

Northeast Utilities
Millstone - Unit 3

Independent Corrective Action Verification Program
(ICAVP)

Modification Review Checklist

CK-MP3-03-04, Rev. 0

Electrical System Design

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	Name	Signature	Date

System	
Modification No.	
Verified by:	
Concurrence by:	

Electrical System Design Review

Instructions

This checklist supplements PI- MP3-03 and shall be used to document the electrical design review process for system modifications. Application and use of this checklist shall be as follows:

1. When the need for a electrical design review is identified by the modification screening checklist (CK-MP3-03-02), the Verifier shall implement this check to verify that electrical system design aspects have been properly addressed in the modification.
2. The Verifier shall review each attribute listed in the checklist and shall determine whether the attribute has been properly addressed or is not applicable. The determination shall be documented by checking the appropriate column in the checklist.
3. For all "Yes" and "No" responses, the Verifier shall assign a sequential comment number and shall describe the basis for the response on the comment sheet included in this checklist. Comments may also be provide for "N/A" responses.
4. When all attributes have been reviewed, the Verifier shall sign and date the cover sheet
5. The Lead Verifier shall indicate his concurrence that the electrical system review has been completed by signing and dating the cover sheet.

The system designation and modification number shall be entered on all sheets of the completed checklist. Pages shall be sequentially numbered. It shall be acceptable to add insert pages numbered as 1A, 1B, 2A, etc.

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<u>Attribute</u>		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>Comment</u>
1.	Performance requirements such as capacity, rating, output, are clearly identified and addressed.	_____	_____	_____	_____
2.	The scope of the design document defines the basis/reason for the design/design change and provides an adequately detailed description of the design change. The content of the design document fulfills the stated scope.	_____	_____	_____	_____
3.	Codes, standards and regulatory requirements are documented, including applicable issue date and/or addenda. Exceptions are highlighted.	_____	_____	_____	_____
4.	Assumptions necessary to perform the design activity are adequately described and reasonable and the design method used was appropriate.	_____	_____	_____	_____
5.	Failure modes are identified and considered, e.g., loss of air, loss of power, loss of function (start, stop, open and close control).	_____	_____	_____	_____
6.	Interface requirements are specified and addressed.	_____	_____	_____	_____
7.	Operational requirements including mode restrictions are identified; effect on all system operating alignments.	_____	_____	_____	_____
8.	Redundancy and separation requirements are addressed.	_____	_____	_____	_____
9.	Assumptions necessary to perform the design activity are adequately described and reasonable and the design method used was appropriate.	_____	_____	_____	_____
10.	Breached barrier requirements, including mode restrictions, are clearly stated.	_____	_____	_____	_____
11.	The effects of design changes, issued or in-process, have been reviewed for impact on the design document. There is a process for identifying open modifications against proposed design changes.	_____	_____	_____	_____
12.	Industry Experience was factored into design where necessary.	_____	_____	_____	_____
13.	Component temperature/voltage rating are reconciled with the system design temperature/voltage.	_____	_____	_____	_____
14.	Overcurrent protection and voltage drop considerations are factored into the design.	_____	_____	_____	_____

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<u>Attribute</u>		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>Comments</u>
15.	Assignment of equipment and identification tagging was adequately addressed.	_____	_____	_____	_____
16.	Materials and equipment are adequately identified, specified, and suitable for the service environment and process conditions. For example, electrical device and component performance characteristics are identified and have been verified to be adequate for the application (such as minimum and maximum voltage, etc.). Resources such as IE Notices have been reviewed for applicable field service experience.	_____	_____	_____	_____
17.	Special material or equipment specification requirements or tests have been appropriately specified. (Examples: 10CFR50.49, IEEE-323, UL/FM Approved)	_____	_____	_____	_____
18.	Maintainability factors were accounted for in the design [such as location, accessibility, arrangement, environment, and isolation/separation features (breakers, fuses)].	_____	_____	_____	_____
19.	Affected calculations have been revised and/or new calculations have been prepared.	_____	_____	_____	_____
	a. Ampacity	_____	_____	_____	_____
	b. Voltage drop	_____	_____	_____	_____
	c. Relay or Trip device sizing and coordination	_____	_____	_____	_____
	d. Interrupting rating, both momentary and full load	_____	_____	_____	_____
	e. Voltage Regulation	_____	_____	_____	_____
	f. Bus loading under appropriate conditions	_____	_____	_____	_____
	g. Second Level Undervoltage	_____	_____	_____	_____
	h. Overload settings	_____	_____	_____	_____
	i. Equipment operating pressure	_____	_____	_____	_____
	j. MOV Calculations, e.g. overload, torque, stroke time, etc.	_____	_____	_____	_____
	k. Configuration control, e.g. fuse sizing, bus loading, cable tray loading	_____	_____	_____	_____
20.	Affected electrical drawings and databases have been updated?	_____	_____	_____	_____
	a. Schematics	_____	_____	_____	_____
	b. General Arrangements	_____	_____	_____	_____
	c. Equipment Location	_____	_____	_____	_____
	d. Single Line Drawings	_____	_____	_____	_____
	e. Wiring Diagrams	_____	_____	_____	_____
	f. Front Elevations (if appropriate)	_____	_____	_____	_____
	g. Logic Diagram	_____	_____	_____	_____
	h. Bus Loading	_____	_____	_____	_____
	i. Cable Tray Loading	_____	_____	_____	_____

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<u>Attribute</u>		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>Commen</u>
j.	Design Installation and Test Specifications	_____	_____	_____	_____
k.	Design Basis Documents	_____	_____	_____	_____
l.	Procurement Specifications	_____	_____	_____	_____
m.	Vendor Drawing/Data Sheets	_____	_____	_____	_____
n.	Vendor Manual	_____	_____	_____	_____
o.	Valve List	_____	_____	_____	_____
p.	Electrical Equipment List	_____	_____	_____	_____
q.	Component datasheets/databases	_____	_____	_____	_____
21.	If a containment electrical penetration was utilized, then all applicable factors were considered, e.g., splicing, sizing, segregation, short circuit and overload protection, etc.	_____	_____	_____	_____
22.	Any changes in alarm settings, or the addition of new alarms, were properly evaluated against licensing requirements and operating procedures.	_____	_____	_____	_____
23.	If new equipment was added, or existing equipment was modified such that changes in heat loading occurred, the impact was evaluated on existing HVAC systems.	_____	_____	_____	_____
24.	Grounding and lightning protection was considered for any new equipment additions.	_____	_____	_____	_____
25.	Post Modification Test requirements have been specified and include acceptance criteria sufficient to allow verification that design requirements have been satisfactorily accomplished.	_____	_____	_____	_____
26.	Proper consideration was given to the mounting of small components or pieces of equipment relative to interaction with large dynamic pieces of equipment.	_____	_____	_____	_____
27.	Proper consideration was given to minimize or eliminate the possibility of water entry into electrical equipment.	_____	_____	_____	_____
28.	Proper consideration was given to the impact on electrical equipment if it was mounted within close proximity to any components which generate heat, e.g. pipes, transformers, etc.	_____	_____	_____	_____
29.	Human factor engineering considerations were incorporated into the design.	_____	_____	_____	_____
30.	The design has no impact on security lighting.	_____	_____	_____	_____
31.	The impact on the training curriculum and the simulator was correctly identified. Simulator compatible materials were specified.	_____	_____	_____	_____

Electrical System Design Review

[illegible]

Electrical System Design Review

Comment Form

[illegible]

Prepared by

Signature _____

Date _____