

Automatic Throw-Over (ATO)				
Component Classification Categories				
Criticality	I	X		Key Venues
	II		X	All Other Locations
Duty Cycle	Heavy Load	N/A	N/A	
	Normal Load	N/A	N/A	
Service Condition	In Service	N/A	N/A	
	Spare	N/A	N/A	
Condition Monitoring Tasks				
None	Task Frequencies	Task Frequencies	Failure Codes	Comments
	N/A	N/A		
Time Directed Tasks				
Calibration	Task Frequencies	Task Frequencies	Failure Codes	Comments
	1Y	2Y	1a-b, 1d-g, 2a-g	
Failure Finding Tasks				
Control Cabinet Inspection	Task Frequencies	Task Frequencies	Failure Codes	Comments
	1Y	1Y	1a-c, 2a-d, 4a, 5a-b	
Visual Inspection	3M	1Y	3a, 5a, 5c-d	
Internal Inspection	6M	2Y	1g-k, 2e-f, 3b-c, 4a, 5b	
Condition Directed Tasks				
None	Task Frequencies	Task Frequencies	Failure Codes	Comments
	N/A	N/A		

FAILURE MODE

- 4. Fails to Provide Adequate Insulation Level
- 4. Fails to Provide Adequate Insulation Level

- 5. Fails to Maintain Boundary Integrity

FAILURE CAUSES

- 4a. Contamination
- 4a. Contamination

- 5a. Corrosion
- 5a. Corrosion
- 5b. Moisture
- 5b. Moisture
- 5c. Degradation of Components
- 5d. Vents Blocked/Damaged

MAINTENANCE TASKS

- Control Cabinet Inspection
- Internal Inspection

- Control Cabinet Inspection
- Visual Inspection
- Control Cabinet Inspection
- Internal Inspection
- Visual Inspection
- Visual Inspection

TASK	DEFINITION
Calibration	Scope includes decoupling the motor operators, checking for proper manual operation, verifying voltage and over-current settings, and testing in automatic operation by testing open phase detection, verifying loss of preferred and alternate source transfers, verifying over-current lockout and reset and validating all associated transfer times
Control Cabinet Inspection	Scope includes record current operations count as indicated on mechanism counter, check seals, check for signs of moisture, corrosion, contamination, check controller LCB and indicating lights, test switch cutouts, check relay targets and covers, check connections and wires, strip heaters, indications of excessive heat (cracked components, frail wires, tie wrap damage, burn marks), ensure that the ATO is in auto and ready mode
Internal Inspection	Items to be checked include seal integrity, hinges, signs of moisture intrusion, contamination, infestation, corrosion, insulators, bushings, bus insulation, connections, cable and cable terminations, bonds/grounding, arresters, barriers, switchgear disconnects/fuse holders, interrupters, chains, indicating flags, stored energy (spring/gas), hand crank/decoupling tool, potential transformers and fuses, proper installation of sensing units, unexpected noises and smells, and that motor operators are coupled.
Visual Inspection	Items to be checked include location of switchgear, access to switchgear obstructed, physical condition including signs of damage, corrosion, peeling paint, foundation/pad, labeling/signage, locks/padlocks, doors, hinges, and handles, vents, spare fuses

Automatic Throw-over (ATO) Template Summary

The Preventive Maintenance program is documented via Performance Centered Maintenance (PCM) templates. Templates have been developed that address all transmission, substation, and distribution equipment that is owned, and / or, 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 PCM templates are the result of good industry practices, industry experience, and manufacturer recommendations.

References:

Internal reports and operating experience
OEM Maintenance Manuals and Interviews
RCM 4.1.1 Evaluation Automatic Throw-over Switch (ATO) dated 4/18/2000
OP-CE-P072-R0009, Key Venue PM Matrix
OP-CE-P072, Key Venue Strategy - Contingency Planning and Risk Mitigation for Key Venues and Special Events

Boundary Definition

The boundary of an ATO is defined from the line side connections to the distribution circuit and ends at the load side terminal block connection, including:

All equipment in the control cabinet
Controller
Sensing equipment
Relays
Switch operating mechanisms
Fuses
Transfer
Incoming line and outgoing load buses
Interrupters
Underground cable connections including cable terminations.

Excluded from this treatment are: Line and load side underground cabling, Building Lighting Panel ATOs intended for auxiliary AC power purposes.

Failure Experiences

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

Vendor Recommendations

Review of vendor manuals and discussion with vendors were conducted in the development of this template.

Disposition of Vendor Recommendations

Incorporation of vendor recommendations was made as warranted.

Basis For Template Tasks

Calibration: This functional test simulates a throw-over to detect problems with the control unit **and motor operators**. It provides condition data used to initiate corrective actions.

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

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

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.

Revision 0		Date 12/29/2006
Writer	Larry Griess (Strategic Programs)	
Reviewer(s)		
Approver(s)	Kathy McHugh (FAM Maintenance Planning)	
Reason Written	To document the maintenance program tasks, frequencies, failure modes, and basis	

Revision 1		Date 11/30/2010
Writer	Chuck Priebe	
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 2		Date 01/27/2014
Writer	Suneetha Parupalli, Sr Engineer, Material Condition	
Reviewer(s)	Ken Wendt (Mgr. Material Condition)	
Approver(s)	Mike Moy (UFAM)	
Reason Written	3 year review, reformat document, No content change	

Revision 3		Date 01/24/2017
Writer	Hugo Castaneda (Material Condition)	
Reviewer(s)	Dale Player (Mgr. Material Condition), Henry Sabuda (Distribution Testing), Ed Smykowski (Distribution Standards), Peter Yan (Reliability Programs)	
Approver(s)	Mike Moy (UFAM)	
Reason Written	3 year review: Minor clarification to the Calibration task detail and Maintenance Basis sections.	

Revision 4		Date 1/31/2020
Writer	Jimi Conway (Material Condition)	
Reviewer(s)	Suneetha Parupalli (Mgr. Material Condition), Keith Frost (Mgr, Reliability Programs), Lucy Ballesteros (Reliability Programs)	
Approver(s)	Mike Moy (UFAM)	
Reason Written	3 year review. Updated criticalities to align with Key Venue Requirements and added associated notation in Maintenance Basis.	