

April 14, 2010

Ms. Renee J. Jenkins  
Director, Administration Department  
Secretary to the Commission  
Docketing Division  
The Public Utilities Commission of Ohio  
180 Broad Street  
Columbus, OH 43215-3793

Mr. John Williams  
Director, Service Monitoring and Enforcement Department  
Public Utilities Commission of Ohio  
180 East Broad Street  
Columbus, Ohio 43215-3793

**Re: Case Number 09-0802-EL-ESS  
Ohio Edison Company, The Cleveland Electric Illuminating Company and The Toledo Edison Company (collectively, the "Companies") programs for inspection, maintenance, repair, and replacement of transmission and distribution circuits and equipment required under O.A.C. 4901:1-10-27(E); and requests for revisions and amendments to that program pursuant to O.A.C. 4901:1-10-27(F).**

Dear Ms. Jenkins and Mr. Williams:

Enclosed for filing under Case Number 09-0802-EL-ESS, please find the Companies' revised programs for inspection, maintenance, repair, and replacement of transmission and distribution circuits and equipment as required under O.A.C. 4901:1-10-27(E). The Companies originally filed such programs with the Commission on September 14, 2009. Subsequent to such filing, Staff requested and the Companies made certain changes to their programs. The Companies are now submitting revised programs.

Should you have any questions, please feel free to call me at 330-384-5969.

Very truly yours,



Ebony L. Miller

Enclosures

Ohio Edison Company ("Ohio Edison")

Inspection, Maintenance, Repair and Replacement  
Programs

Program Description

Pursuant to Ohio Administrative Code ("O.A.C.") 4901:1-10-27(E)(1)(a), Ohio Edison Company ("Ohio Edison") will inspect distribution wood poles on a ten-year cycle as outlined in the *"Distribution Inspection & Maintenance Practice – Wood Pole Groundline"* dated 3/19/2010. The purpose for inspecting distribution wood poles is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance, and to comply with the state regulatory agencies and the National Electrical Safety Code (NESC). This preventative maintenance inspection for wood poles is performed by Company personnel or contractors and will include a visual inspection on all poles as well as hammer-sounding on poles older than 10 years. In addition, if any pole has indication of incipient decay or the pole is thirty-five (35) years or older, pole boring and partial excavation will be performed to further assess the condition of the pole. Inspectors / contractors have experiences deemed adequate by management. This may consist of field experience, technical experience, or other training.

All poles will be visually inspected on a ten-year cycle. The above ground visual inspection consists of inspecting the pole and its attachments from the groundline to the top of the pole and the recording of abnormal conditions including but not limited to the following:

- Damage –
  - broken,
  - splits,
  - shell-rot,
  - lightning,
  - mechanical damage
- Equipment –
  - crossarms,
  - insulators,
  - conductors,
  - leaking equipment,
  - underground risers – inspect to ensure the U-Guard and U-Guard adapter is not damaged and is in tact and there is no exposed primary cable.
- Testing for decayed internal wood

If applicable, hammer sounding is performed by striking the pole with a hammer to detect decay. The inspector shall listen carefully for sounds that are typical of decayed internal wood and note any signs of decay.

In addition to the visual inspection and hammer sounding if applicable, poles showing incipient decay or poles that are thirty-five (35) years old or older will be bored and a partial excavation performed to further assess the condition of the pole. This inspection consists of the recording of tests performed and abnormal conditions detected including but not limited to the following:

- Boring – testing for internal decay
- Verify shell thickness

Wood boring is performed by drilling a minimum of two 3/8 inch diameter holes at 180 degrees from each other at the groundline. The borings shall be angled downward and reach the center of the pole. Next, a shell thickness indicator shall be used to measure interior decay. The inspector shall note any signs of decay.

Partial excavation is performed by creating two six-inch-deep excavations 180 degrees apart at the pole groundline. The pole will be hammer-sounded in the excavated areas, and bored to determine presence of internal decay.

#### Corrective Maintenance

Wood poles and supporting structures with recorded defects that Ohio Edison could reasonably expect to endanger life or property shall be promptly repaired, disconnected, or isolated. All remaining deficiencies likely to cause an outage shall be corrected within one year of the completion of the inspection that originally revealed such deficiencies as required by O.A.C. 4901:1-10-27(E)(4). Corrective maintenance of a deficiency identified by Ohio Edison may include repair or replacement. Items not likely to cause an outage will be evaluated and prioritized on a case-by-case basis.

#### Recordkeeping

In advance of inspections, Ohio Edison provides information which may include inspection forms and maps to the necessary inspectors. In addition, Ohio Edison creates an inspection and maintenance schedule prior to beginning work. This helps to plan the amount of work that needs to be accomplished each year.

Ohio Edison maintains inspection and maintenance records either electronically or in hard copy as required by O.A.C. 4901:1-10-27(E)(4). Periodic reports may be generated from a database system to monitor the status of the program.

#### Justification

Pursuant to O.A.C. 4901:1-10-27(E)(2), the practice of performing wood pole inspections on a ten-year cycle is based on accepted electric utility practices and the experience of Ohio Edison. NESC Rule 12.121.A states, "*lines and equipment shall be inspected at such intervals as experience has shown to be necessary.*" A periodicity of ten years between inspections has proven to be successful in addressing emergent problems in a timely manner, allowing for proper planning and remediation prior to the emergent problem having a negative impact on personal safety, equipment integrity or service reliability.

Program Description

Pursuant to Ohio Administrative Code ("O.A.C.") 4901:1-10-27(D)(1) and 4901:1-10-27(E)(1)(b), Ohio Edison Company ("Ohio Edison") shall visually inspect overhead circuit lines and equipment on a five-year cycle as outlined in the "*Distribution Inspection & Maintenance Practice – Overhead Circuits & Equipment*" dated 3/19/2010. The purpose for inspecting overhead circuit lines and equipment is to identify and repair unsafe conditions or conditions that may adversely affect service reliability, and to comply with the state regulatory agencies and the National Electrical Safety Code (NESC). This program shall be limited to the overhead facilities.

At least one-fifth of all circuits will be inspected annually by Company personnel or contractors as required by O.A.C. 4901:1-10-27(D)(1). This means that circuits are inspected at least once every five years. Inspectors / contractors have experiences deemed adequate by management. This may consist of field experience, technical experience, or other training.

This preventative maintenance will consist of a visual inspection and recording of abnormal conditions including but not limited to the following types of overhead circuit equipment:

- Conductors (wire and cable) –
  - excessive slack,
  - condition,
  - damage,
  - clearances
- Supporting structures (wood pole) –
  - severely leaning or rotted poles,
  - sustained damage (lightning, vehicle, woodpecker holes)
  - Two-pole conditions identified during circuit and line inspections. This does not include the removal of the pole, cause removal of attachments of other pole attaching companies, or provide documents regarding the date the transfer was requested.
- Pole hardware –
  - deteriorated condition or physical damage to crossarms, reclosers, transformers and associated pole hardware,
  - underground risers – inspect to ensure the U-Guard and U-Guard adapter is not damaged and is in tact and there is no exposed primary cable
- Guying –
  - condition,
  - damage
- Pole-mounted distribution equipment –
  - condition,
  - damage
  - capacitor installation problems such as blown primary fuses, bulged capacitors or signs of oil leaks, broken bushings, damaged lightning arresters, and the general condition of the controlling device on the switched bank

Corrective Maintenance

Supporting structures with recorded defects that Ohio Edison could reasonably expect to endanger life or property shall be promptly repaired, disconnected, or isolated. Deficiencies likely to cause an outage shall be corrected within one year of the completion of the inspection that originally revealed such deficiencies as required by O.A.C. 4901:1-10-27(E)(4). Corrective maintenance of a deficiency identified by Ohio Edison may include repair or replacement. Items found that are not likely to cause an outage will be evaluated and prioritized on a case-by-case basis.

Recordkeeping

In advance of inspections, Ohio Edison provides information which may include inspection forms and maps to the necessary inspectors. In addition, Ohio Edison creates an inspection and maintenance schedule prior to beginning work. This helps to plan the amount of work that needs to be accomplished each year.

Ohio Edison maintains inspection and maintenance records either electronically or in hard copy as required by O.A.C. 4901:1-10-27(E)(4). Periodic reports may be generated from a database system to monitor the status of the program.

Justification

Pursuant to O.A.C. 4901:1-10-27(E)(2), the practice of performing overhead circuit and equipment inspections on a five-year cycle is based on accepted electric utility practices and the experience of Ohio Edison. NESC Rule 12.121.A states, "*lines and equipment shall be inspected at such intervals as experience has shown to be necessary.*" A periodicity of five years between inspections has proven to be successful in addressing emergent problems in a timely manner, allowing for proper planning and remediation prior to the emergent problem having a negative impact on personal safety, equipment integrity or service reliability.

Program Description

Pursuant to Ohio Administrative Code (“O.A.C.”) 4901:1-10-27(E)(1)(c), Ohio Edison Company (“Ohio Edison”) hereby requests to modify its current distribution underground equipment program. Ohio Edison’s current approved program calls for a security and complete field inspection of all pad-mounted equipment. Ohio Edison’s modified program shall visually inspect distribution underground equipment (i.e., pad-mounted transformers and switchgear and secondary enclosures including pedestals and handholes) on a five-year cycle as outlined in the *“Distribution Inspection & Maintenance Practice – Underground Equipment”* dated 3/19/2010. The purpose for inspecting distribution underground equipment is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance, and to comply with the state regulatory agencies and the National Electrical Safety Code (NESC).

The preventative maintenance inspection is performed by Company personnel or contractors and shall include the visual inspection of the condition and security of underground equipment. Inspectors / contractors have experiences deemed adequate by management. This may consist of field experience, technical experience, or other training.

Pad-mounted equipment (transformers and switchgear) – inspection and recording of abnormal conditions including but not limited to the following:

- Equipment condition –
  - oil leakage,
  - cabinet damage,
  - holes,
  - washout
- Security –
  - locking mechanisms
- Accessibility –
  - as required for operation and maintenance purposes
- Warning labels –
  - electrical hazard warning label,
  - landscaping instructions notice
- Underground risers –
  - inspect to ensure the U-Guard and U-Guard adapter is not damaged and is in tact and there is no exposed primary cable

Handholes and Pedestals – inspection and recording of abnormal conditions including but not limited to the following:

- Equipment condition –
  - holes and washout
- Security –
  - locking mechanisms

Pad-mounted enclosures are to be maintained with security based on manufacturer provisions. Units may contain provisions by the manufacturer for penta bolt(s), locks, or similar provisions. For example, units that are manufactured with a provision for penta bolt and lock are secured with both.

#### Corrective Maintenance

Equipment with recorded defects that Ohio Edison could reasonably expect to endanger life or property shall be promptly repaired, disconnected, or isolated. Deficiencies likely to cause an outage shall be corrected within one year of the completion of the inspection that originally revealed such deficiencies as required by O.A.C. 4901:1-10-27(E)(4). Corrective maintenance of a deficiency identified by Ohio Edison may include repair or replacement. Items found that are not likely to cause an outage will be evaluated and prioritized on a case-by-case basis.

#### Recordkeeping

In advance of inspections, Ohio Edison provides information which may include inspection forms and maps to the necessary inspectors. In addition, Ohio Edison creates an inspection and maintenance schedule prior to beginning work. This helps to plan the amount of work that needs to be accomplished each year.

Ohio Edison maintains inspection and maintenance records either electronically or in hard copy as required by O.A.C. 4901:1-10-27(E)(4). Periodic reports may be generated from a database system to monitor the status of the program.

#### Justification

Pursuant to O.A.C. 4901:1-10-27(E)(2), the practice of performing distribution underground equipment inspections on a five-year cycle is based on accepted electric utility practices and the experience of Ohio Edison. NESC Rule 12.121.A states, "*lines and equipment shall be inspected at such intervals as experience has shown to be necessary.*" A periodicity of five years between inspections has proven to be successful in addressing emergent problems in a timely manner, allowing for proper planning and remediation prior to the emergent problem having a negative impact on personal safety, equipment integrity or service reliability.



Program Description

Pursuant to Ohio Administrative Code ("O.A.C.") 4901:1-10-27(E)(1)(d), Ohio Edison Company ("Ohio Edison") hereby requests to modify its current distribution line recloser program. Ohio Edison's current approved program calls for quarterly counter readings as well as an annual field inspection. Ohio Edison's modified programs calls for a visual inspection of distribution line reclosers annually as outlined in the "*Distribution Inspection & Maintenance Practice – Line Reclosers*" dated 3/19/2010. The purpose for inspecting distribution line reclosers is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance, and to comply with the state regulatory agencies and the National Electrical Safety Code (NESC).

The annual preventative maintenance is performed by Company personnel or contractors and consists of counter readings and the field inspection on both hydraulic and electronic reclosers. Inspectors / contractors have experiences deemed adequate by management. This may consist of field experience, technical experience, or other training.

The counter readings are obtained to assess system performance based on the number of momentary outages. In regard to electronic reclosers, batteries are checked during the annual inspection. The annual inspection is a visual examination which includes but is not limited to the following:

- Type of recloser and current rating
- Counter reading
- Condition –
  - rust,
  - dents,
  - physical damage,
  - oil leaks,
  - lightning damage
- Equipment –
  - surge arresters,
  - tank-ground connections,
  - by-pass switches,
  - pole
- Batteries –
  - checked and replaced as necessary (electronic reclosers only)
- Grounds –
  - damage,
  - condition

Complete Shop Inspection & Maintenance

Complete Shop Inspection & Maintenance shall apply to hydraulic type units only. The maintenance cycle is determined by exceeding a set number of reclosing operations based on the ratio of the available fault current at the recloser location to the recloser nameplate capability.

Given the interrupting duty (available fault current) and the hydraulic recloser's ability (nameplate maximum interrupting ability), the recloser's interrupting duty to ability ratio (D/A) can be calculated. Reclosers shall be maintained as specified below.

Recloser Complete Shop Inspection & Maintenance Cycles	
Recloser Duty to Ability Ratio (D/A)	Remove for Shop Maintenance after...
Reclosers with Standard Contacts	
Greater than 75%	100 Operations
Less than 75%	200 Operations

#### Corrective Maintenance

Reclosers and supporting structures with recorded defects that Ohio Edison could reasonably expect to endanger life or property shall be promptly repaired, disconnected, or isolated. Deficiencies likely to cause an outage shall be corrected within one year of the completion of the inspection that originally revealed such deficiencies as required by O.A.C. 4901:1-10-27(E)(4). Corrective maintenance of a deficiency identified by Ohio Edison may include repair or replacement. Items found that are not likely to cause an outage will be evaluated and prioritized on a case-by-case basis.

#### Recordkeeping

In advance of inspections, Ohio Edison provides information which may include inspection forms and maps to the necessary inspectors. In addition, Ohio Edison creates an inspection and maintenance schedule prior to beginning work. This helps to plan the amount of work that needs to be accomplished each year.

Ohio Edison maintains inspection and maintenance records either electronically or in hard copy as required by O.A.C. 4901:1-10-27(E)(4). Periodic reports may be generated from a database system to monitor the status of the program.

#### Justification

Pursuant to O.A.C. 4901:1-10-27(E)(2), the practice of performing annual recloser inspections is based on accepted electric utility practices and the experience of Ohio Edison. NESC Rule 12.121.A states, "*lines and equipment shall be inspected at such intervals as experience has shown to be necessary.*" A periodicity of one year between inspections has proven to be successful in addressing emergent problems in a timely manner, allowing for proper planning and remediation prior to the emergent problem having a negative impact on personal safety, equipment integrity or service reliability.

Program Description

Pursuant to Ohio Administrative Code (“O.A.C.”) 4901:1-10-27(E)(1)(e), Ohio Edison Company (“Ohio Edison”) visually inspects distribution overhead line capacitors annually as outlined in the *“Distribution Inspection & Maintenance Practice – Line Capacitors”* dated 3/19/2010. The purpose for inspecting distribution line capacitors is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance, and to comply with the state regulatory agencies and the National Electrical Safety Code (NESC). Installing capacitors on a circuit with lagging power factor will improve the power factor as well as provide a cost-effective means to improve voltage, reduce losses and reduce thermal loading of lines and equipment.

This preventative maintenance inspection is performed by Company personnel or contractors and shall be divided into two parts; a visual inspection (for both fixed and switched banks) and an operational test (switched banks only). Inspectors / contractors have experiences deemed adequate by management. This may consist of field experience, technical experience, or other training.

The operational test is a verification of control units capability to operate. The visual inspection consists of the recording of abnormal conditions including but not limited to the following types of distribution line capacitor equipment:

- Bank oil/vacuum switches –
  - operational test (switched-bank only)
- Case –
  - damage,
  - bulging,
  - leaking,
  - rust
- Bushings –
  - damage,
  - signs of tracking, cracking or
  - lightning strike
- Mounting brackets –
  - cracked,
  - bent,
  - broken
- Pole and equipment racks –
  - damage or appreciable rust
- Grounds –
  - damage,
  - corrosion
- Protective equipment –
  - cutouts,
  - surge arrestors

Corrective Maintenance

Capacitors and supporting structures with recorded defects that Ohio Edison could reasonably expect to endanger life or property shall be promptly repaired, disconnected, or isolated. Deficiencies likely to cause an outage shall be corrected within one year of the completion of the inspection that originally revealed such deficiencies as required by O.A.C. 4901:1-10-27(E)(4). Corrective maintenance of a deficiency identified by Ohio Edison may include repair or replacement. Items found that are not likely to cause an outage will be evaluated and prioritized on a case-by-case basis.

Recordkeeping

In advance of inspections, Ohio Edison provides information which may include inspection forms and maps to the necessary inspectors. In addition, Ohio Edison creates an inspection and maintenance schedule prior to beginning work. This helps to plan the amount of work that needs to be accomplished each year.

Ohio Edison maintains inspection and maintenance records either electronically or in hard copy as required by O.A.C. 4901:1-10-27(E)(4). Periodic reports may be generated from a database system to monitor the status of the program.

Justification

Pursuant to O.A.C. 4901:1-10-27(E)(2), the practice of performing annual capacitor inspections is based on accepted electric utility practices and the experience of Ohio Edison. NESC Rule 12.121.A states, "*lines and equipment shall be inspected at such intervals as experience has shown to be necessary.*" A periodicity of one year between inspections has proven to be successful in addressing emergent problems in a timely manner, allowing for proper planning and remediation prior to the emergent problem having a negative impact on personal safety, equipment integrity or service reliability.

#### Program Description

Pursuant to Ohio Administrative Code ("O.A.C") 4901:1-10-27(E)(1)(f), Ohio Edison Company ("Ohio Edison") performs vegetation management to help ensure the continued safe and reliable operation of the distribution system. The Standard Specification for vegetation management is designed to support line reliability, maintain access, make repairs, or restore service and to support safe and reliable service. Ohio Edison's currently approved vegetation specification provides vegetation to be pruned to achieve 4 years of clearance, removal of selected incompatible trees within the clearing zone corridor, removal of certain defective limbs that are overhanging primary conductors, controlling selected incompatible brush mechanically and/or using herbicide, and removal of off-corridor priority trees that are dead, dying, diseased, and leaning or significantly encroaching the corridor. Ohio Edison's Right-of-Way Vegetation Control program has four complete calendar years to perform the work. This means each year Ohio Edison anticipates having the entire year to complete the work designated for completion in that year.

Portions of a circuit that experience high customer interruption minutes due to vegetation-caused outages may be targeted to receive the Standard Specification as well as enhanced vegetation removal techniques, which includes removal of certain healthy limbs, based on tree species and condition, which overhang primary conductors.

For portions of a circuit that have not experienced a primary voltage interruption due to a vegetation-caused outage over the period of a 4 year cycle (subject to the levelization process), a proactive Inspect/Maintain process will target selective vegetation removal for continued reliable system operation. This process involves inspection of the vegetation to evaluate the extent of potential for vegetation to interfere with energized conductors. Factors to consider in the evaluation are the voltage and height of the conductor, the type of tree, its growth rate and branching habit. Trees that will impact safety or reliability will be maintained to the Standard Specification.

The Inspect/Maintain Specification may be utilized to levelize Ohio Edison's circuits over the period 2010-2013. This levelization process is necessary due to a disproportionate workload associated with the circuits scheduled for maintenance in certain years. The levelization process enables Ohio Edison to make responsible vegetation management decisions, without an impact to the safe and reliable performance of the distribution system, when shifting work from one calendar year to the next, and could also be used on circuits designated for Enhanced or Standard Specification work processes. Ohio Edison plans to complete the levelization by December 31, 2013, on which date the Inspect/Maintain Specification will conclude.

#### Corrective Maintenance

Corrective maintenance methods used to manage and control vegetation include manual control methods using hand-operated tools, mechanical control using equipment-mounted saws, mowers or other devices, and various herbicide application techniques such as, selective basal herbicide applications, stem foliage applications and cut stubble applications.

Justification

Distribution vegetation management activities are performed in accordance with the following:

- Applicable statutory law and regulations.
- Generally accepted industry practices.
- All routine vegetation clearing work is performed in compliance with ANSI Z133.1 and A-300 Standards and according to the requirements given by OSHA and the National Electrical Safety Code (NESC).
- *FirstEnergy Vegetation Management Specifications* dated 2010.

Nothing in this Vegetation Management Program, the Company's Contractor Guidelines or the Commission rules and regulations is intended to limit or modify the grant of legal rights to the Company under a right-of-way or easement. To the extent that a question arises regarding the legal rights, concerning the existence and scope of easements and right-of-ways, such questions remain in the exclusive jurisdiction of a court of law except to the extent Commission retains exclusive jurisdiction over service-related and / or regulations enforced by the Commission under O.A.C. 4901:1-10 Electric Companies.

Program Description

Pursuant to Ohio Administrative Code (“O.A.C.”) 4901:1-10-27(D)(3) and 4901:1-10-27(E)(1)(g), Ohio Edison Company (“Ohio Edison”) inspects its distribution substations twelve times annually, with no inspection interval to exceed forty calendar days between inspections as outlined in the “*Substation Maintenance Practices – Section 20*” dated 2/12/2009. The purpose of these monthly inspections of the distribution substations is to capture monthly readings and to ensure that any developing substation problems are identified and addressed in a timely manner in support of system reliability and electrical safety.

Each monthly preventative maintenance inspection is performed by Company personnel and consists of two groups of related tasks, monthly readings and the patrol inspection. Inspectors are trained by Company-designated personnel.

1. Monthly Readings
  - Read and record currents, voltages, temperatures, pressures and operations counters on installed substation equipment
2. Patrol Inspection - Inspection and recording of abnormal conditions including but not limited to the following types of substation equipment:
  - Substation control house
    - security breaches,
    - roof integrity,
    - fire protection equipment,
    - general housekeeping
  - Substation yard and perimeter
    - gate,
    - fence,
    - signage,
    - debris,
    - vegetation
    - proper grounding / bonding installed
  - Substation major equipment
    - power transformers,
    - circuit breakers,
    - instrument transformers
  - Batteries and chargers
  - Relays

Fault & Load Interrupting Devices (including Circuit Breakers and Reclosers)

In addition to a Substation Patrol Inspection, circuit breakers and reclosers are tested on various cycles depending on their voltage class and type (oil, gas, air and vacuum) as outlined in the “*Substation Maintenance Practices – Section 2*” dated 2/26/2010. These inspection intervals vary from one to ten years and include various types of preventative maintenance programs (annual, two-year, diagnostic, etc.) based on the type of breaker or recloser. The following routine testing performed under the various preventative maintenance programs typically include: moisture content for SF6 gas and air breakers,



contact resistance (ductor), on-line timing (open and close), motion analysis, power factor (doble), hi-pot and oil dielectric testing. Equipment maintenance results are documented on the appropriate forms.

#### Substation Power Transformers

In addition to a Substation Patrol Inspection, power transformers and load tap changers (LTCs) are tested on various cycles depending on their size, voltage class and application (GSU vs. Transmission vs. Distribution) as outlined in the *"Substation Maintenance Practices – Section 1"* dated 2/26/2010. These cycles vary from six months for Generator Step Up (GSU) transformers and up to 12 years for Distribution power transformers. The following routine testing performed under the various preventative maintenance programs typically include: Dissolved Gas Analysis (DGA), Moisture in Oil Testing, Oil Screen Testing (Acidity, Color, etc.), Oil Dielectric, Power Factor (Doble®) testing. On a case-by-case basis, additional tests or more frequent testing can occur as diagnostic tools. Equipment maintenance results are documented on the appropriate forms.

#### Voltage Regulators

In addition to a Substation Patrol Inspection, substation voltage regulators have a Diagnostic Inspection performed every two to four years based on the type of manufacture as outlined in the *"Substation Maintenance Practices – Section 4"* dated 2/26/2010. The Diagnostic test includes various oil tests (dielectric and color). A Complete Inspection is performed based on the number of operations. This includes additional tests and maintenance activities tests as well as an internal inspection. Equipment maintenance results are documented on the appropriate forms.

#### Capacitor Banks

Open-air capacitor banks are inspected during the Substation Patrol Inspection and enclosed banks are inspected annually as outlined in the *"Substation Maintenance Practices – Section 6"* dated 2/26/2010. The inspection includes a check for damaged capacitors, blown fuses and general physical damage.

#### Protection & Control (Relays and Associated Equipment)

In addition to a Substation Patrol Inspection, Protective Relays are maintained and tested on various cycles depending on their voltage classification (Transmission vs. Distribution as outlined in the *"Substation Maintenance Practices – Section 13"* dated 2/26/2010. These inspection intervals vary from four to six years. Functional testing of relay schemes is part of a breaker diagnostic inspection. Equipment maintenance results are documented on the appropriate forms.



Corrective Maintenance

Equipment with recorded defects that Ohio Edison could reasonably expect to endanger life or property shall be promptly repaired, disconnected, or isolated. Deficiencies likely to cause an outage shall be corrected within one year of the completion of the inspection that originally revealed such deficiencies as required by O.A.C. 4901:1-10-27(E)(4). Corrective maintenance of a deficiency identified by Ohio Edison may include repair or replacement. Items found that are not likely to cause an outage will be evaluated and prioritized on a case-by-case basis.

Recordkeeping

Ohio Edison creates an inspection and maintenance schedule prior to beginning work. This helps to plan the amount of work that needs to be accomplished each year.

Ohio Edison maintains inspection and maintenance records either electronically or in hard copy as required by O.A.C. 4901:1-10-27(E)(4). Periodic reports may be generated from a database system to monitor the status of the program.

Justification

Pursuant to O.A.C. 4901:1-10-27(E)(2), the practice of performing monthly substation inspections is based on accepted electric utility practices and the experience of Ohio Edison. Providing a trained, physical presence within the substation on a regular, periodic basis has proven very successful in detecting the degradation of facilities not always captured by existing local and remote surveillance and monitoring tools. A periodicity of one month between inspections has proven to be successful in addressing emergent problems in a timely manner, allowing for proper planning and remediation prior to the emergent problem having a negative impact on personal safety, equipment integrity or service reliability.

The Cleveland Electric Illuminating Company ("CEI")

Inspection, Maintenance, Repair and Replacement  
Programs

Program Description

Pursuant to Ohio Administrative Code ("O.A.C.") 4901:1-10-27(E)(1)(a), The Cleveland Electric Illuminating Company ("CEI") will inspect distribution wood poles on a ten-year cycle as outlined in the *"Distribution Inspection & Maintenance Practice – Wood Pole Groundline"* dated 3/19/2010. The purpose for inspecting distribution wood poles is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance, and to comply with the state regulatory agencies and the National Electrical Safety Code (NESC). This preventative maintenance inspection for wood poles is performed by Company personnel or contractors and will include a visual inspection on all poles as well as hammer-sounding on poles older than 10 years. In addition, if any pole has indication of incipient decay or the pole is thirty-five (35) years or older, pole boring and partial excavation will be performed to further assess the condition of the pole. Inspectors / contractors have experiences deemed adequate by management. This may consist of field experience, technical experience, or other training.

All poles will be visually inspected on a ten-year cycle. The above ground visual inspection consists of inspecting the pole and its attachments from the groundline to the top of the pole and the recording of abnormal conditions including but not limited to the following:

- Damage –
  - broken,
  - splits,
  - shell-rot,
  - lightning,
  - mechanical damage
- Equipment –
  - crossarms,
  - insulators,
  - conductors,
  - leaking equipment,
  - underground risers – inspect to ensure the U-Guard and U-Guard adapter is not damaged and is in tact and there is no exposed primary cable.
- Testing for decayed internal wood

If applicable, hammer sounding is performed by striking the pole with a hammer to detect decay. The inspector shall listen carefully for sounds that are typical of decayed internal wood and note any signs of decay.

In addition to the visual inspection and hammer sounding if applicable, poles showing incipient decay or poles that are thirty-five (35) years old or older will be bored and a partial excavation performed to further assess the condition of the pole. This inspection consists of the recording of tests performed and abnormal conditions detected including but not limited to the following:

- Boring – testing for internal decay
- Verify shell thickness

Wood boring is performed by drilling a minimum of two 3/8 inch diameter holes at 180 degrees from each other at the groundline. The borings shall be angled downward and reach the center of the pole. Next, a shell thickness indicator shall be used to measure interior decay. The inspector shall note any signs of decay.

Partial excavation is performed by creating two six-inch-deep excavations 180 degrees apart at the pole groundline. The pole will be hammer-sounded in the excavated areas, and bored to determine presence of internal decay.

#### Corrective Maintenance

Wood poles and supporting structures with recorded defects that CEI could reasonably expect to endanger life or property shall be promptly repaired, disconnected, or isolated. All remaining deficiencies likely to cause an outage shall be corrected within one year of the completion of the inspection that originally revealed such deficiencies as required by O.A.C. 4901:1-10-27(E)(4). Corrective maintenance of a deficiency identified by CEI may include repair or replacement. Items not likely to cause an outage will be evaluated and prioritized on a case-by-case basis.

#### Recordkeeping

In advance of inspections, CEI provides information which may include inspection forms and maps to the necessary inspectors. In addition, CEI creates an inspection and maintenance schedule prior to beginning work. This helps to plan the amount of work that needs to be accomplished each year.

CEI maintains inspection and maintenance records either electronically or in hard copy as required by O.A.C. 4901:1-10-27(E)(4). Periodic reports may be generated from a database system to monitor the status of the program.

#### Justification

Pursuant to O.A.C. 4901:1-10-27(E)(2), the practice of performing wood pole inspections on a ten-year cycle is based on accepted electric utility practices and the experience of CEI. NESC Rule 12.121.A states, *"lines and equipment shall be inspected at such intervals as experience has shown to be necessary."* A periodicity of ten years between inspections has proven to be successful in addressing emergent problems in a timely manner, allowing for proper planning and remediation prior to the emergent problem having a negative impact on personal safety, equipment integrity or service reliability.

#### Program Description

Pursuant to Ohio Administrative Code (“O.A.C.”) 4901:1-10-27(D)(1) and 4901:1-10-27(E)(1)(b), The Cleveland Electric Illuminating Company (“CEI”) shall visually inspect overhead circuit lines and equipment on a five-year cycle as outlined in the “*Distribution Inspection & Maintenance Practice – Overhead Circuits & Equipment*” dated 3/19/2010. The purpose for inspecting overhead circuit lines and equipment is to identify and repair unsafe conditions or conditions that may adversely affect service reliability, and to comply with the state regulatory agencies and the National Electrical Safety Code (NESC). This program shall be limited to the overhead facilities.

At least one-fifth of all circuits will be inspected annually by Company personnel or contractors as required by O.A.C. 4901:1-10-27(D)(1). This means that circuits are inspected at least once every five years. Inspectors / contractors have experiences deemed adequate by management. This may consist of field experience, technical experience, or other training.

This preventative maintenance will consist of a visual inspection and recording of abnormal conditions including but not limited to the following types of overhead circuit equipment:

- Conductors (wire and cable) –
  - excessive slack,
  - condition,
  - damage,
  - clearances
- Supporting structures (wood pole) –
  - severely leaning or rotted poles,
  - sustained damage (lightning, vehicle, woodpecker holes)
  - Two-pole conditions identified during circuit and line inspections. This does not include the removal of the pole, cause removal of attachments of other pole attaching companies, or provide documents regarding the date the transfer was requested.
- Pole hardware –
  - deteriorated condition or physical damage to crossarms, reclosers, transformers and associated pole hardware,
  - underground risers – inspect to ensure the U-Guard and U-Guard adapter is not damaged and is in tact and there is no exposed primary cable
- Guying –
  - condition,
  - damage

- Pole-mounted distribution equipment –
  - condition,
  - damage
  - capacitor installation problems such as blown primary fuses, bulged capacitors or signs of oil leaks, broken bushings, damaged lightning arresters, and the general condition of the controlling device on the switched bank

#### Corrective Maintenance

Supporting structures with recorded defects that CEI could reasonably expect to endanger life or property shall be promptly repaired, disconnected, or isolated. Deficiencies likely to cause an outage shall be corrected within one year of the completion of the inspection that originally revealed such deficiencies as required by O.A.C. 4901:1-10-27(E)(4). Corrective maintenance of a deficiency identified by CEI may include repair or replacement. Items found that are not likely to cause an outage will be evaluated and prioritized on a case-by-case basis.

#### Recordkeeping

In advance of inspections, CEI provides information which may include inspection forms and maps to the necessary inspectors. In addition, CEI creates an inspection and maintenance schedule prior to beginning work. This helps to plan the amount of work that needs to be accomplished each year.

CEI maintains inspection and maintenance records either electronically or in hard copy as required by O.A.C. 4901:1-10-27(E)(4). Periodic reports may be generated from a database system to monitor the status of the program.

#### Justification

Pursuant to O.A.C. 4901:1-10-27(E)(2), the practice of performing overhead circuit and equipment inspections on a five-year cycle is based on accepted electric utility practices and the experience of CEI. NESC Rule 12.121.A states, "*lines and equipment shall be inspected at such intervals as experience has shown to be necessary.*" A periodicity of five years between inspections has proven to be successful in addressing emergent problems in a timely manner, allowing for proper planning and remediation prior to the emergent problem having a negative impact on personal safety, equipment integrity or service reliability.

## **Primary Enclosures and Secondary Enclosures Inspection, Maintenance, Repair and Replacement Program**

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### Program Description

Pursuant to Ohio Administrative Code (“O.A.C.”) 4901:1-10-27(E)(1)(c), The Cleveland Electric Illuminating Company (“CEI”) hereby requests to modify its current distribution underground equipment program. CEI’s current approved program calls for a security and complete field inspection of all pad-mounted equipment. CEI’s modified program shall visually inspect distribution underground equipment (i.e., pad-mounted transformers and switchgear and secondary enclosures including pedestals and handholes) on a five-year cycle as outlined in the *“Distribution Inspection & Maintenance Practice – Underground Equipment”* dated 3/19/2010. The purpose for inspecting distribution underground equipment is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance, and to comply with the state regulatory agencies and the National Electrical Safety Code (NESC).

The preventative maintenance inspection is performed by Company personnel or contractors and shall include the visual inspection of the condition and security of underground equipment. Inspectors / contractors have experiences deemed adequate by management. This may consist of field experience, technical experience, or other training.

Pad-mounted equipment (transformers and switchgear) – inspection and recording of abnormal conditions including but not limited to the following:

- Equipment condition –
  - oil leakage,
  - cabinet damage,
  - holes,
  - washout
- Security –
  - locking mechanisms
- Accessibility –
  - as required for operation and maintenance purposes
- Warning labels –
  - electrical hazard warning label,
  - landscaping instructions notice
- Underground risers –
  - inspect to ensure the U-Guard and U-Guard adapter is not damaged and is in tact and there is no exposed primary cable

Handholes and Pedestals – inspection and recording of abnormal conditions including but not limited to the following:

- Equipment condition –
  - holes and washout
- Security –
  - locking mechanisms

## **Primary Enclosures and Secondary Enclosures Inspection, Maintenance, Repair and Replacement Program**

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Pad-mounted enclosures are to be maintained with security based on manufacturer provisions. Units may contain provisions by the manufacturer for penta bolt(s), locks, or similar provisions. For example, units that are manufactured with a provision for penta bolt and lock are secured with both.

### Corrective Maintenance

Equipment with recorded defects that CEI could reasonably expect to endanger life or property shall be promptly repaired, disconnected, or isolated. Deficiencies likely to cause an outage shall be corrected within one year of the completion of the inspection that originally revealed such deficiencies as required by O.A.C. 4901:1-10-27(E)(4). Corrective maintenance of a deficiency identified by CEI may include repair or replacement. Items found that are not likely to cause an outage will be evaluated and prioritized on a case-by-case basis.

### Recordkeeping

In advance of inspections, CEI provides information which may include inspection forms and maps to the necessary inspectors. In addition, CEI creates an inspection and maintenance schedule prior to beginning work. This helps to plan the amount of work that needs to be accomplished each year.

CEI maintains inspection and maintenance records either electronically or in hard copy as required by O.A.C. 4901:1-10-27(E)(4). Periodic reports may be generated from a database system to monitor the status of the program.

### Justification

Pursuant to O.A.C. 4901:1-10-27(E)(2), the practice of performing distribution underground equipment inspections on a five-year cycle is based on accepted electric utility practices and the experience of CEI. NESC Rule 12.121.A states, "*lines and equipment shall be inspected at such intervals as experience has shown to be necessary.*" A periodicity of five years between inspections has proven to be successful in addressing emergent problems in a timely manner, allowing for proper planning and remediation prior to the emergent problem having a negative impact on personal safety, equipment integrity or service reliability.



#### Program Description

Pursuant to Ohio Administrative Code ("O.A.C.") 4901:1-10-27(E)(1)(d), The Cleveland Electric Illuminating Company ("CEI") hereby requests to modify its current distribution line recloser program. CEI's current approved program calls for quarterly counter readings as well as an annual field inspection. CEI's modified programs calls for a visual inspection of distribution line reclosers annually as outlined in the "*Distribution Inspection & Maintenance Practice – Line Reclosers*" dated 3/19/2010. The purpose for inspecting distribution line reclosers is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance, and to comply with the state regulatory agencies and the National Electrical Safety Code (NESC).

The annual preventative maintenance is performed by Company personnel or contractors and consists of counter readings and the field inspection on both hydraulic and electronic reclosers. Inspectors / contractors have experiences deemed adequate by management. This may consist of field experience, technical experience, or other training.

The counter readings are obtained to assess system performance based on the number of momentary outages. In regard to electronic reclosers, batteries are checked during the annual inspection. The annual inspection is a visual examination which includes but is not limited to the following:

- Type of recloser and current rating
- Counter reading
- Condition –
  - rust,
  - dents,
  - physical damage,
  - oil leaks,
  - lightning damage
- Equipment –
  - surge arresters,
  - tank-ground connections,
  - by-pass switches,
  - pole
- Batteries –
  - checked and replaced as necessary (electronic reclosers only)
- Grounds –
  - damage,
  - condition

#### Complete Shop Inspection & Maintenance

Complete Shop Inspection & Maintenance shall apply to hydraulic type units only. The maintenance cycle is determined by exceeding a set number of reclosing operations based on the ratio of the available fault current at the recloser location to the recloser nameplate capability.

Given the interrupting duty (available fault current) and the hydraulic recloser's ability (nameplate maximum interrupting ability), the recloser's interrupting duty to ability ratio (D/A) can be calculated. Reclosers shall be maintained as specified below.

Recloser Complete Shop Inspection & Maintenance Cycles	
Recloser Duty to Ability Ratio (D/A)	Remove for Shop Maintenance after...
Reclosers with Standard Contacts	
Greater than 75%	100 Operations
Less than 75%	200 Operations

#### Corrective Maintenance

Reclosers and supporting structures with recorded defects that CEI could reasonably expect to endanger life or property shall be promptly repaired, disconnected, or isolated. Deficiencies likely to cause an outage shall be corrected within one year of the completion of the inspection that originally revealed such deficiencies as required by O.A.C. 4901:1-10-27(E)(4). Corrective maintenance of a deficiency identified by CEI may include repair or replacement. Items found that are not likely to cause an outage will be evaluated and prioritized on a case-by-case basis.

#### Recordkeeping

In advance of inspections, CEI provides information which may include inspection forms and maps to the necessary inspectors. In addition, CEI creates an inspection and maintenance schedule prior to beginning work. This helps to plan the amount of work that needs to be accomplished each year.

CEI maintains inspection and maintenance records either electronically or in hard copy as required by O.A.C. 4901:1-10-27(E)(4). Periodic reports may be generated from a database system to monitor the status of the program.

#### Justification

Pursuant to O.A.C. 4901:1-10-27(E)(2), the practice of performing annual recloser inspections is based on accepted electric utility practices and the experience of CEI. NESC Rule 12.121.A states, "*lines and equipment shall be inspected at such intervals as experience has shown to be necessary.*" A periodicity of one year between inspections has proven to be successful in addressing emergent problems in a timely manner, allowing for proper planning and remediation prior to the emergent problem having a negative impact on personal safety, equipment integrity or service reliability.

Program Description

Pursuant to Ohio Administrative Code (“O.A.C.”) 4901:1-10-27(E)(1)(e), The Cleveland Electric Illuminating Company (“CEI”) visually inspects distribution overhead line capacitors annually as outlined in the *“Distribution Inspection & Maintenance Practice – Line Capacitors”* dated 3/19/2010. The purpose for inspecting distribution line capacitors is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance, and to comply with the state regulatory agencies and the National Electrical Safety Code (NESC). Installing capacitors on a circuit with lagging power factor will improve the power factor as well as provide a cost-effective means to improve voltage, reduce losses and reduce thermal loading of lines and equipment.

This preventative maintenance inspection is performed by Company personnel or contractors and shall be divided into two parts; a visual inspection (for both fixed and switched banks) and an operational test (switched banks only). Inspectors / contractors have experiences deemed adequate by management. This may consist of field experience, technical experience, or other training.

The operational test is a verification of control units capability to operate. The visual inspection consists of the recording of abnormal conditions including but not limited to the following types of distribution line capacitor equipment:

- Bank oil/vacuum switches –
  - operational test (switched-bank only)
- Case –
  - damage,
  - bulging,
  - leaking,
  - rust
- Bushings –
  - damage,
  - signs of tracking, cracking or
  - lightning strike
- Mounting brackets –
  - cracked,
  - bent,
  - broken
- Pole and equipment racks –
  - damage or appreciable rust
- Grounds –
  - damage,
  - corrosion
- Protective equipment –
  - cutouts,
  - surge arrestors

#### Corrective Maintenance

Capacitors and supporting structures with recorded defects that CEI could reasonably expect to endanger life or property shall be promptly repaired, disconnected, or isolated. Deficiencies likely to cause an outage shall be corrected within one year of the completion of the inspection that originally revealed such deficiencies as required by O.A.C. 4901:1-10-27(E)(4). Corrective maintenance of a deficiency identified by CEI may include repair or replacement. Items found that are not likely to cause an outage will be evaluated and prioritized on a case-by-case basis.

#### Recordkeeping

In advance of inspections, CEI provides information which may include inspection forms and maps to the necessary inspectors. In addition, CEI creates an inspection and maintenance schedule prior to beginning work. This helps to plan the amount of work that needs to be accomplished each year.

CEI maintains inspection and maintenance records either electronically or in hard copy as required by O.A.C. 4901:1-10-27(E)(4). Periodic reports may be generated from a database system to monitor the status of the program.

#### Justification

Pursuant to O.A.C. 4901:1-10-27(E)(2), the practice of performing annual capacitor inspections is based on accepted electric utility practices and the experience of CEI. NESC Rule 12.121.A states, "*lines and equipment shall be inspected at such intervals as experience has shown to be necessary.*" A periodicity of one year between inspections has proven to be successful in addressing emergent problems in a timely manner, allowing for proper planning and remediation prior to the emergent problem having a negative impact on personal safety, equipment integrity or service reliability.

### Program Description

Pursuant to Ohio Administrative Code ("O.A.C") 4901:1-10-27(E)(1)(f), The Cleveland Electric Illuminating Company ("CEI") performs vegetation management to help ensure the continued safe and reliable operation of the distribution system. The Standard Specification for vegetation management is designed to support line reliability, maintain access, make repairs, or restore service and to support safe and reliable service. CEI's currently approved vegetation specification provides vegetation to be pruned to achieve 4 years of clearance, removal of selected incompatible trees within the clearing zone corridor, removal of certain defective limbs that are overhanging primary conductors, controlling selected incompatible brush mechanically and/or using herbicide, and removal of off-corridor priority trees that are dead, dying, diseased, and leaning or significantly encroaching the corridor. CEI's Right-of-Way Vegetation Control program has four complete calendar years to perform the work. This means each year CEI anticipates having the entire year to complete the work designated for completion in that year.

Portions of a circuit that experience high customer interruption minutes due to vegetation-caused outages may be targeted to receive the Standard Specification as well as enhanced vegetation removal techniques, which includes removal of certain healthy limbs, based on tree species and condition, which overhang primary conductors.

For portions of a circuit that have not experienced a primary voltage interruption due to a vegetation-caused outage over the period of a 4 year cycle (subject to the levelization process), a proactive Inspect/Maintain process will target selective vegetation removal for continued reliable system operation. This process involves inspection of the vegetation to evaluate the extent of potential for vegetation to interfere with energized conductors. Factors to consider in the evaluation are the voltage and height of the conductor, the type of tree, its growth rate and branching habit. Trees that will impact safety or reliability will be maintained to the Standard Specification.

The Inspect/Maintain Specification may be utilized to levelize CEI's circuits over the period 2010-2013. This levelization process is necessary due to a disproportionate workload associated with the circuits scheduled for maintenance in certain years. The levelization process enables CEI to make responsible vegetation management decisions, without an impact to the safe and reliable performance of the distribution system, when shifting work from one calendar year to the next, and could also be used on circuits designated for Enhanced or Standard Specification work processes. CEI plans to complete the levelization by December 31, 2013, on which date the Inspect/Maintain Specification will conclude.

### Corrective Maintenance

Corrective maintenance methods used to manage and control vegetation include manual control methods using hand-operated tools, mechanical control using equipment-mounted saws, mowers or other devices, and various herbicide application techniques such as, selective basal herbicide applications, stem foliage applications and cut stubble applications.

Justification

Distribution vegetation management activities are performed in accordance with the following:

- Applicable statutory law and regulations.
- Generally accepted industry practices.
- All routine vegetation clearing work is performed in compliance with ANSI Z133.1 and A-300 Standards and according to the requirements given by OSHA and the National Electrical Safety Code (NESC).
- *FirstEnergy Vegetation Management Specifications* dated 2010.

Nothing in this Vegetation Management Program, the Company's Contractor Guidelines or the Commission rules and regulations is intended to limit or modify the grant of legal rights to the Company under a right-of-way or easement. To the extent that a question arises regarding the legal rights, concerning the existence and scope of easements and right-of-ways, such questions remain in the exclusive jurisdiction of a court of law except to the extent Commission retains exclusive jurisdiction over service-related and / or regulations enforced by the Commission under O.A.C. 4901:1-10 Electric Companies.

#### Program Description

Pursuant to Ohio Administrative Code (“O.A.C.”) 4901:1-10-27(D)(3) and 4901:1-10-27(E)(1)(g), The Cleveland Electric Illuminating Company (“CEI”) inspects its distribution substations twelve times annually, with no inspection interval to exceed forty calendar days between inspections as outlined in the *“Substation Maintenance Practices – Section 20”* dated 2/12/2009. The purpose of these monthly inspections of the distribution substations is to capture monthly readings and to ensure that any developing substation problems are identified and addressed in a timely manner in support of system reliability and electrical safety.

Each monthly preventative maintenance inspection is performed by Company personnel and consists of two groups of related tasks, monthly readings and the patrol inspection. Inspectors are trained by Company-designated personnel.

1. Monthly Readings
  - Read and record currents, voltages, temperatures, pressures and operations counters on installed substation equipment
2. Patrol Inspection - Inspection and recording of abnormal conditions including but not limited to the following types of substation equipment:
  - Substation control house
    - security breaches,
    - roof integrity,
    - fire protection equipment,
    - general housekeeping
  - Substation yard and perimeter
    - gate,
    - fence,
    - signage,
    - debris,
    - vegetation
    - proper grounding / bonding installed
  - Substation major equipment
    - power transformers,
    - circuit breakers,
    - instrument transformers
  - Batteries and chargers
  - Relays

#### Fault & Load Interrupting Devices (including Circuit Breakers and Reclosers)

In addition to a Substation Patrol Inspection, circuit breakers and reclosers are tested on various cycles depending on their voltage class and type (oil, gas, air and vacuum) as outlined in the *“Substation Maintenance Practices – Section 2”* dated 2/26/2010. These inspection intervals vary from one to ten years and include various types of preventative maintenance programs (annual, two-year, diagnostic, etc.) based on the type of breaker or recloser. The following routine testing performed under the various preventative



maintenance programs typically include: moisture content for SF6 gas and air breakers, contact resistance (ductor), on-line timing (open and close), motion analysis, power factor (doble), hi-pot and oil dielectric testing. Equipment maintenance results are documented on the appropriate forms.

#### Substation Power Transformers

In addition to a Substation Patrol Inspection, power transformers and load tap changers (LTCs) are tested on various cycles depending on their size, voltage class and application (GSU vs. Transmission vs. Distribution) as outlined in the *“Substation Maintenance Practices – Section 1”* dated 2/26/2010. These cycles vary from six months for Generator Step Up (GSU) transformers and up to 12 years for Distribution power transformers. The following routine testing performed under the various preventative maintenance programs typically include: Dissolved Gas Analysis (DGA), Moisture in Oil Testing, Oil Screen Testing (Acidity, Color, etc.), Oil Dielectric, Power Factor (Doble®) testing. On a case-by-case basis, additional tests or more frequent testing can occur as diagnostic tools. Equipment maintenance results are documented on the appropriate forms.

#### Voltage Regulators

In addition to a Substation Patrol Inspection, substation voltage regulators have a Diagnostic Inspection performed every two to four years based on the type of manufacture as outlined in the *“Substation Maintenance Practices – Section 4”* dated 2/26/2010. The Diagnostic test includes various oil tests (dielectric and color). A Complete Inspection is performed based on the number of operations. This includes additional tests and maintenance activities tests as well as an internal inspection. Equipment maintenance results are documented on the appropriate forms.

#### Capacitor Banks

Open-air capacitor banks are inspected during the Substation Patrol Inspection and enclosed banks are inspected annually as outlined in the *“Substation Maintenance Practices – Section 6”* dated 2/26/2010. The inspection includes a check for damaged capacitors, blown fuses and general physical damage.

#### Protection & Control (Relays and Associated Equipment)

In addition to a Substation Patrol Inspection, Protective Relays are maintained and tested on various cycles depending on their voltage classification (Transmission vs. Distribution) as outlined in the *“Substation Maintenance Practices – Section 13”* dated 2/26/2010. These inspection intervals vary from four to six years. Functional testing of relay schemes is part of a breaker diagnostic inspection. Equipment maintenance results are documented on the appropriate forms.



#### Corrective Maintenance

Equipment with recorded defects that CEI could reasonably expect to endanger life or property shall be promptly repaired, disconnected, or isolated. Deficiencies likely to cause an outage shall be corrected within one year of the completion of the inspection that originally revealed such deficiencies as required by O.A.C. 4901:1-10-27(E)(4). Corrective maintenance of a deficiency identified by CEI may include repair or replacement. Items found that are not likely to cause an outage will be evaluated and prioritized on a case-by-case basis.

#### Recordkeeping

CEI creates an inspection and maintenance schedule prior to beginning work. This helps to plan the amount of work that needs to be accomplished each year.

CEI maintains inspection and maintenance records either electronically or in hard copy as required by O.A.C. 4901:1-10-27(E)(4). Periodic reports may be generated from a database system to monitor the status of the program.

#### Justification

Pursuant to O.A.C. 4901:1-10-27(E)(2), the practice of performing monthly substation inspections is based on accepted electric utility practices and the experience of CEI. Providing a trained, physical presence within the substation on a regular, periodic basis has proven very successful in detecting the degradation of facilities not always captured by existing local and remote surveillance and monitoring tools. A periodicity of one month between inspections has proven to be successful in addressing emergent problems in a timely manner, allowing for proper planning and remediation prior to the emergent problem having a negative impact on personal safety, equipment integrity or service reliability.

The Toledo Edison Company (“Toledo Edison”)

Inspection, Maintenance, Repair and Replacement  
Programs

Program Description

Pursuant to Ohio Administrative Code ("O.A.C.") 4901:1-10-27(E)(1)(a), The Toledo Edison Company ("Toledo Edison") will inspect distribution wood poles on a ten-year cycle as outlined in the *"Distribution Inspection & Maintenance Practice – Wood Pole Groundline"* dated 3/19/2010. The purpose for inspecting distribution wood poles is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance, and to comply with the state regulatory agencies and the National Electrical Safety Code (NESC). This preventative maintenance inspection for wood poles is performed by Company personnel or contractors and will include a visual inspection on all poles as well as hammer-sounding on poles older than 10 years. In addition, if any pole has indication of incipient decay or the pole is thirty-five (35) years or older, pole boring and partial excavation will be performed to further assess the condition of the pole. Inspectors / contractors have experiences deemed adequate by management. This may consist of field experience, technical experience, or other training.

All poles will be visually inspected on a ten-year cycle. The above ground visual inspection consists of inspecting the pole and its attachments from the groundline to the top of the pole and the recording of abnormal conditions including but not limited to the following:

- Damage –
  - broken,
  - splits,
  - shell-rot,
  - lightning,
  - mechanical damage
- Equipment –
  - crossarms,
  - insulators,
  - conductors,
  - leaking equipment,
  - underground risers – inspect to ensure the U-Guard and U-Guard adapter is not damaged and is in tact and there is no exposed primary cable.
- Testing for decayed internal wood

If applicable, hammer sounding is performed by striking the pole with a hammer to detect decay. The inspector shall listen carefully for sounds that are typical of decayed internal wood and note any signs of decay.

In addition to the visual inspection and hammer sounding if applicable, poles showing incipient decay or poles that are thirty-five (35) years old or older will be bored and a partial excavation performed to further assess the condition of the pole. This inspection consists of the recording of tests performed and abnormal conditions detected including but not limited to the following:

- Boring – testing for internal decay
- Verify shell thickness

Wood boring is performed by drilling a minimum of two 3/8 inch diameter holes at 180 degrees from each other at the groundline. The borings shall be angled downward and reach the center of the pole. Next, a shell thickness indicator shall be used to measure interior decay. The inspector shall note any signs of decay.

Partial excavation is performed by creating two six-inch-deep excavations 180 degrees apart at the pole groundline. The pole will be hammer-sounded in the excavated areas, and bored to determine presence of internal decay.

#### Corrective Maintenance

Wood poles and supporting structures with recorded defects that Toledo Edison could reasonably expect to endanger life or property shall be promptly repaired, disconnected, or isolated. All remaining deficiencies likely to cause an outage shall be corrected within one year of the completion of the inspection that originally revealed such deficiencies as required by O.A.C. 4901:1-10-27(E)(4). Corrective maintenance of a deficiency identified by Toledo Edison may include repair or replacement. Items not likely to cause an outage will be evaluated and prioritized on a case-by-case basis.

#### Recordkeeping

In advance of inspections, Toledo Edison provides information which may include inspection forms and maps to the necessary inspectors. In addition, Toledo Edison creates an inspection and maintenance schedule prior to beginning work. This helps to plan the amount of work that needs to be accomplished each year.

Toledo Edison maintains inspection and maintenance records either electronically or in hard copy as required by O.A.C. 4901:1-10-27(E)(4). Periodic reports may be generated from a database system to monitor the status of the program.

#### Justification

Pursuant to O.A.C. 4901:1-10-27(E)(2), the practice of performing wood pole inspections on a ten-year cycle is based on accepted electric utility practices and the experience of Toledo Edison. NESC Rule 12.121.A states, *"lines and equipment shall be inspected at such intervals as experience has shown to be necessary."* A periodicity of ten years between inspections has proven to be successful in addressing emergent problems in a timely manner, allowing for proper planning and remediation prior to the emergent problem having a negative impact on personal safety, equipment integrity or service reliability.

Program Description

Pursuant to Ohio Administrative Code ("O.A.C.") 4901:1-10-27(D)(1) and 4901:1-10-27(E)(1)(b), The Toledo Edison Company ("Toledo Edison") shall visually inspect overhead circuit lines and equipment on a five-year cycle as outlined in the "*Distribution Inspection & Maintenance Practice – Overhead Circuits & Equipment*" dated 3/19/2010. The purpose for inspecting overhead circuit lines and equipment is to identify and repair unsafe conditions or conditions that may adversely affect service reliability, and to comply with the state regulatory agencies and the National Electrical Safety Code (NESC). This program shall be limited to the overhead facilities.

At least one-fifth of all circuits will be inspected annually by Company personnel or contractors as required by O.A.C. 4901:1-10-27(D)(1). This means that circuits are inspected at least once every five years. Inspectors / contractors have experiences deemed adequate by management. This may consist of field experience, technical experience, or other training.

This preventative maintenance will consist of a visual inspection and recording of abnormal conditions including but not limited to the following types of overhead circuit equipment:

- Conductors (wire and cable) –
  - excessive slack,
  - condition,
  - damage,
  - clearances
- Supporting structures (wood pole) –
  - severely leaning or rotted poles,
  - sustained damage (lightning, vehicle, woodpecker holes)
  - Two-pole conditions identified during circuit and line inspections. This does not include the removal of the pole, cause removal of attachments of other pole attaching companies, or provide documents regarding the date the transfer was requested.
- Pole hardware –
  - deteriorated condition or physical damage to crossarms, reclosers, transformers and associated pole hardware,
  - underground risers – inspect to ensure the U-Guard and U-Guard adapter is not damaged and is in tact and there is no exposed primary cable
- Guying –
  - condition,
  - damage
- Pole-mounted distribution equipment –
  - condition,
  - damage
  - capacitor installation problems such as blown primary fuses, bulged capacitors or signs of oil leaks, broken bushings, damaged lightning arresters, and the general condition of the controlling device on the switched bank

Corrective Maintenance

Supporting structures with recorded defects that Toledo Edison could reasonably expect to endanger life or property shall be promptly repaired, disconnected, or isolated. Deficiencies likely to cause an outage shall be corrected within one year of the completion of the inspection that originally revealed such deficiencies as required by O.A.C. 4901:1-10-27(E)(4). Corrective maintenance of a deficiency identified by Toledo Edison may include repair or replacement. Items found that are not likely to cause an outage will be evaluated and prioritized on a case-by-case basis.

Recordkeeping

In advance of inspections, Toledo Edison provides information which may include inspection forms and maps to the necessary inspectors. In addition, Toledo Edison creates an inspection and maintenance schedule prior to beginning work. This helps to plan the amount of work that needs to be accomplished each year.

Toledo Edison maintains inspection and maintenance records either electronically or in hard copy as required by O.A.C. 4901:1-10-27(E)(4). Periodic reports may be generated from a database system to monitor the status of the program.

Justification

Pursuant to O.A.C. 4901:1-10-27(E)(2), the practice of performing overhead circuit and equipment inspections on a five-year cycle is based on accepted electric utility practices and the experience of Toledo Edison. NESC Rule 12.121.A states, "*lines and equipment shall be inspected at such intervals as experience has shown to be necessary.*" A periodicity of five years between inspections has proven to be successful in addressing emergent problems in a timely manner, allowing for proper planning and remediation prior to the emergent problem having a negative impact on personal safety, equipment integrity or service reliability.

Program Description

Pursuant to Ohio Administrative Code ("O.A.C.") 4901:1-10-27(E)(1)(c), The Toledo Edison Company ("Toledo Edison") hereby requests to modify its current distribution underground equipment program. Toledo Edison's current approved program calls for a security and complete field inspection of all pad-mounted equipment. Toledo Edison's modified program shall visually inspect distribution underground equipment (i.e., pad-mounted transformers and switchgear and secondary enclosures including pedestals and handholes) on a five-year cycle as outlined in the *"Distribution Inspection & Maintenance Practice – Underground Equipment"* dated 3/19/2010. The purpose for inspecting distribution underground equipment is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance, and to comply with the state regulatory agencies and the National Electrical Safety Code (NESC).

The preventative maintenance inspection is performed by Company personnel or contractors and shall include the visual inspection of the condition and security of underground equipment. Inspectors / contractors have experiences deemed adequate by management. This may consist of field experience, technical experience, or other training.

Pad-mounted equipment (transformers and switchgear) – inspection and recording of abnormal conditions including but not limited to the following:

- Equipment condition –
  - oil leakage,
  - cabinet damage,
  - holes,
  - washout
- Security –
  - locking mechanisms
- Accessibility –
  - as required for operation and maintenance purposes
- Warning labels –
  - electrical hazard warning label,
  - landscaping instructions notice
- Underground risers –
  - inspect to ensure the U-Guard and U-Guard adapter is not damaged and is in tact and there is no exposed primary cable

Handholes and Pedestals – inspection and recording of abnormal conditions including but not limited to the following:

- Equipment condition –
  - holes and washout
- Security –
  - locking mechanisms

Pad-mounted enclosures are to be maintained with security based on manufacturer provisions. Units may contain provisions by the manufacturer for penta bolt(s), locks, or

similar provisions. For example, units that are manufactured with a provision for penta bolt and lock are secured with both.

#### Corrective Maintenance

Equipment with recorded defects that Toledo Edison could reasonably expect to endanger life or property shall be promptly repaired, disconnected, or isolated. Deficiencies likely to cause an outage shall be corrected within one year of the completion of the inspection that originally revealed such deficiencies as required by O.A.C. 4901:1-10-27(E)(4). Corrective maintenance of a deficiency identified by Toledo Edison may include repair or replacement. Items found that are not likely to cause an outage will be evaluated and prioritized on a case-by-case basis.

#### Recordkeeping

In advance of inspections, Toledo Edison provides information which may include inspection forms and maps to the necessary inspectors. In addition, Toledo Edison creates an inspection and maintenance schedule prior to beginning work. This helps to plan the amount of work that needs to be accomplished each year.

Toledo Edison maintains inspection and maintenance records either electronically or in hard copy as required by O.A.C. 4901:1-10-27(E)(4). Periodic reports may be generated from a database system to monitor the status of the program.

#### Justification

Pursuant to O.A.C. 4901:1-10-27(E)(2), the practice of performing distribution underground equipment inspections on a five-year cycle is based on accepted electric utility practices and the experience of Toledo Edison. NESC Rule 12.121.A states, "*lines and equipment shall be inspected at such intervals as experience has shown to be necessary.*" A periodicity of five years between inspections has proven to be successful in addressing emergent problems in a timely manner, allowing for proper planning and remediation prior to the emergent problem having a negative impact on personal safety, equipment integrity or service reliability.



Program Description

Pursuant to Ohio Administrative Code ("O.A.C.") 4901:1-10-27(E)(1)(d), The Toledo Edison Company ("Toledo Edison") hereby requests to modify its current distribution line recloser program. Toledo Edison's current approved program calls for quarterly counter readings as well as an annual field inspection. Toledo Edison's modified programs calls for a visual inspection of distribution line reclosers annually as outlined in the "*Distribution Inspection & Maintenance Practice – Line Reclosers*" dated 3/19/2010. The purpose for inspecting distribution line reclosers is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance, and to comply with the state regulatory agencies and the National Electrical Safety Code (NESC).

The annual preventative maintenance is performed by Company personnel or contractors and consists of counter readings and the field inspection on both hydraulic and electronic reclosers. Inspectors / contractors have experiences deemed adequate by management. This may consist of field experience, technical experience, or other training.

The counter readings are obtained to assess system performance based on the number of momentary outages. In regard to electronic reclosers, batteries are checked during the annual inspection. The annual inspection is a visual examination which includes but is not limited to the following:

- Type of recloser and current rating
- Counter reading
- Condition –
  - rust,
  - dents,
  - physical damage,
  - oil leaks,
  - lightning damage
- Equipment –
  - surge arresters,
  - tank-ground connections,
  - by-pass switches,
  - pole
- Batteries –
  - checked and replaced as necessary (electronic reclosers only)
- Grounds –
  - damage,
  - condition

Complete Shop Inspection & Maintenance

Complete Shop Inspection & Maintenance shall apply to hydraulic type units only. The maintenance cycle is determined by exceeding a set number of reclosing operations based on the ratio of the available fault current at the recloser location to the recloser nameplate capability.

Given the interrupting duty (available fault current) and the hydraulic recloser's ability (nameplate maximum interrupting ability), the recloser's interrupting duty to ability ratio (D/A) can be calculated. Reclosers shall be maintained as specified below.

Recloser Complete Shop Inspection & Maintenance Cycles	
Recloser Duty to Ability Ratio (D/A)	Remove for Shop Maintenance after...
Reclosers with Standard Contacts	
Greater than 75%	100 Operations
Less than 75%	200 Operations

#### Corrective Maintenance

Reclosers and supporting structures with recorded defects that Toledo Edison could reasonably expect to endanger life or property shall be promptly repaired, disconnected, or isolated. Deficiencies likely to cause an outage shall be corrected within one year of the completion of the inspection that originally revealed such deficiencies as required by O.A.C. 4901:1-10-27(E)(4). Corrective maintenance of a deficiency identified by Toledo Edison may include repair or replacement. Items found that are not likely to cause an outage will be evaluated and prioritized on a case-by-case basis.

#### Recordkeeping

In advance of inspections, Toledo Edison provides information which may include inspection forms and maps to the necessary inspectors. In addition, Toledo Edison creates an inspection and maintenance schedule prior to beginning work. This helps to plan the amount of work that needs to be accomplished each year.

Toledo Edison maintains inspection and maintenance records either electronically or in hard copy as required by O.A.C. 4901:1-10-27(E)(4). Periodic reports may be generated from a database system to monitor the status of the program.

#### Justification

Pursuant to O.A.C. 4901:1-10-27(E)(2), the practice of performing annual recloser inspections is based on accepted electric utility practices and the experience of Toledo Edison. NESC Rule 12.121.A states, "*lines and equipment shall be inspected at such intervals as experience has shown to be necessary.*" A periodicity of one year between inspections has proven to be successful in addressing emergent problems in a timely manner, allowing for proper planning and remediation prior to the emergent problem having a negative impact on personal safety, equipment integrity or service reliability.

Program Description

Pursuant to Ohio Administrative Code (“O.A.C.”) 4901:1-10-27(E)(1)(e), The Toledo Edison Company (“Toledo Edison”) visually inspects distribution overhead line capacitors annually as outlined in the “*Distribution Inspection & Maintenance Practice – Line Capacitors*” dated 3/19/2010. The purpose for inspecting distribution line capacitors is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance, and to comply with the state regulatory agencies and the National Electrical Safety Code (NESC). Installing capacitors on a circuit with lagging power factor will improve the power factor as well as provide a cost-effective means to improve voltage, reduce losses and reduce thermal loading of lines and equipment.

This preventative maintenance inspection is performed by Company personnel or contractors and shall be divided into two parts; a visual inspection (for both fixed and switched banks) and an operational test (switched banks only). Inspectors / contractors have experiences deemed adequate by management. This may consist of field experience, technical experience, or other training.

The operational test is a verification of control units capability to operate. The visual inspection consists of the recording of abnormal conditions including but not limited to the following types of distribution line capacitor equipment:

- Bank oil/vacuum switches –
  - operational test (switched-bank only)
- Case –
  - damage,
  - bulging,
  - leaking,
  - rust
- Bushings –
  - damage,
  - signs of tracking, cracking or
  - lightning strike
- Mounting brackets –
  - cracked,
  - bent,
  - broken
- Pole and equipment racks –
  - damage or appreciable rust
- Grounds –
  - damage,
  - corrosion
- Protective equipment –
  - cutouts,
  - surge arrestors

Corrective Maintenance

Capacitors and supporting structures with recorded defects that Toledo Edison could reasonably expect to endanger life or property shall be promptly repaired, disconnected, or isolated. Deficiencies likely to cause an outage shall be corrected within one year of the completion of the inspection that originally revealed such deficiencies as required by O.A.C. 4901:1-10-27(E)(4). Corrective maintenance of a deficiency identified by Toledo Edison may include repair or replacement. Items found that are not likely to cause an outage will be evaluated and prioritized on a case-by-case basis.

#### Recordkeeping

In advance of inspections, Toledo Edison provides information which may include inspection forms and maps to the necessary inspectors. In addition, Toledo Edison creates an inspection and maintenance schedule prior to beginning work. This helps to plan the amount of work that needs to be accomplished each year.

Toledo Edison maintains inspection and maintenance records either electronically or in hard copy as required by O.A.C. 4901:1-10-27(E)(4). Periodic reports may be generated from a database system to monitor the status of the program.

#### Justification

Pursuant to O.A.C. 4901:1-10-27(E)(2), the practice of performing annual capacitor inspections is based on accepted electric utility practices and the experience of Toledo Edison. NESC Rule 12.121.A states, "*lines and equipment shall be inspected at such intervals as experience has shown to be necessary.*" A periodicity of one year between inspections has proven to be successful in addressing emergent problems in a timely manner, allowing for proper planning and remediation prior to the emergent problem having a negative impact on personal safety, equipment integrity or service reliability.

#### Program Description

Pursuant to Ohio Administrative Code ("O.A.C") 4901:1-10-27(E)(1)(f), The Toledo Edison Company ("Toledo Edison") performs vegetation management to help ensure the continued safe and reliable operation of the distribution system. The Standard Specification for vegetation management is designed to support line reliability, maintain access, make repairs, or restore service and to support safe and reliable service. Toledo Edison's currently approved vegetation specification provides vegetation to be pruned to achieve 4 years of clearance, removal of selected incompatible trees within the clearing zone corridor, removal of certain defective limbs that are overhanging primary conductors, controlling selected incompatible brush mechanically and/or using herbicide, and removal of off-corridor priority trees that are dead, dying, diseased, and leaning or significantly encroaching the corridor. Toledo Edison's Right-of-Way Vegetation Control program has four complete calendar years to perform the work. This means each year Toledo Edison anticipates having the entire year to complete the work designated for completion in that year.

Portions of a circuit that experience high customer interruption minutes due to vegetation-caused outages may be targeted to receive the Standard Specification as well as enhanced vegetation removal techniques, which includes removal of certain healthy limbs, based on tree species and condition, which overhang primary conductors.

For portions of a circuit that have not experienced a primary voltage interruption due to a vegetation-caused outage over the period of a 4 year cycle (subject to the levelization process), a proactive Inspect/Maintain process will target selective vegetation removal for continued reliable system operation. This process involves inspection of the vegetation to evaluate the extent of potential for vegetation to interfere with energized conductors. Factors to consider in the evaluation are the voltage and height of the conductor, the type of tree, its growth rate and branching habit. Trees that will impact safety or reliability will be maintained to the Standard Specification.

The Inspect/Maintain Specification may be utilized to levelize Toledo Edison's circuits over the period 2010-2013. This levelization process is necessary due to a disproportionate workload associated with the circuits scheduled for maintenance in certain years. The levelization process enables Toledo Edison to make responsible vegetation management decisions, without an impact to the safe and reliable performance of the distribution system, when shifting work from one calendar year to the next, and could also be used on circuits designated for Enhanced or Standard Specification work processes. Toledo Edison plans to complete the levelization by December 31, 2013, on which date the Inspect/Maintain Specification will conclude.

#### Corrective Maintenance

Corrective maintenance methods used to manage and control vegetation include manual control methods using hand-operated tools, mechanical control using equipment-mounted saws, mowers or other devices, and various herbicide application techniques such as, selective basal herbicide applications, stem foliage applications and cut stubble applications.

Justification

Distribution vegetation management activities are performed in accordance with the following:

- Applicable statutory law and regulations.
- Generally accepted industry practices.
- All routine vegetation clearing work is performed in compliance with ANSI Z133.1 and A-300 Standards and according to the requirements given by OSHA and the National Electrical Safety Code (NESC).
- *FirstEnergy Vegetation Management Specifications* dated 2010.

Nothing in this Vegetation Management Program, the Company's Contractor Guidelines or the Commission rules and regulations is intended to limit or modify the grant of legal rights to the Company under a right-of-way or easement. To the extent that a question arises regarding the legal rights, concerning the existence and scope of easements and right-of-ways, such questions remain in the exclusive jurisdiction of a court of law except to the extent Commission retains exclusive jurisdiction over service-related and / or regulations enforced by the Commission under O.A.C. 4901:1-10 Electric Companies.

Program Description

Pursuant to Ohio Administrative Code (“O.A.C.”) 4901:1-10-27(D)(3) and 4901:1-10-27(E)(1)(g), The Toledo Edison Company (“Toledo Edison”) inspects its distribution substations twelve times annually, with no inspection interval to exceed forty calendar days between inspections as outlined in the “*Substation Maintenance Practices – Section 20*” dated 2/12/2009. The purpose of these monthly inspections of the distribution substations is to capture monthly readings and to ensure that any developing substation problems are identified and addressed in a timely manner in support of system reliability and electrical safety.

Each monthly preventative maintenance inspection is performed by Company personnel and consists of two groups of related tasks, monthly readings and the patrol inspection. Inspectors are trained by Company-designated personnel.

1. Monthly Readings
  - Read and record currents, voltages, temperatures, pressures and operations counters on installed substation equipment
2. Patrol Inspection - Inspection and recording of abnormal conditions including but not limited to the following types of substation equipment:
  - Substation control house
    - security breaches,
    - roof integrity,
    - fire protection equipment,
    - general housekeeping
  - Substation yard and perimeter
    - gate,
    - fence,
    - signage,
    - debris,
    - vegetation
    - proper grounding / bonding installed
  - Substation major equipment
    - power transformers,
    - circuit breakers,
    - instrument transformers
  - Batteries and chargers
  - Relays

Fault & Load Interrupting Devices (including Circuit Breakers and Reclosers)

In addition to a Substation Patrol Inspection, circuit breakers and reclosers are tested on various cycles depending on their voltage class and type (oil, gas, air and vacuum) as outlined in the “*Substation Maintenance Practices – Section 2*” dated 2/26/2010. These inspection intervals vary from one to ten years and include various types of preventative maintenance programs (annual, two-year, diagnostic, etc.) based on the type of breaker or recloser. The following routine testing performed under the various preventative maintenance programs typically include: moisture content for SF6 gas and air breakers, contact resistance (ductor), on-line timing (open and close), motion analysis, power



factor (doble), hi-pot and oil dielectric testing. Equipment maintenance results are documented on the appropriate forms.

#### Substation Power Transformers

In addition to a Substation Patrol Inspection, power transformers and load tap changers (LTCs) are tested on various cycles depending on their size, voltage class and application (GSU vs. Transmission vs. Distribution) as outlined in the *"Substation Maintenance Practices – Section 1"* dated 2/26/2010. These cycles vary from six months for Generator Step Up (GSU) transformers and up to 12 years for Distribution power transformers. The following routine testing performed under the various preventative maintenance programs typically include: Dissolved Gas Analysis (DGA), Moisture in Oil Testing, Oil Screen Testing (Acidity, Color, etc.), Oil Dielectric, Power Factor (Doble®) testing. On a case-by-case basis, additional tests or more frequent testing can occur as diagnostic tools. Equipment maintenance results are documented on the appropriate forms.

#### Voltage Regulators

In addition to a Substation Patrol Inspection, substation voltage regulators have a Diagnostic Inspection performed every two to four years based on the type of manufacture as outlined in the *"Substation Maintenance Practices – Section 4"* dated 2/26/2010. The Diagnostic test includes various oil tests (dielectric and color). A Complete Inspection is performed based on the number of operations. This includes additional tests and maintenance activities tests as well as an internal inspection. Equipment maintenance results are documented on the appropriate forms.

#### Capacitor Banks

Open-air capacitor banks are inspected during the Substation Patrol Inspection and enclosed banks are inspected annually as outlined in the *"Substation Maintenance Practices – Section 6"* dated 2/26/2010. The inspection includes a check for damaged capacitors, blown fuses and general physical damage.

#### Protection & Control (Relays and Associated Equipment)

In addition to a Substation Patrol Inspection, Protective Relays are maintained and tested on various cycles depending on their voltage classification (Transmission vs. Distribution) as outlined in the *"Substation Maintenance Practices – Section 13"* dated 2/26/2010. These inspection intervals vary from four to six years. Functional testing of relay schemes is part of a breaker diagnostic inspection. Equipment maintenance results are documented on the appropriate forms.

#### Corrective Maintenance

Equipment with recorded defects that Toledo Edison could reasonably expect to endanger life or property shall be promptly repaired, disconnected, or isolated. Deficiencies likely to cause an outage shall be corrected within one year of the



completion of the inspection that originally revealed such deficiencies as required by O.A.C. 4901:1-10-27(E)(4). Corrective maintenance of a deficiency identified by Toledo Edison may include repair or replacement. Items found that are not likely to cause an outage will be evaluated and prioritized on a case-by-case basis.

#### Recordkeeping

Toledo Edison creates an inspection and maintenance schedule prior to beginning work. This helps to plan the amount of work that needs to be accomplished each year.

Toledo Edison maintains inspection and maintenance records either electronically or in hard copy as required by O.A.C. 4901:1-10-27(E)(4). Periodic reports may be generated from a database system to monitor the status of the program.

#### Justification

Pursuant to O.A.C. 4901:1-10-27(E)(2), the practice of performing monthly substation inspections is based on accepted electric utility practices and the experience of Toledo Edison. Providing a trained, physical presence within the substation on a regular, periodic basis has proven very successful in detecting the degradation of facilities not always captured by existing local and remote surveillance and monitoring tools. A periodicity of one month between inspections has proven to be successful in addressing emergent problems in a timely manner, allowing for proper planning and remediation prior to the emergent problem having a negative impact on personal safety, equipment integrity or service reliability.

American Transmission Systems, Inc. ("ATSI")  
Inspection, Maintenance, Repair and Replacement  
Programs



American Transmission Systems, Inc.  
a subsidiary of FirstEnergy Corp.

## **Transmission Circuit and Line Inspection, Maintenance, Repair and Replacement Program**

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### Program Description

Pursuant to Ohio Administrative Code ("O.A.C") 4901:1-10-27(D)(2) and 4901:1-10-27(E)(1)(b), American Transmission Systems, Inc. ("ATSI") hereby requests to modify its current aerial inspection program. ATSI's current approved program calls for aerial patrols of circuits and lines twice per year. ATSI's modified program shall perform transmission (69 kV to 345 kV) circuit and line inspections at least once (1) per year. The purpose for routine circuit and line inspections is to ensure the integrity of in-service transmission lines to maintain quality, safe, and reliable service.

This preventative maintenance is performed from a helicopter and includes inspection and recording of abnormal conditions including but not limited to the following transmission equipment:

- Poles and equipment (deteriorated tops, broken guy wires, crossarm condition, braces)
- Towers
- Hardware (insulators, conductor strands, bundle spacers, grounding connections)
- Right-of-Way (vegetation, encroachments, ground erosion)

### Corrective Maintenance

Lines and equipment with recorded defects that ATSI could reasonably expect to endanger life or property shall be promptly repaired, disconnected, or isolated. All remaining deficiencies likely to cause an outage shall be corrected within one year of the completion of the inspection that originally revealed such deficiencies as required by O.A.C. 4901:1-10-27(E)(4). Corrective maintenance of a deficiency identified by ATSI may include repair or replacement. Items not likely to cause an outage will be evaluated and prioritized on a case-by-case basis.

### Justification

Pursuant to O.A.C. 4901:1-10-27(E)(2), the practice of performing annual circuit and line inspections is based on accepted electric utility practices and the experience of ATSI. National Electrical Safety Code (NESC) Rule 12.121.A states, *"lines and equipment shall be inspected at such intervals as experience has shown to be necessary."* A periodicity of at least once per year between inspections has proven to be successful in addressing emergent problems in a timely manner, allowing for proper planning and remediation prior to the emergent problem having a negative impact on personal safety, equipment integrity or service reliability.



American Transmission Systems, Inc.  
a subsidiary of FirstEnergy Corp.

## Transmission Wood Pole Inspection, Maintenance, Repair and Replacement Program

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### Program Description

Pursuant to Ohio Administrative Code ("O.A.C") 4901:1-10-27(E)(1)(a), American Transmission Systems, Inc. ("ATSI") inspects and treats transmission (69 kV to 345 kV) wood poles, on a fifteen (15) year cycle. The purpose for inspecting and treating transmission wood poles is to ensure the integrity of in-service poles and to maintain quality, safe and reliable service.

This visual inspection is made from the groundline to the top of the pole. Poles are hammer-sounded from a height of six feet down to the groundline. The inspector will listen for sounds that are typical of decayed internal wood. Poles may be bored and inspected for internal decay. Poles are internally treated if boring and inspection indicate decay pockets larger than 1". Poles are excavated 18" below groundline and externally treated.

This preventative maintenance includes inspection and recording of abnormal conditions including but not limited to the following transmission wood pole equipment:

- Guy wires (hardware, plates, tension)
- Pole (pole cap, decay, cracks, splits, insect damage)
- Equipment (crossarms, braces, insulators, clamps, mounting hardware)
- Conductors (excessive wear, wire strands, sag, clearances)

### Corrective Maintenance

Transmission wood poles with recorded defects that ATSI could reasonably expect to endanger life or property shall be promptly repaired, disconnected, or isolated. All remaining deficiencies likely to cause an outage shall be corrected within one year of the completion of the inspection that originally revealed such deficiencies as required by O.A.C. 4901:1-10-27(E)(4). Corrective maintenance of a deficiency identified by ATSI may include repair or replacement. Items not likely to cause an outage will be evaluated and prioritized on a case-by-case basis.

### Justification

Pursuant to O.A.C. 4901:1-10-27(E)(2), the practice of performing wood pole inspections on a fifteen (15) year cycle is based on accepted electric utility practices and the experience of ATSI. National Electrical Safety Code (NESC) Rule 12.121.A states, *"lines and equipment shall be inspected at such intervals as experience has shown to be necessary."* A periodicity of fifteen (15) years between inspections has proven to be successful in addressing emergent problems in a timely manner, allowing for proper planning and remediation prior to the emergent problem having a negative impact on personal safety, equipment integrity or service reliability.



American Transmission Systems, Inc.  
a subsidiary of FirstEnergy Corp.

## Transmission Vegetation Management Inspection, Maintenance, Repair and Replacement Program

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### Program Description

Pursuant to Ohio Administrative Code ("O.A.C") 4901:1-10-27(E)(1)(f), American Transmission Systems, Inc. ("ATSI") performs vegetation management to ensure the continued and safe operation of Transmission circuits. Vegetation control is the removal of vegetation that has the potential to interfere with the safe and efficient operation of the transmission system. Clearing vegetation located in a specified corridor is performed in accordance with pre-established schedules, or as required to ensure line reliability, maintain access, make repairs, or restore service.

A periodicity of five years has demonstrated to be effective for most locations. Select locations may require more-frequent spot-control, such as urban areas or where conditions limit tree to conductor clearances. The frequency of vegetation control activities is dependent upon and impacted by variability in local conditions such as conductor movement (sag and sway), tree species, growth rates, terrain and results of other transmission circuit and line inspection programs.

### Corrective Maintenance

Corrective maintenance methods used to manage and control vegetation include manual control methods using hand-operated tools, mechanical control using equipment-mounted saws, mowers or other devices, and various herbicide application techniques such as, selective basal herbicide applications, stem foliage applications and cut stubble applications.

Trees located adjacent to the transmission corridor that are either dead, diseased, declining, severely leaning or significantly encroaching are also targeted for removal.

### Justification

Transmission vegetation management activities are performed in accordance with the following:

- Applicable statutory law and regulations.
- Generally accepted industry practices.
- Easements which provide the legal authority for control and removal of trees and vegetation on transmission rights of way that traverse private property.
- NERC Vegetation Management Standard FAC-003-1
- All routine vegetation clearing work is performed in compliance with ANSI Z133.1 and A-300 Standards and according to the requirements given by OSHA and the National Electrical Safety Code (NESC).
- *FirstEnergy Vegetation Management Specifications* dated 2010.

Nothing in this Vegetation Management Program, the Company's Contractor Guidelines or the Commission rules and regulations is intended to limit or modify the grant of legal rights to the Company under a right-of-way or easement. To the extent that a question arises regarding the legal rights, concerning the existence and scope of easements and right-of-ways, such questions remain in the exclusive jurisdiction of a court of law except to the extent Commission retains exclusive jurisdiction over service-related and / or regulations enforced by the Commission under O.A.C. 4901:1-10 Electric Companies.



American Transmission Systems, Inc.  
a subsidiary of FirstEnergy Corp.

## Transmission Substation Inspection, Maintenance, Repair and Replacement Program

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### Program Description

Pursuant to Ohio Administrative Code ("O.A.C.") 4901:1-10-27(D)(3) and 4901:1-10-27(E)(1)(g), American Transmission Systems, Inc. ("ATSI") inspects its transmission substations twelve times annually, with no inspection interval to exceed forty calendar days between inspections as outlined in the *"Substation Maintenance Practices – Section 20"* dated 2/12/2009. The purpose of these monthly inspections of the transmission substations is to capture monthly readings and to ensure that any developing substation problems are identified and addressed in a timely manner in support of system reliability and electrical safety.

Each monthly preventative maintenance inspection is performed by Company personnel and consists of two groups of related tasks, monthly readings and the patrol inspection. Inspectors are trained by Company-designated personnel.

1. Monthly Readings
  - Read and record currents, voltages, temperatures, pressures and operations counters on installed substation equipment
2. Patrol Inspection - Inspection and recording of abnormal conditions including but not limited to the following types of substation equipment:
  - Substation control house
    - security breaches,
    - roof integrity,
    - fire protection equipment,
    - general housekeeping
  - Substation yard and perimeter
    - gate,
    - fence,
    - signage,
    - debris,
    - vegetation
    - proper grounding / bonding installed
  - Substation major equipment
    - power transformers,
    - circuit breakers,
    - instrument transformers
  - Batteries and chargers
  - Relays

### Fault & Load Interrupting Devices (including Circuit Breakers and Reclosers)

In addition to a Substation Patrol Inspection, circuit breakers and reclosers are tested on various cycles depending on their voltage class and type (oil, gas, air and vacuum) as outlined in the *"Substation Maintenance Practices – Section 2"* dated 2/26/2010. These inspection intervals vary from one to ten years and include various types of preventative maintenance programs (annual, two-year, diagnostic, etc.) based on the type of breaker or recloser. The following routine testing performed under the various preventative

## **Transmission Substation Inspection, Maintenance, Repair and Replacement Program**

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maintenance programs typically include: moisture content for SF6 gas and air breakers, contact resistance (ductor), on-line timing (open and close), motion analysis, power factor (doble), hi-pot and oil dielectric testing. Equipment maintenance results are documented on the appropriate forms.

### Substation Power Transformers

In addition to a Substation Patrol Inspection, power transformers and load tap changers (LTCs) are tested on various cycles depending on their size, voltage class and application (GSU vs. Transmission vs. Distribution) as outlined in the *"Substation Maintenance Practices – Section 1"* dated 2/26/2010. These cycles vary from six months for Generator Step Up (GSU) transformers and up to 12 years for Distribution power transformers. The following routine testing performed under the various preventative maintenance programs typically include: Dissolved Gas Analysis (DGA), Moisture in Oil Testing, Oil Screen Testing (Acidity, Color, etc.), Oil Dielectric, Power Factor (Doble®) testing. On a case-by-case basis, additional tests or more frequent testing can occur as diagnostic tools. Equipment maintenance results are documented on the appropriate forms.

### Voltage Regulators

In addition to a Substation Patrol Inspection, substation voltage regulators have a Diagnostic Inspection performed every two to four years based on the type of manufacture as outlined in the *"Substation Maintenance Practices – Section 4"* dated 2/26/2010. The Diagnostic test includes various oil tests (dielectric and color). A Complete Inspection is performed based on the number of operations. This includes additional tests and maintenance activities tests as well as an internal inspection. Equipment maintenance results are documented on the appropriate forms.

### Capacitor Banks

Open-air capacitor banks are inspected during the Substation Patrol Inspection and enclosed banks are inspected annually as outlined in the *"Substation Maintenance Practices – Section 6"* dated 2/26/2010. The inspection includes a check for damaged capacitors, blown fuses and general physical damage.

### Protection & Control (Relays and Associated Equipment)

In addition to a Substation Patrol Inspection, Protective Relays are maintained and tested on various cycles depending on their voltage classification (Transmission vs. Distribution) as outlined in the *"Substation Maintenance Practices – Section 13"* dated 2/26/2010. These inspection intervals vary from four to six years. Functional testing of relay schemes is part of a breaker diagnostic inspection. Equipment maintenance results are documented on the appropriate forms.



American Transmission Systems, Inc.  
a subsidiary of FirstEnergy Corp.

## **Transmission Substation Inspection, Maintenance, Repair and Replacement Program**

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### Corrective Maintenance

Equipment with recorded defects that ATSI could reasonably expect to endanger life or property shall be promptly repaired, disconnected, or isolated. Deficiencies likely to cause an outage shall be corrected within one year of the completion of the inspection that originally revealed such deficiencies as required by O.A.C. 4901:1-10-27(E)(4). Corrective maintenance of a deficiency identified by ATSI may include repair or replacement. Items found that are not likely to cause an outage will be evaluated and prioritized on a case-by-case basis.

### Recordkeeping

ATSI creates an inspection and maintenance schedule prior to beginning work. This helps to plan the amount of work that needs to be accomplished each year.

ATSI maintains inspection and maintenance records either electronically or in hard copy as required by O.A.C. 4901:1-10-27(E)(4). Periodic reports may be generated from a database system to monitor the status of the program.

### Justification

Pursuant to O.A.C. 4901:1-10-27(E)(2), the practice of performing monthly substation inspections is based on accepted electric utility practices and the experience of ATSI. Providing a trained, physical presence within the substation on a regular, periodic basis has proven very successful in detecting the degradation of facilities not always captured by existing local and remote surveillance and monitoring tools. A periodicity of one month between inspections has proven to be successful in addressing emergent problems in a timely manner, allowing for proper planning and remediation prior to the emergent problem having a negative impact on personal safety, equipment integrity or service reliability.



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Summary: Response for the Companies' revised programs for inspection, maintenance, repair, and replacement of transmission and distribution circuits and equipment. electronically filed by Mr. George A Yurchisin on behalf of FirstEnergy Corp. and Miller, Ebony