

Distribution Bifurcating Cabinets					
Component Classification Categories					
Criticality	I	X			DC, SS, TDC, TSS locations that serve O'Hare & Midway Airports
	II		X		Locations exclusive of Criticality I and DC locations
	III			X	DC locations
Duty Cycle	High	N/A	N/A	N/A	
	Low	N/A	N/A	N/A	
Service Condition	In Service	X	X	X	
	Spare	N/A	N/A	N/A	
Condition Monitoring Tasks		Task Frequencies		Failure Codes	Comments
None		N/A	N/A	N/A	
Failure Finding Tasks		Task Frequencies		Failure Codes	Comments
Visual Inspection		5W	10W	3M	6a-d
Thermography		1Y	1Y	1Y	4a
Time Directed Tasks		Task Frequencies		Failure Codes	Comments
Bifurcating Cabinet Maintenance		6Y	6Y	6Y	1a, 1c, 2a, 2c, 3c, 5a
Functional Test		6Y	6Y	6Y	1b, 2b, 3a-b
Condition Directed Tasks		Task Frequencies		Failure Codes	Comments
None		N/A	N/A	N/A	N/A

DISTRIBUTION BIFURCATING CABINET FAILURE MODES

FAILURE MODES	FAILURE CAUSES	MAINTENANCE TASKS
1. Fails to Close	1a. Control Circuit Failure	Bifurcating Cabinet Maintenance
1. Fails to Close	1b. Control Circuit Failure	Functional Test
1. Fails to Close	1c. Lack of / Improper Lubrication	Bifurcating Cabinet Maintenance
2. Fails to Open	2a. Control Circuit Failure	Bifurcating Cabinet Maintenance
2. Fails to Open	2b. Control Circuit Failure	Functional Test
2. Fails to Open	2c. Lack of / Improper Lubrication	Bifurcating Cabinet Maintenance
3. Fails to Interrupt	3a. Mechanical/Linkage Failure	Functional Test
3. Fails to Interrupt	3b. Stored Energy Failure (Spring)	Functional Test
3. Fails to Interrupt	3c. Stored Energy Failure (Spring)	Bifurcating Cabinet Maintenance
4. Fails to Provide Adequate Conductive Path	4a. High Resistance Connection	Thermography
5. Fails to Provide Adequate Insulation Level	5a. Contamination	Bifurcating Cabinet Maintenance
6. Fails to Maintain Boundary Integrity	6a. Cabinet Weld Failure	Visual Inspection
6. Fails to Maintain Boundary Integrity	6b. Cabinet Corrosion	Visual Inspection
6. Fails to Maintain Boundary Integrity	6c. Concrete Pad Spalling	Visual Inspection

DISTRIBUTION BIFURCATING CABINET MAINTENANCE TASK DEFINITION

TASK	DEFINITION
Bifurcating Cabinet Maintenance	<p>This task includes the following:</p> <ul style="list-style-type: none"> -- Check for signs of rodent or insect presence; proper sealing of ducts -- Check correct grounding of concentric neutrals -- Check for contamination on insulators. Clean as necessary. -- Check all doors, latches and weather seals are effective -- Check barriers for signs of tracking, cracking or flash marks. Damaged barriers cannot be cleaned, replace. -- Clean all dirt and debris from enclosure -- Check proper installation of current sensors
Functional Test	Open and close each switch minimum of three times
Thermography	Infrared inspection of cabinet and power path components.
Visual Inspection	<p>External visual inspection of cabinet. Items to be checked are:</p> <ul style="list-style-type: none"> -- Signs of corrosion -- Integrity of compartment and locking devices -- Pad / foundation condition -- Signs of wildlife intrusion -- Proper labeling -- Free access to front of cabinet

DISTRIBUTION BIFURCATING CABINET MAINTENANCE BASIS

Distribution Bifurcating Cabinet Template Summary

The Preventive Maintenance program is documented via maintenance templates. Templates have been developed that address transmission, substation, and distribution equipment that is owned and maintained by Exelon Utilities. Each template documents the program tasks, frequencies, failure modes, and maintenance basis for the associated equipment. Tasks and associated frequencies are designed to address known failure modes of the equipment covered by the template. In general, the tasks included in the maintenance templates are the result of good industry practices, industry experience, and manufacturer recommendations.

References:

Internal reports and operating experience
OEM Maintenance Manuals and Interviews

Boundary Definition

The boundary of a distribution bifurcating cabinet includes:

- Enclosure
- Concrete pad or other foundation
- Switching mechanism and disconnects
- Insulators and barriers
- Current sensors / transformers
- Cable terminations
- Controls and protection relay
- Grounding of cable concentric neutrals

Excluded from this treatment are: control cables, power cables

Failure Experience

Failures are subject to ACE/RCI investigation. Findings/recommended corrective actions are incorporated into the template as required.

Vendor Recommendations

N/A

Disposition of Vendor Recommendations

N/A

DISTRIBUTION BIFURCATING CABINET MAINTENANCE BASIS

Basis for Template Tasks

Bifurcating Cabinet Maintenance: With equipment out of service, cabinet maintenance includes a close-up inspection of all internal components.

Functional Test: Confirms proper operation of the disconnects, allows wipe-cleaning of contact points and verifies control circuitry.

Thermography: IEEE Standard 62 identifies thermography as a primary tool for detection of connection issues, bushing issues, and issues with the cooling systems.

Visual Inspection: This inspection approximates real-time condition monitoring that can detect developing problems and degradation, and provides condition data used to initiate corrective actions.

BIFURCATING CABINET - TEMPLATE DEVELOPMENT HISTORY

Revision 0		Date 06/17/2005
Writer	Chris Stefanski (Strategic Programs)	
Reviewer(s)		
Approver(s)	Kathy McHugh (FAM Maintenance Planning)	
Reason Written	To document the maintenance program tasks, frequencies, failure modes, and maintenance basis	

Revision 1		Date 11/17/2006
Writer	Chris Stefanski (Strategic Programs)	
Reviewer(s)		
Approver(s)	Kathy McHugh (FAM Maintenance Planning)	
Reason Written	General scrub, task and periodicity review/update	

Revision 2		Date 11/30/2010
Writer	Chris Stefanski	
Reviewer(s)	Ken Wendt (Mgr. Material Condition)	
Approver(s)	Bill Fluhler , Bill Gannon, Nitin Patel, Jim Crane, Bill Sullivan	
Reason Written	Added note to ensure template changes are communicated to affected work groups.	

Revision 3		Date 04/29/2011
Writer	Chris Stefanski (Material Condition)	
Reviewer(s)	Ken Wendt, Drew Reindel, Jim Crane	
Approver(s)	Bill Fluhler (ComEd)	
Reason Written	Modified criticality definitions and incorporated 10-week and 3-month inspection task frequencies	

Revision 4		Date 03/19/2014
Writer	Suneetha Parupalli (Material Condition)	
Reviewer(s)	Ken Wendt (Mgr. Material Condition), Peter Yan (Sr. Engineer)	
Approver(s)	Mike Moy (ComEd)	
Reason Written	3 year review, reformat document, No content change	

BIFURCATING CABINET - TEMPLATE DEVELOPMENT HISTORY

Revision 5		Date 02/06/2015
Writer	Chris Stefanski (Exelon Utilities)	
Reviewer(s)	Ken Wendt	
Approver(s)	Michael Moy (UFAM ComEd)	
Reason Written	Minor administrative corrections; no change to PM program.	

Revision 6		Date 01/26/2018
Writer	Hugo Castaneda (Material Condition)	
Reviewer(s)	Dale Player (Mgr. Material Condition), Doug Mason (T&S Equipment Standards)	
Approver(s)	Michael Moy (UFAM ComEd)	
Reason Written	3 year review, No content change	