of affecting design characteristics? If YES, evaluate PER/NER history on the equipment being modified to determine if problems have previously been identified.
☐ YES	☒ NO	18.	Does the modification involve a programmatic or digital logic controller? If YES, has the addition of uninterruptible power supplies been considered?
☐ YES	☒ NO	19.	Does the modification involve fault tolerant non-safety-related equipment important to operation such that the need for redundant power sources should be considered (such as CERPI control room devices)?
☐ YES	☒ NO	20.	Does the design or modification impact an Integrated Computer System (ICS) data point that is also an Emergency Response Data System (ERDS) data point? If YES, coordination with Site Licensing is required in accordance with 10CFR50 Appendix E.
☐ YES	☒ NO	21.	Does the design or modification impact off site power capability or ability to meet 10CFR50 Appendix A Criterion-17 requirements? If YES, coordinate with Electrical Lead Engineer.

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TECHNICAL EVALUATION CONSIDERATIONS OF 0-TI-2

MECHANICAL:

Ensure EQ requirements addressed for ancillary subcomponents (e.g., Limit Switches on Mechanical only valves). Coordinate with Electrical EQ Engineer as necessary.

☐ YES	☒ NO	1.	Does the change affect design conditions or requirements such as process pressure, temperature, chemistry or operating cycles? If YES, ensure the evaluation encompasses all aspects of the affected system, including impacts on interfacing systems. Coordinate with mechanical EGS for potential revisions to affected MEQ documentation.
☐ YES	☒ NO	2.	Does the change affect ECCS, decay heat removal systems, or MPC cooling ancillary equipment? Ensure that any changes are consistent with the safety analyses for the plant including WBN SAR Chapter 15 NPSH minimum flow requirements, diesel loading sequencing, and ultimate heat sink limits.
☐ YES	☒ NO	3.	Is the Auxiliary Building Secondary Containment Enclosures (ABSCE) as defined in WBN2-30AB-4001, affected by this change? Does this change modify any cable, cable tray, conduit, duct, pipe, or instrument tubing penetrating secondary containment? Consult 46W501 drawing series for the locations of the ABSCE Boundary, and discuss proposed changes with the NSSS EGS. A justification for the "Yes/No" is required. ***The activities are internal to the MCC. There are no external cables, cable trays, conduit, ducts, pipes or instrument tubing being affected by this EDCR-2.***
☐ YES	☒ NO	4.	Does the change involve potential heating, ventilation, and air-conditioning (HVAC) system impacts resulting from adding heat loads, altering air flow or ductwork etc.? ***No airflows or ventilation ductwork is altered by this design change package. The existing electrical heat load for motor control centers is based on a conservative 200 watts/per vertical section and is not affected since the existing MCC bucket size is not being changed and no vertical sections are being added or deleted by this design change package.***
☐ YES	☒ NO	5.	Does this change make any alterations or configuration changes to Motor Operated Valves (MOVs) or Air Operated Valves (AOVs)? Does this change impact any MOV or AOV Program documents? Impacts that should be considered include changes to instrumentation or control circuits, power supplies, or change system operating or design conditions such as pressure and flow rate.
☐ YES	☒ NO	6.	Does this change involve replacement of a complete valve or valve internals which are listed in the Engineering Specification N1M-007 or is the valve located in a system that interfaces directly with the Reactor Coolant System (RCS)? Procurement requirements should evaluate valve and valve internals replacements that are located in or interfaces with the Reactor Coolant System (RCS) for hard faced components that are non-cobalt bearing. Hard facing alternatives include NOREM Nitronic 60 and may include other non-cobalt materials as approved by Engineering. Cobalt bearing hard faced materials is a concern in fluid systems that contain radioactive materials.
☐ YES	☒ NO	7.	Does the modification add a new check valve or impact an existing check valve? Ensure the valve is sized properly, proper type for required service, properly oriented, located suitable distance from upstream components that cause turbulent flow.

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TECHNICAL EVALUATION CONSIDERATIONS OF 0-TI-2

MECHANICAL:			
☐ YES	☒ NO	8.	Does the modification add, delete, or reroute components in a mechanical piping system? If Yes, will the added components come in contact with borated water or some other harsh environmental area?
☐ YES	☒ NO	8a.	Evaluate to determine if the change affects the ASME Section III Code (Class 1, 2, and 3) boundary. If ASME Section III boundary is affected were materials in accordance with ASME Section II Code used in installation? Was the installation performed in accordance with ASME Section III Code?
☐ YES	☒ NO	9.	Specify applicable welding requirements (e.g., AISC/AWS, ANSI B31.1, or other applicable codes) on safety-related DRAs or for drawing, original issues or revisions. **No welding is being performed as part of this EDCR-2 work activity.**
☐ YES	☒ NO	10.	Does this modification introduce material into the containment that could become dislodged during LOCA or other events and contribute to Emergency Core Cooling system (ECCS) sump screen or strainer blockage? Does this modification affect protective coatings inside the containment?
☐ YES	☒ NO	11.	Does the modification increase the possibility of flooding from a Moderate Energy Line Break?
☐ YES	☒ NO	12.	Does the modification affect the power uprate?
☐ YES	☒ NO	13.	Are there NUREG-0612 impacts? Does the change add, delete, or alter a permanent handling system? Does the change move a heavy load path over safe shutdown equipment or move safe shutdown equipment into a heavy load path?
☐ YES	☒ NO	14.	Does the change affect barriers such as walls, doors, penetrations, relief panels, and ducts which could affect HVAC flow paths, fire barriers, or environmental conditions in either harsh or mild areas? **All work activities are internal to the MCC and does not include any cabling.** If the answer to any of the above questions is "YES", the change shall be coordinated with the Mechanical EGS.
☐ YES	☒ NO	15.	Is a new material being added and does the change affect components susceptible to Flow Accelerated Corrosion (FAC) or Microbiologically Induced Corrosion (MIC)?
☐ YES	☒ NO	16.	Does the modification increase the susceptibility for cavitation?
☐ YES	☒ NO	17.	Could the change affect location or operation of high energy piping systems, location or operation of radioactive piping systems, operation of environmental control systems, or environmental barriers such as walls, doors, relief panels, piping/other thermal insulation, and ducts which could affect environmental conditions in either harsh or mild areas?

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TECHNICAL EVALUATION CONSIDERATIONS OF 0-TI-2

MECHANICAL:

If YES, coordinate with ME for potential revision to the environmental drawings/design criteria and coordinate with EE for potential impact to EQ of equipment.

☐ YES ☒ NO 18. Does the change involve any valve tabulation information?

If YES, include the completed MEL Data Entry Sheet in the EDCR Package.

☐ YES ☒ NO 19. Does this change affect the Seismic Category I boundary?

If YES, the applicable Seismic Category I Boundary calculations must be revised.

NOTE Issuing a design calculation in accordance with NEDP-2 is the means of assuring that the applicable Seismic Category I Boundary calculation is revised.

☐ YES ☒ NO 20. Does the modification change ventilation, cooling requirements for electronic equipment?

The modifications do not change ventilation or cooling requirements, since no additional electrical equipment has been added in any new bucket. Bucket loading and components are not changed.

If YES, coordinate with Mechanical Engineering for determination of impact on HVAC coolant.

☐ YES ☒ NO 21. Does the modification involve strainers for a raw water supply?

If YES, proper strainer selection should be based on industry guidelines (Fluid Controls Institute Std 89-1) and specific site criteria. Major consideration should be given to the following: type of strainer, redundant strainer capability, materials/housing, perforations number and arrangement, mesh size & free area, capacity and pressure loss, fluid type, particle weight & shape, macro fouling and aduatic debris potential, operating parameters, filtration versus separation, blow down line sizing, vendor recommendations, automatic back flushing and the necessity of a bypass line.

NOTE: Contact the appropriate program coordinator in the Mechanical Programs group (or in Plant Design for MOV questions) if any Engineering Design Program(s) are impacted by the proposed modification.

☒ YES ☐ NO 22. Does the change directly or indirectly impact Mechanical or Electrical Appendix R equipment, or cables, required for safe-shutdown per 10CFR50 Appendix R (TI-277 at WBN)?

☒ YES ☐ NO Does the modification involve a system, component or structure required for Appendix R safe shutdown capability?

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TECHNICAL EVALUATION CONSIDERATIONS OF 0-TI-2

MECHANICAL:

Systems 3, 26, 31, 62, 63, 68, 70, 72, 74, 213 are required for Appendix R; and changes to the MCC compartments powering the listed system loads have been evaluated and will not adversely affect the ability to achieve safe shutdown following a fire.

Appendix R breakages were reviewed and evaluated for this MCC. The Appendix R breakages are limited to implementing modifications to the internal compartments. Modifications include wiring changes, re-wiring limit switch connections, and indicating lights 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 and some breakers placed in the open postion to eliminate spurious valve operation and Appendix R hotshutdown requirements.

Compartment Breakers will be administratively controlled in the open position to prevent spurious valve actions for Flow Control Valves that are required to be locked in the open position as a result of the Appendix R Analysis.

The Functionality of Compartments 10F and 15A in 2-MCC-213-B1-B are being moved to 7E and 7D in 2-MCC-214-B1-B as required by the Appendix R Analysis.

See Table 1 of work scope for all detailed Appendix R related changes.

☐ YES	☒ NO	Does the modification involve a fire rated barrier (includes fire door, fire damper, fire wrap, walls, floors, ceilings, penetration seals, etc.)?
☐ YES	☒ NO	Does the modification affect a suppression system, the detection system, or Appendix R required lighting, including the illumination path?

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TECHNICAL EVALUATION CONSIDERATIONS OF 0-TI-2

MECHANICAL:		
☐ YES	☒ NO	Does the modification introduce or remove combustible material or fire source in the area? ***No. Even though feeder breakers, buckets, miscellaneous components and internal wiring is being replaced, combustible loading is not affected as the materials of combustion being added are approximately equal to the materials of combustion being removed.*** ***During construction activities, adherence to SPP-10.10 "Control of Transient Combustible" provides requirements and controls for the use of combustible materials during construction activities. These requirements are part of the defense in depth fire protection philosophy for safety related systems, structure and components.***
If YES, see the 10CFR 50 Appendix R Program Owner.		

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TECHNICAL EVALUATION CONSIDERATIONS OF 0-TI-2

OPERATIONS/HUMAN FACTORS:

☐ YES	☒ NO	1.	Does the change involve compensatory measures or require an increase in operator staffing to complete newly required actions?
☐ YES	☒ NO	2.	Does the change affect the main control room or the backup control areas (Environment, workspace, controls and displays)? If YES, human factors must be addressed.
☒ YES	☐ NO	3.	Are OSHA considerations included? Whenever replacement or major repair,renovation, or modification of a machine or equipment is performed, and whenever new machines or equipment are installed, energy isolating devices for such machines or equipment must be designed to accept a lockout device. This applies to mechanical and electrical devices. ***Yes. For new installation, repairs, and removal, OSHA considerations are taken into account as part of conduct of Maintenance and plant procedures. OSHA considerations are considered in the replacement buckets, which are provided with a locking device and provisions to padlock the breaker in the open or closed position.***
☐ YES	☒ NO	4.	Does the modification affect valves listed in the locked valve checklist maintained by Operations and the locked position shown on design output? If YES, ensure that design output (DRAs/drawings) agree with the locked position of applicable valves or coordinate a revision to the locked valve checklist, if necessary.

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TECHNICAL EVALUATION CONSIDERATIONS OF 0-TI-2

OTHER:

☐ YES ☒ NO 1. Does the change affect equipment diversity, failure modes, single failure criteria (DS-E2.0.2, "Single Point Failure For Power Generation Reliability"), equipment redundancy, or equipment reliability?

☐ YES ☒ NO Does the modification install redundant equipment?

If YES, utilization of redundant attendant equipment (e.g., power from alternate sources) shall be considered and addressed.

☐ YES ☒ NO 2. Does the modification change System 18, 43, 66, 77, or 90, or potentially impact the plant Chemistry Organization (i.e., sampling, procedures, training, spare parts, chemical treatments, etc.)?

☐ YES ☒ NO 3. Does the change involve environmental impacts?

☐ YES ☒ NO Will the modification require new Chemicals (as defined in SPP-5.4) to be used anywhere onsite or result in a change in plant chemical storage or usage?

☐ YES ☒ NO Will the modification generate any new wastes? (Solid, Liquid, Hazardous, Universal, Used Oil, Radioactive, etc.) or result in the release of any new or different substances to the land, air, or water?

NOTE This does not include consumables used to facilitate the installation of the modification.

☐ YES ☒ NO Will the modification change the existing flow path or characteristics of any discharge to the land, air, or water?

☐ YES ☒ NO Will the modification result in demolition of any building or the purchase of real-estate, regardless of size?

☐ YES ☒ NO Will the modification result in disturbance of more than 1 acre of site property?

☐ YES ☒ NO Will the modification involve any equipment containing PCBs, Mercury, or Asbestos?

☐ YES ☒ NO Will the modification result in all upgrade or alteration to any pollution control equipment?

☐ YES ☒ NO Will the modification affect the waters of the U.S. (e.g., dredging or discharging to the river)?

☐ YES ☒ NO Will the modification involve storage or use of oil or hazardous substance in an amount equal to or greater than 55 gallons?

If YES, contact Environmental Staff to ensure that the applicable Environmental Review (in accordance with SPP-5.5 and TVA National Environmental Policy Act (NEPA) Process or chemical traffic control review are initiated/performed.

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TECHNICAL EVALUATION CONSIDERATIONS OF 0-TI-2

OTHER:

If YES, Environmental shall be a Core Review group at the initial and final meeting.

☐ YES ☒ NO 4. Does the modification affect the Radiological Emergency Plan (for example, radiation monitors, meteorological instrumentation, onsite emergency sirens, or onsite telephone system) or does the modification affect any equipment, boundaries, or plant structures in a manner that will affect any of the Emergency Action levels (EALs) in EPIP-1 or the REP Appendix A, B, or C?

If either question is YES, contact Radiological Emergency Plan Staff to ensure that a Plan Effectiveness Determination is initiated/performed (in accordance with 10CFR50.54 and EPIL-1, Emergency Preparedness Instruction Letter, "Procedures, Maps, and Drawings") to determine if NRC prior approval is required prior to any REP revision.

If NRC approval is required prior to any REP revision (i.e., EPIP changes), then annotates in block 10 on Attachment B, "EDCR Cover Sheet."

☐ YES ☒ NO 5. Does this modification impact the fire protection system or equipment of an insured building?

If YES, a Site Engineering representative shall coordinate review and concurrence of the EDCR documents with the insurance carrier.

☒ YES ☐ NO 6. Does the change affect information in the Q-List?

2-MCC-213-B1-B is an existing MCC, and it is classified as safety-related, Class 1E on the Q-List. The MCC compartments are being modified with new components and the Q-List has been updated on the MEL based on the new components.

☐ YES ☒ NO Are any attributes as defined in Limited QA appendix of NEDP-4 added, deleted, or modified?

☒ YES ☐ NO Is the UNID for a component in MEL altered?

MEL package information is being updated for feeder breakers, MCC compartments and relays to include the new replacement components and the load served.

☒ YES ☐ NO Is the MEL evaluation for the proposed modification adequate and complete?

☒ YES ☐ NO Is a UNID being added or modified in the MEL?

For any relays being added or replaced, the UNIDs are added or modified in the MEL.

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TECHNICAL EVALUATION CONSIDERATIONS OF 0-TI-2

OTHER:

☐ YES	☒ NO	7.	Does the modification change functional logic which has the potential of affecting design characteristics or change/impact an item listed in the Equipment Performance Information Exchange (EPIX) system? If YES, evaluate PER/NER history and EPIX on the equipment being modified to determine if problems have previously been identified and are appropriately addressed in the EDCR Package. Ensure appropriate coordination with affected organizations is performed such as Operations, Maintenance, Environmental, Chemistry, and Emergency Preparedness.
☐ YES	☒ NO	8.	Does the change substitute, change, add or modify materials, components or chemical treatments not previously evaluated to the system parameters or application? If YES, an evaluation for material compatibility shall be performed.
☒ YES	☐ NO	9.	Does the change involve a component or component parts whose function and usage have been made obsolete as result of the change? ***This EDCR-2 scope of work is to replace the existing obsolete MCC starter buckets with new Square D model starters and to replace the existing type EF3 feeder breakers with new Siemens type ED63 breakers.*** ***This EDCR-2 also provides the replacement of the existing obsolete solid state Crydom relays used for status monitoring in the rear panel of the MCC compartment with new electro-mechanical type relays. The existing Crydom relays were replaced by Unit 1 due to an operational deficiency and are obsolete for their application. The new electro-mechanical relays will provide more reliable operation for the MCC buckets.*** If YES, ensure that the materials organization is notified in order to perform an inventory evaluation.

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TECHNICAL EVALUATION CONSIDERATIONS OF 0-TI-2

10CFR50 APPENDIX R AND OTHER FIRE PROTECTION IMPACTS: See the Program Owner			
☒ YES	☐ NO	a.	Does the change directly or indirectly impact Mechanical or Electrical Appendix R equipment, or cables, required for safe-shutdown (This includes manual actions required for safe shutdown.)? **An Appendix R review has been completed and the Appendix R changes have been incorporated on the appropriate DRAs.**
☐ YES	☒ NO	b.	Does the change impact Appendix R component availability in any fire area/zone?
☐ YES	☒ NO	c.	Have any Appendix R equipment parameters (e.g., flow rate, pressure, setpoints, load limitations, electrical load, interface with other components) changed?
☐ YES	☒ NO	d.	Have Appendix R cable tag/UNID numbers or cable fire area/zone routings changed?
☐ YES	☒ NO	e.	Have Appendix R cables been added/deleted or Appendix R control circuit logics been changed? **The work scope of the EDCR does not include any cabling activities.**
☐ YES	☒ NO	f.	Does the change involve a non-Appendix R circuit which interferes with an Appendix R Circuit (e.g., re-wiring to create associated circuits)?
☐ YES	☒ NO	g.	Does the change impact the use of Appendix R equipment in any fire area/zone?
☐ YES	☒ NO	h.	Has component been installed or relocated which obstructs the light pattern of an existing Appendix R emergency light?
☐ YES	☒ NO	i.	Has an Appendix R component been added, deleted, or relocated which would affect Appendix R light placement, including ingress/egress lights?
☐ YES	☒ NO	j.	Has an Appendix R component been installed or relocated in the same fire area/zone as its functionally redundant safe shutdown train/system? (This includes instrument sensing lines.) Note: The functionally redundant train is not necessarily the redundant divisional train.
☐ YES	☒ NO	k.	Does the change affect in-plant communication systems?
☐ YES	☒ NO	l.	Does the change affect fire barriers, fire doors, fire dampers or fire wraps, or affect electrical or mechanical penetrations through fire rated walls, floors, ceilings or cable fire stops? **The work scope of the EDCR is internal to the MCC does not include any external activities.**
☐ YES	☒ NO	m.	Does the change affect structural steel, raceway supports or raceway fire-proofing material?

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TECHNICAL EVALUATION CONSIDERATIONS OF 0-TI-2

10CFR50 APPENDIX R AND OTHER FIRE PROTECTION IMPACTS: See the Program Owner			
☐ YES	☒ NO	n.	Does the change result in the addition or deletion of in-situ combustibles in a fire area/zone (e.g., panels, new cable trays, components with oil sumps, grease plastics)? (Note: Exclude cables routed entirely in conduits. Also exclude cables routed in existing trays without exceeding the tray fill capacity. Exclude combustibles less than 0.5 gallons oil, 4 lbs. plastic, 4 lbs. grease or equivalent amount of other combustible materials.) If yes, combustible loading calculation may be affected. Check with the 10CFR50 Appendix R Program Owner.
☐ YES	☒ NO	o.	Does the change affect any of the fire protection systems (HPFP, SFFF, Halon, or CO_2) or affect any of the fire detection systems (e.g., smoke or heat)?
☐ YES	☒ NO	p.	Does the change impact the Fire Protection Reports? If "YES", then a DCN must be issued.
☐ YES	☒ NO	q.	Does the change impact the property insurance carrier fire protection standards and/or associated commitments?
☐ YES	☒ NO	r.	Does the change involve the reactor coolant pump oil collection system? If YES, see the Appendix R Program Owner.

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TECHNICAL EVALUATION CONSIDERATIONS OF 0-TI-2

SINGLE POINT FAILURE/FAILURE MODES AND EFFECTS/RELIABILITY:			
Checklist of questions to ask vendors of large scale systems, and our own designer(s) in regards to single point failures and margin to operation/trip/runback. The following questions should be considered when dealing with vendor supplied packaged solutions.			
This modification does not affect any electrical/mechanical plant equipment such that the basic operating principles are changed. Further, this change does not meet the applicability requirements of the Electrical Design Standard DS-E2-0.2, thus no further analysis is required.			
☐ YES	☒ NO	a.	What are the system failure modes for the entire package (i.e., output fail-as-is, fail high or low, oscillate, trip system/plant, run back system plant, consider loss of motive power such as electric or control air, etc.)? ***The scope of this EDCR-2 is the replacement of selected MCC buckets and feeder breakers due to component obsolescence and reliability considerations for Safety Related application at WBN2. The primary function of the bucket or feeder breaker is for power distribution. Failure analysis of the system it serves is not a consideration in this EDCR-2.***
☐ YES	☒ NO	b.	What are the failure modes of the individual components which were considered, and what was their effect on the overall system (i.e., consider failures of the digital control systems related to the hardware and software loss of CPU, loss of communication connection, loss of an entire I/O board, etc.)?
☐ YES	☒ NO	c.	Will these system and/or component failures directly or indirectly via transient cause a plant trip or runback? If YES, 1. What is the reliability of the individual components and systems? 2. How can testing be performed to detect failure modes, miss configurations, and precursors to imminent failures? 3. What alarms or indications provide timely precursor indication of impending component/system failure? 4. What are bases for alarm, runback, trip, and operator action points? 5. What are the margins between normal operation and these alarm, runback, trip, and opreator action points? 6. What redundancy is there in the alarms, indications, runback, or trip functions? 7. Which trips and runbacks are absolutely necessary? Which can be changed to alarms and what operator response is needed for the alarms? 8. Are digital systems developed in accordance with SPP-2.6 and SS-E18.15.01 software requirements for real time data acquisition and control computer systems? 9. Are there any reasons why redundancy was not considered in alarm, trip, runback systems, and can redundancy be added?

Attachment 1
(Page 23 of 23)

TECHNICAL EVALUATION CONSIDERATIONS OF 0-TI-2

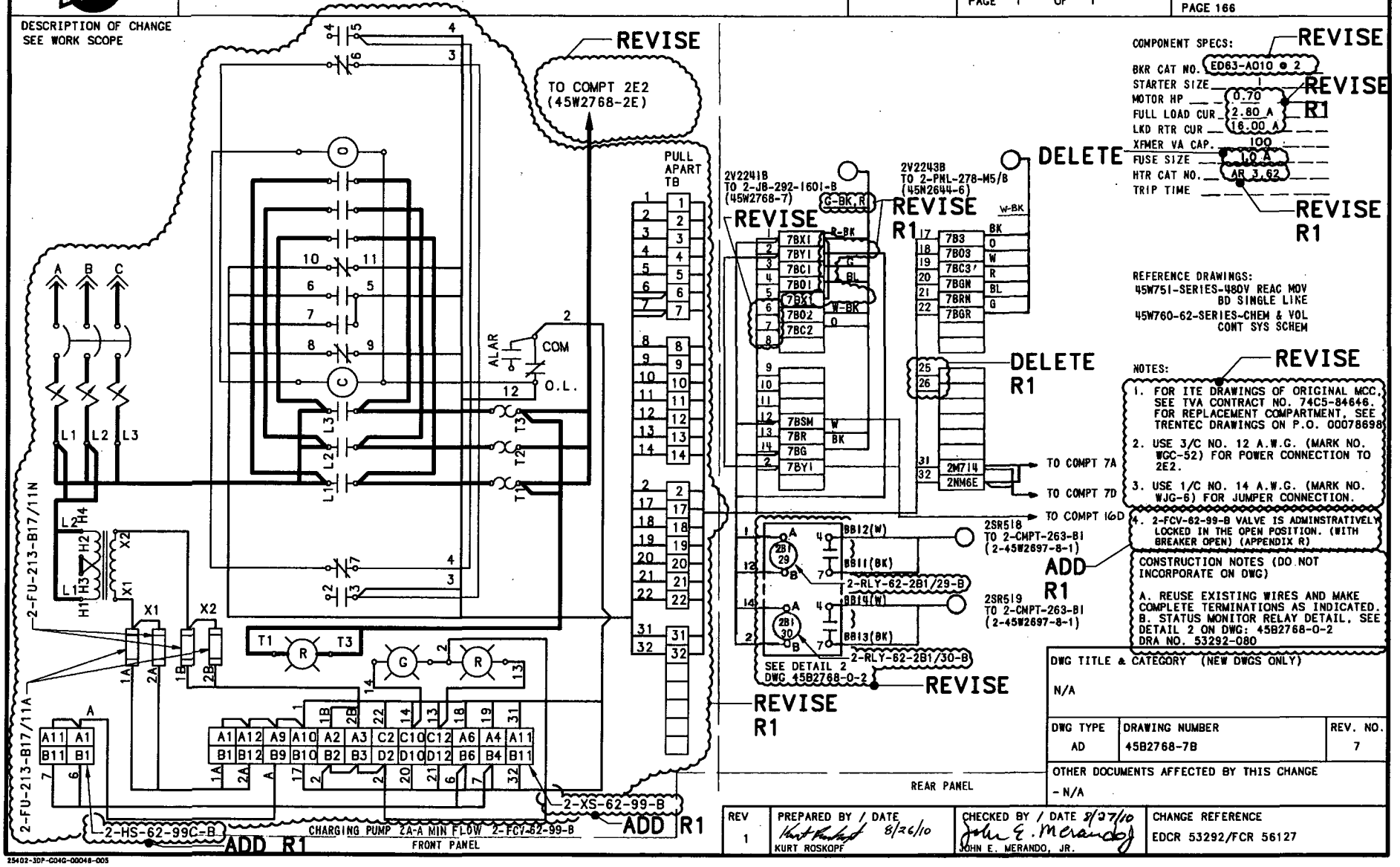
DIGITAL SYSTEM UPGRADES/MODIFICATIONS:			
			If the change involves a digital system, component or upgrade:
☐ YES	☒ NO	1.	Implement digital upgrade using SPP-2.6, SS-E18.15.01, and the guidelines of DG-E18.1.25.
☐ YES	☒ NO	2.	If the change involves a modification of a digital system or component, use SPP-2.6 for in-house modifications and SS-E18.15.01 for modifications performed by a vendor.
☐ YES	☒ NO	3.	For digital upgrades, refer to NRC RIS 2002-22 (Replaced Generic Letter 95-02) which endorses NEI 01-01, Rev. 1. The potential for common cause software failure must be considered (normally only required to be analyzed for when associated with a Safety Related Protection System upgrade) in the design phase (See DG-E18.1.25 and SS-E18.15.01 for guidance and requirements).
☐ YES	☒ NO	4.	Determine the method and level of configuration control needed for the digital application. The configuration control method should be implemented using approved design control processes such as SPP-2.6 and/or SPP-9.3 (i.e., design output). This may involve the need to maintain configuration control of both the software and hardware revision levels. The level of control needed shall be based upon the application function (i.e., Safety Related, Quality Related, Critical to Plant Operations), capability to modify software such as software versus firmware, software and hardware revision compability, etc. Safety Related system configuration control must ensure that V&V qualification remains valid so prescriptive configuration control methods would be required. For Non Safety Related software, the configuration control may be less restrictive with focus on plant reliability and day to day operation. Firmware/Software includes both the Operating/Platform System firmware/software and the application specific firmware/software along with any configuration parameters such as setpoints, constants, scaling, etc.
☐ YES	☒ NO	5.	Perform Cyber Security Assessment to address NEI 04-04 requirements. Contact the Computer Engineering Group for instructions.
☐ YES	☒ NO	6.	If there is communication network interfaces such as an ICS interface, implement design of this interface per the guidelines addressed in DG-E18.1.25.

Based on the above Technical Evaluation Considerations and responses listed above, the modifications described within this EDCR-2 53292-A do not have adverse impacts to the Nuclear Safety standpoint.

DRAWING REVISION AUTHORIZATION (DRA)

JOB NUMBER	DRA NUMBER	FCR NUMBER / PAGE	EDCR NUMBER / PAGE
25402	53292-005	56127 / 74	53292 / 166
	PAGE 1 OF 1		

DESCRIPTION OF CHANGE
SEE WORK SCOPE



COMPONENT SPECS: REVISE

BKR CAT NO.	ED63-A010 @ 2
STARTER SIZE	1
MOTOR HP	0.70
FULL LOAD CUR	2.80 A
LKD RTR CUR	16.00 A
XFMER VA CAP.	100
FUSE SIZE	10 A
HTR CAT NO.	AR 3.62
TRIP TIME	

REVISE R1

REVISE R1

REFERENCE DRAWINGS:
45W751-SERIES-480V REAC MOV BD SINGLE LINE
45W760-62-SERIES-CHEM & VOL CONT SYS SCHEM

NOTES: REVISE

1. FOR ITE DRAWINGS OF ORIGINAL MCC, SEE TVA CONTRACT NO. 74C5-84646. FOR REPLACEMENT COMPARTMENT, SEE TRENTEC DRAWINGS ON P.O. 00078698
2. USE 3/C NO. 12 A.W.G. (MARK NO. WGC-52) FOR POWER CONNECTION TO 2E2.
3. USE 1/C NO. 14 A.W.G. (MARK NO. WJG-6) FOR JUMPER CONNECTION.
4. 2-FCV-62-99-B VALVE IS ADMINSTRATIVELY LOCKED IN THE OPEN POSITION. (WITH BREAKER OPEN) (APPENDIX R)

ADD R1

CONSTRUCTION NOTES (DO NOT INCORPORATE ON DWG)

A. REUSE EXISTING WIRES AND MAKE COMPLETE TERMINATIONS AS INDICATED.
B. STATUS MONITOR RELAY DETAIL, SEE DETAIL 2 ON DWG: 45B2768-0-2
DRA NO. 53292-080

DWG TITLE & CATEGORY (NEW DWGS ONLY)
N/A

DWG TYPE	DRAWING NUMBER	REV. NO.
AD	45B2768-7B	7

OTHER DOCUMENTS AFFECTED BY THIS CHANGE
- N/A

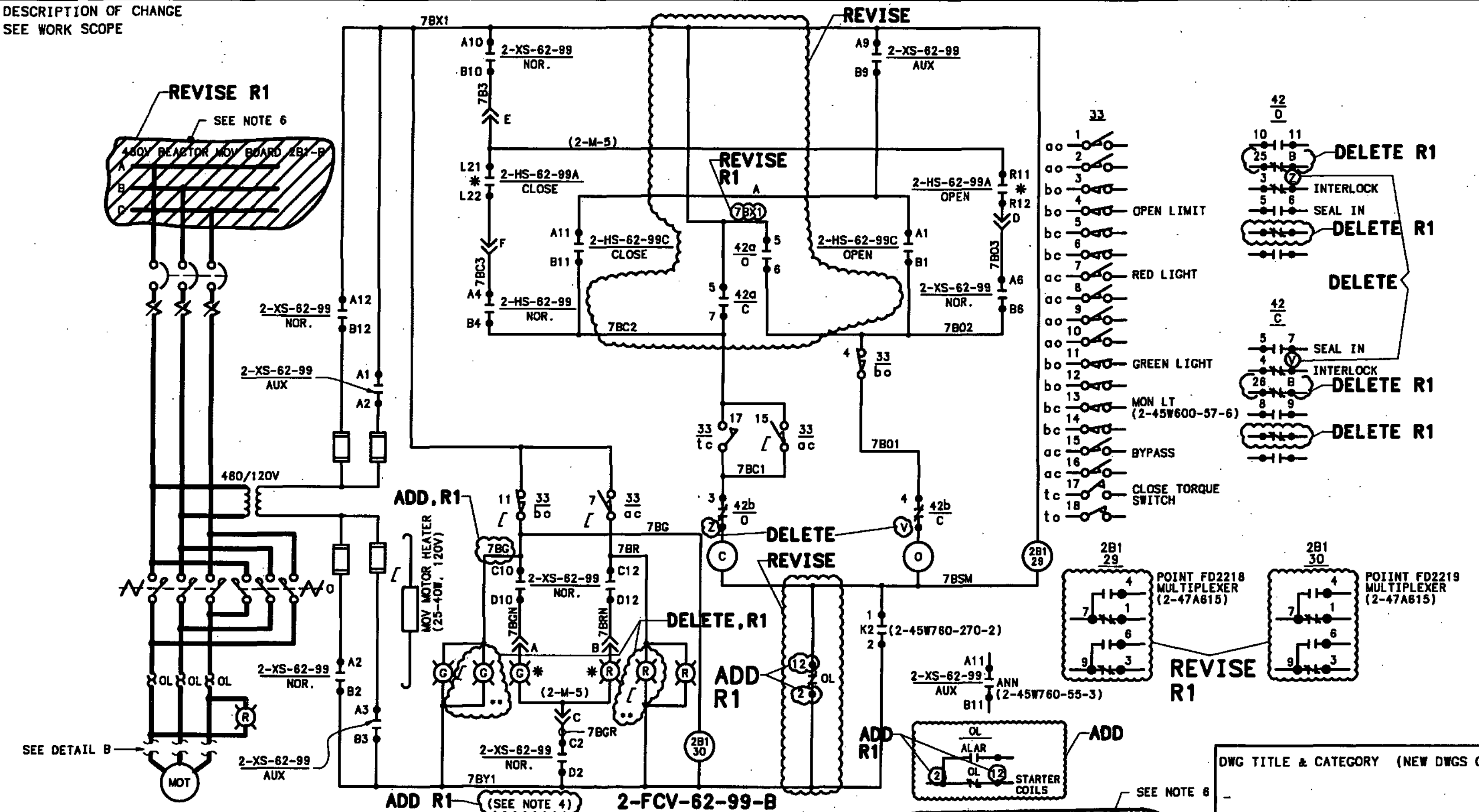
REV	PREPARED BY / DATE	CHECKED BY / DATE	CHANGE REFERENCE
1	KURT ROSKOPF 8/26/10	JOHN E. MERANDO, JR. 8/27/10	EDCR 53292/FCR 56127

25402-3DP-G04G-00048-005

DRAWING REVISION AUTHORIZATION (DRA)

BECHTEL	DRAWING REVISION AUTHORIZATION (DRA)	JOB NUMBER 25402	DRA NUMBER 53292-059 PAGE 1 OF 1	FCR NUMBER 56127 PAGE 125 EDCR NUMBER 53292 PAGE 220

DESCRIPTION OF CHANGE
SEE WORK SCOPE



COMPONENT ID NO.	VLV NO.	NOMENCLATURE	BOARD	WIRE PREFIX	CONTROL SWITCH	AUXILIARY SWITCH	FUSE IDENTIFICATION NO. NOR.	AUX
2-FCV-62-99-B	8111	CHARGING PUMP 2A-A MINIMUM FLOW VALVE	2B1-B	7B	2-HS-62-99A, B, C	2-XS-62-99	2-FU-213-B17/11N	2-FU-213-B17/11N

SEE NOTE 6

DELETE R1

DELETE R1 (crosshatch and note reference)

REVISE — 4. VALVES #2-FCV-62-98-A AND 2-FCV-62-99-B ARE ADMINSTRATIVELY LOCKED IN THE OPEN POSITION. (WITH BREAKER OPEN) (APPENDIX R)

DWG TITLE & CATEGORY (NEW DWGS ONLY)		
-		
DWG TYPE	DRAWING NUMBER	REV. NO.
CC	2-45W760-62-3	0
OTHER DOCUMENTS AFFECTED BY THIS CHANGE		
N/A		

REV	PREPARED BY / DATE	CHECKED BY / DATE	CHANGE REFERENCE
1	Kurt Roskopf 8/26/10 KURT ROSKOPF	John E. Merando Jr. 8/27/10 JOHN E. MERANDO, JR.	EDCR 53292/FCR 56127

25402-3DP-G04G-00048-005

EDCR UNIT DIFFERENCE FORM

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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 U1 DCN for this modification and the Unit-1 schematic 1-45W760-62-3 and connection diagram 45B1768-7A does not display the implemented change.

Unit-2 change only: For Compartment 2C Trentec 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 Calc.

Unit-2 change only: For Compartment 16A Trentec 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 Calc.

Unit-2 change only: For Compartment 7D, TRENTEC replaced the blow fuse detector shown on U1 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 Calc.

Unit-2 change only: For Compartment 10D, TRENTEC replaced the blow fuse detector shown on U1 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 Calc.

Unit-2 change only: For Compartment 11B, Trentec increased the CPT capacity from the original 100VA to 150VA to ensure all combined devices would function properly, per transformer sizing Calc.

The Unit 2 blown fuse detector (BFD) is no longer used for Unit 2. The BFD relay is removed from its socket or base (BFDB) and shall be stored in the TVA warehouse. The BFD for Unit 2 will not trip the up-steam circuit breaker like the Fuseguard (FG) does for the Unit 1 upon a blown fuse condition. This is to provide power to the load to perform its safety function. Control circuit indicating lights for all valves will not be turned off by BFD relays. These indicating lights will perform their original functions in monitoring valves' limit switch status.

SA Hellios — 9/9/11

Unit 2 TVA Engineering Acceptance (Mgr or Designee): **Date:**

Choochart Sornpao — 9/9/11

Prepared By: **Date:**

SESG TO ROUTE A COPY OF THIS COMPLETED FORM TO TVA TRAINING MANAGER AND TO UNIT 2 LICENSING.

Streamlined EDCR approved by TVA Oversight _____**N/A**_____