

Northeast Utilities
Millstone - Unit 3

Independent Corrective Action Verification Program
(ICAVP)

Walkdown Checklist

CK-MP3-05-02, Rev. 1

Physical Drawing Review Attributes Checklist

Prepared by: A.A. NEX
Name

[Signature]
Signature

6/9/97
Date

Approved by: D.K. Schepfer
Name

[Signature]
Signature

6-9-97
Date

IMPLEMENTATION

System	
Document No./Rev.	
Verified by:	
Concurrence by:	

Sheet 1 of ____

Physical Drawing Review Attributes Checklist

Instructions

This checklist shall be used on a System basis to ensure that critical design attributes contained on Upper Tier documents (P&IDs for Mechanical and Electrical Schematics and One Lines for Electrical) have been properly and adequately incorporated into Lower Tier documents (Piping Physical/Isometrics for Mechanical and Electric Wiring Diagrams, Cable Schedules and Physicals for Electrical) prior to walking down the system against those Lower Tier documents.

The purpose of this review is to ensure that functionality was properly incorporated from Upper Tier to Lower Tier documents.

1. In preparing these checklists, the Verifier shall first identify and retrieve the Upper Tier and Lower Tier documents/drawings in the categories listed above, as identified in checklist CK-MP3-05-01 previously prepared, and these documents shall include the redlining of open change documents as described in Section 5.3.4 of PI-MP3-05.
2. In completing the checklists, the Verifier shall concentrate on functionality by determining whether the attributes listed have been properly incorporated on the physical drawings, and checking Yes, No, or N/A to the right of the attribute on the checklist. In checking these answers, the following shall be observed:
 - a. An answer shall be provided to each question, no questions are to be left blank.
 - b. Not applicable (N/A) shall only be used where an attribute is not present in the Upper Tier document.
 - c. Whenever the answer to a question is "No", meaning that the attribute being reviewed is unsatisfactory, a Comment No. shall be entered in the right hand column of the checklist, and a comment shall be entered on the appropriate "Comment Sheet" provided at the end of Attachment A or B, as applicable. Comments shall be numbered sequentially within the Attachment A or B.

In addition, for each unsatisfactory response, the Preparer shall initiate a Discrepancy Report (DR) in accordance with PI-MP3-11. The DR number shall be referenced in the comment in Attachment A. or B.
 - d. When the Attachment A or B checklist has been completed, the Preparer shall print, sign and date at the end of the document in the space provided.
3. When the checklist in Attachment A and B have been completed for a System, the Lead Verifier shall assemble the checklists with this package and sign the CK-MP3-05-02 cover sheet under "Verified by" to indicate that this portion of the System Review has been completed.

Attachment A
Mechanical Physical Drawing Review Attributes Checklist

Have the following Mechanical attributes been properly and adequately incorporated from the P&ID to the Piping Physical/Isometric drawings?

Mechanical Attribute:		Yes	No	Comment No.	N/A
1.	Piping				
1.1	Piping line numbers	_____	_____	_____	_____
1.2	Pipe size	_____	_____	_____	_____
1.3	Piping branch connection - sequence of takeoff	_____	_____	_____	_____
1.4	Reducers/increasers	_____	_____	_____	_____
1.5	Instrument connections in proper sequence	_____	_____	_____	_____
1.6	Line slope properly designated for instrument lines, relief valve discharge lines, etc.	_____	_____	_____	_____
1.7	Vent connections in proper sequence and located at system high points	_____	_____	_____	_____
1.8	Drain connections properly sequenced and located at system low points	_____	_____	_____	_____
1.9	Valves, specialty items and equipment piped in proper sequence	_____	_____	_____	_____
1.10	Piping drawings agree with pipe hanger drawings with respect to location and support type.	_____	_____	_____	_____
1.11	Pipe hanger drawings properly incorporate class, location, and orientation with respect to physical piping drawings	_____	_____	_____	_____
1.12	P&ID notes relative to piping properly incorporated	_____	_____	_____	_____
2.	Valves				
2.1	All valves including numbers properly shown	_____	_____	_____	_____
2.2	Valve type properly designated (i.e., gate, globe,)	_____	_____	_____	_____
2.3	Check valves shown in proper flow direction	_____	_____	_____	_____
2.4	Power for valve properly shown (i.e., air, electric, hydraulic)	_____	_____	_____	_____
2.5	Valve sizes properly translated	_____	_____	_____	_____
2.6	P&ID notes relative to valves properly incorporated	_____	_____	_____	_____
3.	Equipment				

Attachment A
Mechanical Physical Drawing Review Attributes Checklist

		Yes	No	Comment No.	N/A
3.1	All equipment on P&ID properly shown	_____	_____	_____	_____
3.2	Equipment ID correctly transferred	_____	_____	_____	_____
3.3	Process piping to equipment connections properly shown	_____	_____	_____	_____
3.4	Interface to skid mounted equipment clearly shown	_____	_____	_____	_____
3.5	P&ID notes relative to equipment properly incorporated	_____	_____	_____	_____
4. Miscellaneous					
4.1	Heat tracing requirements properly incorporated	_____	_____	_____	_____
4.2	Cathodic protection requirements properly incorporated	_____	_____	_____	_____
4.3	Continuation to interfacing system drawings properly shown	_____	_____	_____	_____
4.4	Specialty items called out on P&IDs, (i.e., strainers, traps, etc.) properly shown	_____	_____	_____	_____
4.5	Miscellaneous notes on P&IDs properly incorporated	_____	_____	_____	_____
4.6	Mechanical equipment, valves, components, etc. properly oriented per manufacturer's drawing requirements	_____	_____	_____	_____
5. Other	List here any other attributes shown on the P&IDs but not listed above, and indicate whether properly shown. (Add sheets as necessary and number sequentially.)				
	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____

Northeast Utilities
Millstone Unit 3

CK-MP3-05-02

System _____
Sheet _____ of _____

Attachment A
Mechanical Physical Drawing Review Attributes Checklist

Attachment A
Mechanical Physical Drawing Review Attributes Checklist

Comment Sheet

[illegible]

(Attach additional sheets as necessary, sign and date last Mechanical Comment Sheet only)

Prepared by: _____

Name _____

Signature _____

Date _____

Attachment B
Electrical Physical Drawing Review Attributes Checklist

Have the following Electrical attributes been properly and adequately incorporated on the Electrical Wiring Diagrams and/or Physical Drawings?

		Yes	No	Comment No.	N/A
Electrical Attribute:					
1. Wiring Diagrams					
1.1	Are the equipment/cable safety classifications and segregation codes consistent within a specific panel?	_____	_____	_____	_____
1.2	Is there reference back to the respective Schematic or One-line for determination of redundancy and separation requirements?	_____	_____	_____	_____
1.3	Is the segregation code, Class 1E Division, etc., for each cable shown, applicable?	_____	_____	_____	_____
1.4	Have the panel layout elevation drawings been reviewed to ensure that separation and/or barriers are provided between devices, wiring and wiring terminations, in accordance with the applicable requirements of the project design criteria with respect to separation of:	_____	_____	_____	_____
	a. Devices and wiring (including terminations) assigned to different Nuclear Safety-Related divisions	_____	_____	_____	_____
	b. Devices and wiring (including terminations) assigned to Nuclear Safety-Related divisions and Non-Safety-Related division devices and wiring (including terminations)?	_____	_____	_____	_____

Attachment B
Electrical Physical Drawing Review Attributes Checklist

		Yes	No	Comment No.	N/A
1.5	Are all contacts shown for devices that are furnished (i.e., control switches, relays, pressure and level switches, limit switches, etc.), and have all contact terminal designations for such devices, when shown on the schematic diagrams, been verified?	_____	_____	_____	_____
1.6	If this is a junction/terminal box wiring diagram, does the quantity of terminal blocks/terminal points shown agree with the junction box tabulation?	_____	_____	_____	_____
1.7	Are the wiring terminations correct and in agreement with the corresponding schematic diagram; and are wire destination and wire code designations (if required) shown at both ends of internal wiring; and are wire designations, color codes and/or numbers, and cable numbers shown for external cables? Does the method of labeling cable conductors (color codes or numbers) agree with that of the cable purchased for the project.	_____	_____	_____	_____

Attachment B
Electrical Physical Drawing Review Attributes Checklist

		Yes	No	Comment No.	N/A
		_____	_____	_____	_____
1.8	Have all internal and/or external wiring connections been verified by a systematic, point-by-point, color-coded review of the wiring diagram with the circuit/circuit-part(s) shown on the corresponding schematic, relay and metering and synchronizing diagrams, to ensure circuit integrity and continuity in the wiring? For revision to existing design, this review must include the areas of the related diagram(s) affected by the physical wiring change on the wiring diagram. For the purposes of this review, the term, "areas of the related diagrams affected by the physical wiring change on the Wiring diagram" is defined to include all termination points of affected common wires (i.e. circuit nodes interconnecting 3 or more circuit devices, also referred to as "daisy-chain" circuits) within the modified equipment.				
1.9	When more than one wiring diagram is required to complete one piece of equipment, are the drawings cross-referenced either by notes or a simple key plan or elevation detail?	_____	_____	_____	_____
1.10	Does each device have a cross-reference to its schematic diagram?	_____	_____	_____	_____

Attachment B
Electrical Physical Drawing Review Attributes Checklist

		Yes	No	Comment No.	N/A
1.11	Is the wiring diagram drawing number added to the appropriate box in the cable tabulation for cables shown terminated on the wiring diagram (three-line diagram). Has the drawing number been added for the other end of the cable if completed?	_____	_____	_____	_____
1.12	Have appropriate jumpers and grounding been shown for unused current transformer secondaries?	_____	_____	_____	_____
1.13	Are power, control and instrumentation cable shields shown terminated properly?	_____	_____	_____	_____
1.14	Have instrument, equipment or valve numbers been documented on the drawings and the wiring diagram drawing number referenced in the appropriate column on instrument, equipment or valve lists?	_____	_____	_____	_____
2.	Cable and Raleway Schedules	_____	_____	_____	_____
2.1	Do "from" and "to" agree with the one-line diagrams, wiring and the schematics?	_____	_____	_____	_____
2.2	Does the conductor/conduit size agree with information shown on the one-line, wiring diagram and on the physical drawings?	_____	_____	_____	_____
2.3	Does the conductor quantity agree with information shown on the one-line, wiring and the physical drawings?	_____	_____	_____	_____
2.4	Does the cable configuration agree with information shown on the one-line, wiring diagram and on the physical drawings?	_____	_____	_____	_____

Attachment B
Electrical Physical Drawing Review Attributes Checklist

		Yes	No	Comment No.	N/A
2.5	Are all raceways (cable trays, risers and conduits in ductruns) identified by segregation code or service code.	_____	_____	_____	_____
2.6	Does a note exist which specifies which segregation codes identify Nuclear Safety-Related cable trays, risers and conduits in ductruns?	_____	_____	_____	_____
2.7	Are routing points located so that they clearly indicate which cable tray level (or which conduit in a ductrun) they refer to?	_____	_____	_____	_____
2.8	Does a note exist which indicates the method of identifying the routing points on the cable trays in the field and the color coding to be used?	_____	_____	_____	_____
2.9	Are relative position of trays that are stacked vertically properly indicated on the drawings?	_____	_____	_____	_____
2.10	Do the routing points agree with the physical drawings?	_____	_____	_____	_____
2.11	Has a method to track routing point numbers been developed to prevent duplication of numbers?	_____	_____	_____	_____
2.12	Does raceway association in C&R schedule agree with physical drawings? Has the scale been identified and verified or a note added that the drawing is not to scale and should not be used to measure distances?	_____	_____	_____	_____
2.13	Do phase markings, phase positions, equipment terminations and phase identification in cable number(s) agree with the phasing diagram?	_____	_____	_____	_____
3.	Physical Drawings	_____	_____	_____	_____

Attachment B
Electrical Physical Drawing Review Attributes Checklist

		Yes	No	Comment No.	N/A
3.1	Location and size of all electrical equipment?	_____	_____	_____	_____
3.2	Equipment numbers for equipment involved?	_____	_____	_____	_____
3.3	Size and type of conduit?	_____	_____	_____	_____
3.4	Segregation or service code of each conduit and/or cable?	_____	_____	_____	_____
3.5	Junction/terminal box numbers shown?	_____	_____	_____	_____
3.6	Junction/terminal box type and elevation, and terminal block quantity?	_____	_____	_____	_____
3.7	Has the scale been identified and verified or a note added that the drawing is not to scale and should not be used to measure distances?	_____	_____	_____	_____
3.8	Segregation code and routing points for each cable tray?	_____	_____	_____	_____
3.9	Tolerances for electrical equipment locations and routing point locations?	_____	_____	_____	_____
3.10	Conduit seals are shown in conduit runs per applicable project procedures/instructions?	_____	_____	_____	_____
3.11	If conduit numbers are used, have they been verified to eliminate duplication?	_____	_____	_____	_____
3.12	Orientation installation of electrical equipment and components per manufacturer's drawing requirements.	_____	_____	_____	_____
3.13	Are tray/conduit supports identified? Are locations adequately shown? Type/details referenced?	_____	_____	_____	_____
3.14	Equipment sealing information for raceway entry provided?	_____	_____	_____	_____
3.15	Are cable tray supports, routing points, and elevations shown on drawings?	_____	_____	_____	_____
3.16	Is flexible conduit identified and shown in accordance with standards?	_____	_____	_____	_____

Attachment B
Electrical Physical Drawing Review Attributes Checklist

		Yes	No	Comment No.	N/A
3.17	Is appropriate grounding identified for equipment and raceways.	_____	_____	_____	_____
3.18	Are separation requirements identified and adequate on drawings?	_____	_____	_____	_____

Attachment B

Electrical Physical Drawing Review Attributes Checklist

Comment Sheet

[illegible]

(Attach additional sheets as necessary, sign and date last Electrical Comment Sheet only)

Prepared by: _____

Name _____

Signature

Date _____