Revisions to this document shall be communicated in accordance with program document AM-EU-P034 to ensure alignment between Maintenance Templates and field work procedures.

INDUCTOR - Oil, 345 kV and above					
Component Classification Categories					
Criticality	I	X			DC, SS, TDC, TSS locations that serve O'Hare & Midway Airports
	II		X		Locations exclusive of Criticality I locations
Duty Cycle	Heavy Load	N/A	N/A		
	Normal Load	N/A	N/A		
Service Condition	In Service	X	X		
	Spare	N/A	N/A		

Condition Monitoring Tasks	**Task Frequencies**		**Failure Codes**	**Comments**
Monitor Nitrogen Pressure	**5W**	**10W**	**4a-f**	
Monitor Oil Flow Indicator	**5W**	**10W**	**3j**	
Monitor Oil Level	**5W**	**10W**	**3e, 4a-e**	
Monitor Oil Temperature	**5W**	**10W**	**3g**	
Visual Inspection	**5W**	**10W**	**2b, 3a-c, 3h, 3j-k, 4a-f**	
Oil DGA	**3M**	**3M**	**1a, 2a, 3f-g**	
Oil Quality Test	**3M**	**3M**	**3d**	
Power Factor Test	**4Y**	**4Y**	**1a, 2a, 3f-i**	
Time Directed Tasks	**Task Frequencies**		**Failure Codes**	**Comments**
Maintenance Inspection	**4Y**	**4Y**	**1b, 3a-b, 3k, 4a-d**	
Winding Resistance	**4Y**	**4Y**	**1a, 2a**	
Failure Finding Tasks	**Task Frequencies**		**Failure Codes**	**Comments**
Check / Replace Desiccant	**5W**	**10W**	**3d**	
Check Bushing Oil Level	**5W**	**10W**	**3h**	
Check Cabinet Heaters	**5W**	**10W**	**3j**	
Thermography	**1Y**	**1Y**	**1a-b, 2a, 3a-b, 3k**	
Check / Verify Gauges and Alarms	**4Y**	**4Y**	**3e, 3g, 3j, 4a-f**	
Functional Alarm Test	**4Y**	**4Y**	**3g, 3j**	
Condition Directed Tasks	**Task Frequencies**		**Failure Codes**	**Comments**
None	**N/A**	**N/A**		

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INDUCTOR - Oil, 69 kV to 230 kV					
Component Classification Categories					
Criticality	I	X			DC, SS, TDC, TSS locations that serve O'Hare & Midway Airports
	II		X		Locations exclusive of Criticality I locations
Duty Cycle	Heavy Load	N/A	N/A		
	Normal Load	N/A	N/A		
Service Condition	In Service	X	X		
	Spare	N/A	N/A		

Condition Monitoring Tasks	**Task Frequencies**		**Failure Codes**	**Comments**
Monitor Nitrogen Pressure	**5W**	**10W**	**4a-f**	
Monitor Oil Flow Indicator	**5W**	**10W**	**3j**	
Monitor Oil Level	**5W**	**10W**	**3e, 4a-e**	
Monitor Oil Temperature	**5W**	**10W**	**3g**	
Visual Inspection	**5W**	**10W**	**2b, 3a-c, 3h, 3j-k, 4a-f**	
Oil DGA	**1Y**	**1Y**	**1a, 2a, 3f-g**	
Oil Quality Test	**1Y**	**1Y**	**3d**	
Power Factor Test	**8Y**	**8Y**	**1a, 2a, 3f-i**	
Time Directed Tasks	**Task Frequencies**		**Failure Codes**	**Comments**
Maintenance Inspection	**8Y**	**8Y**	**1b, 3a-b, 3k, 4a-d**	
Winding Resistance	**8Y**	**8Y**	**1a, 2a**	
Failure Finding Tasks	**Task Frequencies**		**Failure Codes**	**Comments**
Check / Replace Desiccant	**5W**	**10W**	**3d**	
Check Bushing Oil Level	**5W**	**10W**	**3h**	
Check Cabinet Heaters	**5W**	**10W**	**3j**	
Thermography	**1Y**	**1Y**	**1a-b, 2a, 3a-b, 3k**	
Check / Verify Gauges and Alarms	**8Y**	**8Y**	**3e, 3g, 3j, 4a-f**	
Functional Alarm Test	**8Y**	**8Y**	**3g, 3j**	
Condition Directed Tasks	**Task Frequencies**		**Failure Codes**	**Comments**
None	**N/A**	**N/A**		

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INDUCTOR - Air, ≥69kV							
Component Classification Categories							
Criticality	I	X					DC, SS, TDC, TSS locations that serve O'Hare & Midway Airports
	II		X				Locations exclusive of Criticality I locations, DC locations and ≤34kV ESS locations
	III			X			DC locations
	IV				X		≤34kV ESS locations
Duty Cycle	Heavy Load	N/A	N/A	N/A	N/A		
	Normal Load	N/A	N/A	N/A	N/A		
Service Condition	In Service	X	X	X	X		
	Spare	N/A	N/A	N/A	N/A		

Condition Monitoring Tasks	**Task Frequencies**				**Failure Codes**	**Comments**
Visual Inspection	**5W**	**10W**	**3M**	**6M**	**2b, 3a-c, 3h, 3j-k, 4a-f**	
Clean and Inspect	**8Y**	**8Y**	**8Y**	**8Y**	**1b, 2b, 3a-c, 3k**	
Failure Finding Tasks	**Task Frequencies**				**Failure Codes**	**Comments**
Thermography	**1Y**	**1Y**	**1Y**	**4Y**	**1a-b, 2a, 3a-b, 3k**	
Condition Directed Tasks	**Task Frequencies**				**Failure Codes**	**Comments**
None	**N/A**	**N/A**	**N/A**	**N/A**		

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INDUCTOR - Air, ≤34kV							
Component Classification Categories							
Criticality	I	X					DC, SS, TDC, TSS locations that serve O'Hare & Midway Airports
	II		X				Locations exclusive of Criticality I locations, DC locations and ≤34kV ESS locations
	III			X			DC locations
	IV				X		≤34kV ESS locations
Duty Cycle	Heavy Load	N/A	N/A	N/A	N/A		
	Normal Load	N/A	N/A	N/A	N/A		
Service Condition	In Service	X	X	X	X		
	Spare	N/A	N/A	N/A	N/A		
Condition Monitoring Tasks		**Task Frequencies**				**Failure Codes**	**Comments**
Visual Inspection		**5W**	**10W**	**3M**	**6M**	**2b, 3a-c, 3h, 3j-k, 4a-f**	
Clean and Inspect		**6Y**	**6Y**	**6Y**	**6Y**	**1b, 2b, 3a-c, 3k**	
Failure Finding Tasks		**Task Frequencies**				**Failure Codes**	**Comments**
Thermography		**1Y**	**1Y**	**1Y**	**4Y**	**1a-b, 2a, 3a-b, 3k**	
Condition Directed Tasks		**Task Frequencies**				**Failure Codes**	**Comments**
None		**N/A**	**N/A**	**N/A**	**N/A**		

INDUCTOR FAILURE MODES

FAILURE MODE	FAILURE CAUSES	MAINTENANCE TASKS
1. Fails to Provide Conduction Path	1a. Winding Failure	Oil DGA
1. Fails to Provide Conduction Path	1a. Winding Failure	Power Factor Test
1. Fails to Provide Conduction Path	1a. Winding Failure	Winding Resistance
1. Fails to Provide Conduction Path	1a. Winding Failure	Thermography
1. Fails to Provide Conduction Path	1b. Bus Connections Failure	Thermography
1. Fails to Provide Conduction Path	1b. Bus Connections Failure	Clean and Inspect
1. Fails to Provide Conduction Path	1b. Bus Connections Failure	Maintenance Inspection
2. Fails to Limit Fault Current	2a. Winding Failure	Oil DGA
2. Fails to Limit Fault Current	2a. Winding Failure	Power Factor Test
2. Fails to Limit Fault Current	2a. Winding Failure	Winding Resistance
2. Fails to Limit Fault Current	2a. Winding Failure	Thermography
2. Fails to Limit Fault Current	2b. Cracked/Broken Inductor	Visual Inspection
2. Fails to Limit Fault Current	2b. Cracked/Broken Inductor	Clean and Inspect
3. Fails to Provide Adequate Insulation	3a. External Contamination	Visual Inspection
3. Fails to Provide Adequate Insulation	3a. External Contamination	Thermography
3. Fails to Provide Adequate Insulation	3a. External Contamination	Clean and Inspect
3. Fails to Provide Adequate Insulation	3a. External Contamination	Maintenance Inspection
3. Fails to Provide Adequate Insulation	3b. Cracked/Broken Insulator	Visual Inspection
3. Fails to Provide Adequate Insulation	3b. Cracked/Broken Insulator	Thermography
3. Fails to Provide Adequate Insulation	3b. Cracked/Broken Insulator	Clean and Inspect
3. Fails to Provide Adequate Insulation	3b. Cracked/Broken Insulator	Maintenance Inspection
3. Fails to Provide Adequate Insulation	3c. Vegetation	Visual Inspection
3. Fails to Provide Adequate Insulation	3c. Vegetation	Clean and Inspect
3. Fails to Provide Adequate Insulation	3d. Insulating Oil Breakdown	Oil Quality Test
3. Fails to Provide Adequate Insulation	3d. Insulating Oil Breakdown	Check / Replace Desiccant
3. Fails to Provide Adequate Insulation	3e. Loss of Oil	Monitor Oil Level
3. Fails to Provide Adequate Insulation	3e. Loss of Oil	Check / Verify Gauges and Alarms
3. Fails to Provide Adequate Insulation	3f. Solid Insulation Failure	Oil DGA
3. Fails to Provide Adequate Insulation	3f. Solid Insulation Failure	Power Factor Test
3. Fails to Provide Adequate Insulation	3g. Winding Insulation Failure	Monitor Oil Temperature
3. Fails to Provide Adequate Insulation	3g. Winding Insulation Failure	Power Factor Test
3. Fails to Provide Adequate Insulation	3g. Winding Insulation Failure	Functional Alarm Test
3. Fails to Provide Adequate Insulation	3g. Winding Insulation Failure	Check / Verify Gauges and Alarms
3. Fails to Provide Adequate Insulation	3g. Winding Insulation Failure	Oil DGA
3. Fails to Provide Adequate Insulation	3h. Bushing Failure	Visual Inspection
3. Fails to Provide Adequate Insulation	3h. Bushing Failure	Power Factor Test

INDUCTOR FAILURE MODES

FAILURE MODE	FAILURE CAUSES	MAINTENANCE TASKS
3. Fails to Provide Adequate Insulation	3h. Bushing Failure	Check Bushing Oil Level
3. Fails to Provide Adequate Insulation	3i. Lightning Arrester Failure	Power Factor Test
3. Fails to Provide Adequate Insulation	3j. Cooling System Failure	Check Cabinet Heaters
3. Fails to Provide Adequate Insulation	3j. Cooling System Failure	Visual Inspection
3. Fails to Provide Adequate Insulation	3j. Cooling System Failure	Functional Alarm Test
3. Fails to Provide Adequate Insulation	3j. Cooling System Failure	Check / Verify Gauges and Alarms
3. Fails to Provide Adequate Insulation	3j. Cooling System Failure	Monitor Oil Flow Indicator
3. Fails to Provide Adequate Insulation	3k. Inductor Clogged with Debris	Visual Inspection
3. Fails to Provide Adequate Insulation	3k. Inductor Clogged with Debris	Clean and Inspect
3. Fails to Provide Adequate Insulation	3k. Inductor Clogged with Debris	Thermography
3. Fails to Provide Adequate Insulation	3k. Inductor Clogged with Debris	Maintenance Inspection
4. Fails to Maintain Boundary Integrity	4a. Gasket Failure	Monitor Nitrogen Pressure
4. Fails to Maintain Boundary Integrity	4a. Gasket Failure	Visual Inspection
4. Fails to Maintain Boundary Integrity	4a. Gasket Failure	Monitor Oil Level
4. Fails to Maintain Boundary Integrity	4a. Gasket Failure	Check / Verify Gauges and Alarms
4. Fails to Maintain Boundary Integrity	4a. Gasket Failure	Maintenance Inspection
4. Fails to Maintain Boundary Integrity	4b. Weld Failure	Monitor Nitrogen Pressure
4. Fails to Maintain Boundary Integrity	4b. Weld Failure	Visual Inspection
4. Fails to Maintain Boundary Integrity	4b. Weld Failure	Monitor Oil Level
4. Fails to Maintain Boundary Integrity	4b. Weld Failure	Check / Verify Gauges and Alarms
4. Fails to Maintain Boundary Integrity	4b. Weld Failure	Maintenance Inspection
4. Fails to Maintain Boundary Integrity	4c. Radiator Corrosion	Monitor Nitrogen Pressure
4. Fails to Maintain Boundary Integrity	4c. Radiator Corrosion	Visual Inspection
4. Fails to Maintain Boundary Integrity	4c. Radiator Corrosion	Monitor Oil Level
4. Fails to Maintain Boundary Integrity	4c. Radiator Corrosion	Check / Verify Gauges and Alarms
4. Fails to Maintain Boundary Integrity	4c. Radiator Corrosion	Maintenance Inspection
4. Fails to Maintain Boundary Integrity	4d. Loose Mechanical Connection	Monitor Nitrogen Pressure
4. Fails to Maintain Boundary Integrity	4d. Loose Mechanical Connection	Visual Inspection
4. Fails to Maintain Boundary Integrity	4d. Loose Mechanical Connection	Monitor Oil Level
4. Fails to Maintain Boundary Integrity	4d. Loose Mechanical Connection	Check / Verify Gauges and Alarms
4. Fails to Maintain Boundary Integrity	4d. Loose Mechanical Connection	Maintenance Inspection
4. Fails to Maintain Boundary Integrity	4e. Valve Leakage	Monitor Nitrogen Pressure
4. Fails to Maintain Boundary Integrity	4e. Valve Leakage	Visual Inspection
4. Fails to Maintain Boundary Integrity	4e. Valve Leakage	Monitor Oil Level
4. Fails to Maintain Boundary Integrity	4e. Valve Leakage	Check / Verify Gauges and Alarms
4. Fails to Maintain Boundary Integrity	4f. Main Tank Over Pressurization	Monitor Nitrogen Pressure
4. Fails to Maintain Boundary Integrity	4f. Main Tank Over Pressurization	Visual Inspection

INDUCTOR FAILURE MODES

FAILURE MODE	FAILURE CAUSES	MAINTENANCE TASKS
4. Fails to Maintain Boundary Integrity	4f. Main Tank Over Pressurization	Check / Verify Gauges and Alarms

INDUCTOR MAINTENANCE TASK DEFINITION

Task	DEFINITION
Check / Replace Desiccant	Visual verification that desiccant is clean and dry.
Check / Verify Gauges and Alarms	Check accuracy of installed gauges and alarms. Verify switch pick up and drop out values against a calibrated instrument or gauge. Verify set points are correct and equipment operates as designed. (e.g. coolers turn on, alarm / trip is set at correct reading.)
Check Bushing Oil Level	Visual verification that bushing oil levels are appropriate. This task applies only to bushings where level indication is available.
Check Cabinet Heaters	Visual/physical verification that cabinet heaters are operational.
Clean and Inspect	Off-line detailed inspection and cleaning of the air inductor. The items to be checked are: 1. Check top and bottom "spiders" on each inductor for broken wire terminations. 2. Check cooling ducts for foreign objects. 3. Check vertical and horizontal fiberglass ties for possible damage. 4. Check for coating (paint) damage on fiberglass surface repaint as necessary with manufacturer approved paint. 5. Check all hardware for tightness. 6. Visually inspect for damaged, cracked or chipped insulators. 7. Wipe down insulators. 8. Inspect windings and terminations for signs of overheating or deterioration. 9. Blow out windings with compressed air. For outdoor installations, wash with clean water, as required.
Functional Alarm Test	Verify alarm at inductor is sent to substation control house and System Operations. Test should be performed by bringing up an alarm at the equipment and verifying it is received in the substation control house and System Operations.
Maintenance Inspection	Check condition of all grounds, clean and inspect all bushings for oil leaks, damage and contamination. Inspect all line connections for discoloration, frayed or damaged links and tightness of bolted connections. Inspect and replace gaskets as necessary. Inspect hardware fittings and supports, tighten as required. Inspect control cabinet for cleanliness and overall condition. Replace desiccant, as needed.
Monitor Nitrogen Pressure	Visual verification of proper nitrogen pressure by monitoring the Nitrogen Pressure in the main tank and nitrogen bottle (If so equipped.) Add nitrogen as required and record amount added for trending purposes.
Monitor Oil Flow Indicator	Visual verification that pumps are moving oil.

INDUCTOR MAINTENANCE TASK DEFINITION

Task	DEFINITION
Monitor Oil Level	Visual verification of proper oil level in all oil filled compartments. Record oil level. Correct level as required and record amount added/removed for trending.
Monitor Oil Temperature	Record present top oil and maximum top oil temperatures.
Oil DGA	Take syringe samples. Data to be trended.
Oil Quality Test	Take 1 quart sample for voltage class < 220 kV. Take 2 quart sample for voltage class >= 220 kV.
Power Factor Test	Electrical loss measurement, usually performed using Doble power factor equipment, which helps to prove the insulation level of the device.
Thermography	Infrared inspection of electrical equipment and power path components to identify any hot spots that may exist either in the contacts, bus connections or within control cabinets. Comparisons should be made phase to phase or on tank walls to determine if contact heating can be found or to determine oil levels within all tanks and verify level gauge.
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. These items should be checked: - Check for unusual noises and smells - Verify alarm status and relay flags - Visually inspect for damage, cracked or chipped porcelain insulators - Check for signs of oil leakage from bushings, tank penetrations, gasket and flanges - Check for loose, missing or damaged hardware - Check condition of grounding connections - Check coolers for debris and general cleanliness
Winding Resistance	Electrical test performed to identify high resistance connections. This test is a 'go / no go' test to indicate gross problems in the mechanical / electrical connections of the inductor.

INDUCTOR MAINTENANCE BASIS

Inductor 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 failure reports

OEM Maintenance Manuals and Interviews

IEEE Standard C57.106 IEEE Guide for Acceptance and Maintenance of Insulating Oil in Equipment

IEEE Standard C57.152 IEEE Guide for Diagnostic Field Testing of Fluid-Filled Power Transformers, Regulators, and Reactors

EPRI TR-105070 Guidelines for the Life Extension of Substations

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Boundary Definition

The boundary of a substation type, oil immersed or air-core inductor is defined from terminal to terminal, including:

- Bushings
- Pumps
- Controls
- Fans
- Radiators
- Pressure Relief Valves and Sudden Pressure (Rapid Rise) Relay
- Sensors, Monitors, Alarms, and Current Transformers
- Air and Oil Filled Compartments

Excluded from this treatment are: protective, timing, and control relays, conductors, and fire suppression equipment.

Failure Experience

INDUCTOR MAINTENANCE BASIS

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

Vendor Recommendations
OEM manuals were referenced and interviews conducted during the development of this template.

Disposition of Vendor Recommendations
Recommendations were incorporated into the template as deemed necessary.

Basis For Template Tasks

Check / Replace Desiccant: Task intended to ensure designed systems are operating properly to prevent moisture intrusion into the oil inductor compartments.

Check / Verify Gauges and Alarms: IEEE C57.152 identifies calibration as a tool for identifying problems with the various controls and indicators. EPRI 106857-V38 identifies the importance of controls and indications to the operator and system engineer in monitoring the performance of an inductor, and the importance of periodic calibration to ensure proper operation.

Check Bushing Oil Level: Oil filled bushings normally have a means to check the level inside the bushing. Failure modes have been identified on the Exelon system that indicate failure of gasket material which causes loss of oil and eventual failure due to the decrease in dielectric strength associated with the loss of insulating fluid.

Check Cabinet Heaters: Task intended to ensure designed systems are operating properly to prevent moisture intrusion into the transformer control cabinets. Moisture in these areas have been known to cause corrosion damage to transformer control and alarm circuits.

Clean and Inspect: Air-core inductors may be exposed to severe environmental conditions as well as mechanical stresses during fault events. Thorough inspection, tightening of hardware and cleaning of coils and support insulators are manufacturer recommended practices.

Functional Alarm Test: EPRI 106857 identifies functional testing of control circuits to verify proper operation of the auxiliary systems.

INDUCTOR MAINTENANCE BASIS

Maintenance Inspection: Time based periodic detailed inspection of inductor to address and repair items that fail or degrade over time.

Monitor Nitrogen Pressure: Collection of this data is required to ensure proper head pressure is maintained. This nitrogen pressure is intended provide an inert atmosphere above the oil level that acts to prevent corrosion of the internal components, prevent oxidation of the oil and act as a buffer to allow for thermal expansion and contraction of the oil.

Monitor Oil Flow Indicator: Ensures proper pump operation through indication of oil flow.

Monitor Oil Level: Oil level is required to maintain the design properties of the insulating systems, provide cooling to the winding and core. Loss of oil will result in equipment failure. Minor loss of oil will result in environmental cleanup.

Monitor Oil Temperature: Oil and winding temperature measurement are a result of the load current, ambient temperature and effectiveness of the cooling systems. Temperatures of the oil and winding are directly related to the life of inductor insulation. Tracking the actual and maximum temperatures seen can provide insight into the condition of the inductor and correlate to dga oil samples.

Oil DGA: IEEE C57.152 identifies dissolved gas analysis as a primary troubleshooting tool for a range of electrical faults in the inductor, as well as the condition of the insulating oil. EPRI TR-106857-V38 identifies dissolved gas analysis as a tool for detecting electrical degradation of the coils, core, cooling system and insulating system. EPRI 1002913 identifies dissolved gas analysis as an excellent method of assessing inductor condition. The minimum scope for analysis and trending includes: Hydrogen, Carbon Monoxide, Ethylene, Ethane, Methane, Acetylene, Total Dissolved Combustible Gas. Additionally, the following are included in the minimum scope to trend insulation degradation, identify leaks, monitor the integrity of the oil preservation system and verify the quality of the oil sample: Oxygen, Nitrogen, Carbon Dioxide.

INDUCTOR MAINTENANCE BASIS

Oil Quality Test: IEEE C57.152 identifies oil quality tests as a tool for monitoring aging and condition of the insulating system. Oil quality tests provide indication of oil condition and long term paper degradation. EPRI 1002913 identifies oil analysis as a primary tool for determining inductor condition. Insulating oil is a significant element in the insulating system. These tests assess the condition of the oil and the cellulose insulation system. EPRI TR-106857-V38 recommends periodic insulating oil quality tests. The scope of testing includes: Dielectric Strength, Power Factor, Interfacial Tension, Color, Sediment, Moisture Content, Acid Number. It is important to obtain the temperature of the equipment at the time of the sample to ensure accurate calculation of H2O saturation.

Power Factor Test: (including bushings and arresters) IEEE Standard 62 identifies electrical testing as a key diagnostic technique for identifying issues with the core, coils and bushings of an inductor. EPRI 106857-V38 identifies electrical testing as a key tool for evaluating the condition of the inductor. Power Factor testing provides indication of insulation degradation in the main tank or in the bushings and arresters. Best applied as a trending tool.

Thermography: IEEE Standard 62 identifies thermography as a primary tool for detection of connection issues, bushing issues, and issues with the cooling systems. EPRI 1002913 identifies thermography as a tool for detection of connection issues, insulation degradation and cooling system operation. EPRI TR-106857-V38 Identifies thermography as a tool for detection of loose electrical connections, local flux current heating, proper cooler operation as well as bearing wear in pump and fan motors.

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.

Winding Resistance: IEEE C57.152 identifies electrical testing as a key diagnostic technique for identifying issues with the core, coils and bushings of an inductor. EPRI 106857-V38 identifies electrical testing as a key tool for evaluating the condition of the inductor. The winding resistance test provides indication of loose connections and high contact resistance.

INDUCTOR TEMPLATE DEVELOPMENT HISTORY

	Revision 0	Date 06/23/2015
Writer	Chris Stefanski (Exelon Utilities)	
Reviewer(s)	Ken Wendt, Charles McDonald	
Approver(s)	Michael Moy (UFAM ComEd)	
Reason Written	Created to document the ComEd maintenance program tasks, frequencies, failure modes, and maintenance basis. Changed task frequencies from 3Y to 4Y and from 6Y to 8Y to align with 4-year FEG cycles. Removed Sudden Pressure Relay Test; belongs on Protection System template.	

	Revision 1	Date 06/26/2018
Writer	Hugo Castaneda (Material Condition)	
Reviewer(s)	Dale Player Mgr Material Condition	
Approver(s)	Michael Moy (UFAM ComEd)	
Reason Written	3 yr review. Minor format and maintenance basis reference updates.	