STATE OF ILLINOIS

ILLINOIS COMMERCE COMMISSION

Illinois Commerce Commission	)	
On Its Own Motion	)	
	)	20-NOI-02
Notice of Inquiry Regarding	)	
Electric and Natural Gas Service	)	
Safety and Reliability	)	

INITIAL COMMENTS OF COMMONWEALTH EDISON COMPANY

Introduction

Commonwealth Edison Company ("ComEd" or "the Company") submits these Initial Comments in response to the Illinois Commerce Commission's ("ICC") Notice of Inquiry ("NOI") into the safety and reliability of electricity (and natural gas service)s in Illinois. ComEd appreciates the opportunity to share these responses with the NOI stakeholders and looks forward to the continuing dialog that this process enables.

At ComEd, delivering power *safely* and *reliably* is the very foundation of our business and core to how we serve customers in the Northern Illinois region for the past 100 plus years. In the attached, ComEd has laid out a description of our safety and reliability programs, but the fact is that safety and reliability integral to all of our practices, and it is difficult to articulate in a neat narrative every aspect of this continuous effort. Everything we do, whether in the office or in the field, is tied back to safety and reliability. For example, each meeting and each job briefing at ComEd starts with a safety message. Before initiating any work, crews are briefed on safety, the scope of the work, and the equipment being worked on. Our employees are trained to inspect all equipment for safety hazards before working on the equipment, and all potential hazards that are identified are either addressed right then in the field or they are escalated and addressed in accordance with ComEd's work prioritization schedules with due consideration to public and employee safety.

This pervasive cultural approach is critical in light of the breadth of the system and the extent of work that has been done in recent years. No single process or approach can work alone. ComEd and its more than 6,100 employees are responsible for maintaining more than 100,000 circuit miles of power lines which deliver electricity to approximately 4 million customers in northern Illinois. ComEd invests approximately $2 billion dollars annually in infrastructure improvements. This covers foundational investments critical to the performance and safety of the ComEd system (*e.g.*, replacements of poles and wires, and upgrading substations) as well technological improvements, such as SCADA, distribution automation and enhanced relaying, and the supporting communications networks to optimize the ability to interrupt system faults as rapidly as possible minimizing the potential for arc flash hazards. Since the passage of the Energy Infrastructure Modernization Act (EIMA) in 2011, we have improved system reliability by over 70 percent, making ComEd one of the most improved utilities in the nation. ComEd customers have been spared more than 13 million service interruptions due in part to smart grid and system improvements, including distribution automation or digital "smart switches"

that automatically reroute power around potential problem areas. The avoided outages have resulted in $2.4 billion in societal savings and 94M pounds of avoided greenhouse gas pollution. ComEd's reliability is currently first decile on all relevant industry benchmarks.

While undertaking these transformational investments, ComEd has improved its safety performance each year of the past five years. However, while we are proud of this performance and the many efforts we make across our system every day, as set forth in this response, ComEd's work is never done. We work continually to update our facilities and processes to enhance safety and performance, including developing altogether new approaches. Despite sustained effort and continuing process improvements, and investments, ComEd cannot prevent all outages, nor, despite every reasonable effort, can we eliminate all hazards or prevent all accidents involving the public or our employees. We can, however, and do champion an approach that is dynamic and adaptable. As the steward of this enormous and complex system, we understand that we can only fulfill our responsibilities through a learning mindset that leverages experience, education, benchmarking, planning and self-critique. We continually review our processes to find opportunities for improvement. We review every significant incident and we take corrective action when gaps are identified. ComEd employees participate in numerous industry organizations, and we actively seek to learn and share best practices from others in the industry as well as other stakeholders.

In conclusion, we recognize that the attached response to the NOI is one part of the broader context of ComEd's ongoing practices to carry out its obligation to ensure the safety and reliability of this grid. We look forward to our continued work with the Commission in this effort.

Each NOI question is restated below in bold italics and is followed by ComEd's response. Please note, ComEd's understands that the electric transmission system is not within the scope of the NOI and, as such, ComEd's responses do not fully address its safety and reliability programs specific to its transmission system.

<u>Public Utilities</u>

A. Please explain the processes you use to inspect your utility plant, equipment, and property in order to ensure that utility service is provided in a safe and/or reliable manner. Please include detail on the types and quantities of plant, equipment and property inspected, and how and how frequently such plant, equipment, and property is examined.

ComEd's utility plant, equipment, and property (*i.e.,* T&D system assets) includes, but is not limited to, approximately:

- 1,380,000 wood distribution poles
- 504,000 distribution transformers
- 35,000 circuit miles of primary voltage (4-34kV) overhead distribution lines
- 32,000 circuit miles of primary voltage underground distribution cables
- 32,000 manholes
- 22,000 steel transmission structures (towers and steel poles)

- 11,000 substation circuit breakers and reclosers
- 9,100 transmission wood poles
- 7,400 capacitor banks
- 6,500 reclosers & sectionalizers (distribution automation devices)
- 5,600 4kV, 12kV and 34kV circuits
- 5,400 circuit miles of overhead transmission lines (69kV and above)
- 2,900 substation power transformers
- 1,300 Automatic Throw-Over (ATO) switchgear
- 800 substations
- 380 circuit miles of underground transmission cables

System Design and Construction Standards

Ensuring these facilities are safe and reliable does not begin with inspection. ComEd designs the distribution system comprising these assets in accordance with nearly 900 construction standards, conductor sag tables, engineering design practices and a number of administrative procedures continuously updated to exceed the requirements of Part 305 of the Commission's rules, adopting certain parts of the National Electric Safety Code. The assets are all designed and constructed on system utilizing these controls providing the foundation for safe, responsible, and reliable service delivery.

All designed and planned work on system is also done so in accordance with operational and design guidance including but not limited to:

- CM-CE-021005 "Inspection of Aerial Facilities" which provides requirements for inspection of aerial facilities prior to performing work on the facilities
- CM-CE-P339 "Minimum Field Expectations" which provides requirements for value added work to be accomplished when identified during the performance of regular work activities
- AM-EU-9114 "Required Upgrades of Existing Overhead Distribution Facilities" which provides upgrade requirements for existing overhead distribution facilities as part of designed work

These procedures, enclosed herewith as Attachment 01[1], provide for the continuous review and improvement of the portions of plant encountered by various workgroups during daily activity.

[1] For ease in reference and searchability between procedures, all procedures referenced herein are included in Attachment 01.

Inspection of Newly Installed Equipment

All new equipment installed on system is inspected per CM-CE-303002 "ComEd Ready to Start Inspection Process". Attachment 01.

Additionally, a portion of all newly constructed projects are inspected by a dedicated quality control workgroup (15 staff augmentation FTEs).

Currently, 100% of voltage optimization projects are reviewed. 20% of underground splicing projects are reviewed for mainline and URD cable replacement programs. Other large programs such as distribution automation, LED streetlight replacement, new business, facility relocation, and substation improvement projects make up the remainder of projects reviewed.

Inspection data for items not compliant with current construction standard are recorded and tracked for remediation per QA-CE-1023 "QC Inspection: Entering Inspections into QCI" (Attachment 01) in accordance with QA-CE-1018 "Cost of Quality: Performing Corrective Action for Quality Inspections" (Attachment 01).

Variances are reviewed with construction teams to ensure integrity of future installation.

Preventive and Predictive Maintenance Program

Regular inspections of the above-mentioned T&D system assets are conducted through ComEd's Preventive Maintenance (PM) program, which is proceduralized in ComEd's Management Model Procedure AM-EU-P034 "Preventive and Predictive Maintenance Program" (PM Procedure). Attachment 01.

AM-EU-P034 provides guidelines for development, implementation, and oversight of an effective preventive maintenance (PM) program for the electric transmission, substation, and distribution assets. This is implemented, in part, through dozens of maintenance templates. *See* Attachment 02 for a listing of the current PM templates and their assigned work group.

Each template documents the program tasks, frequencies, failure modes, and maintenance reason for the associated equipment. Tasks and associated frequencies are designed to address known failure modes of the equipment covered by the template. In general, the tasks included in the maintenance templates are derived from the expertise of our field engineers, our Standards and Design Engineering groups, industry benchmarking and manufacturer recommendations.

ComEd also maintains a comprehensive set of technical procedures to support the execution of the program tasks as identified in the maintenance templates. Listed below and enclosed herewith in Attachment 01 are a few representative examples of the hundreds of additional active procedures in place to support inspection and maintenance of ComEd's T&D assets.

- CM-CE-P321 “Overhead Distribution Circuit Inspection and Maintenance” provides requirements for overhead inspections.
- PC-CE-P031 “Program Management Plan Wood Pole inspection, Treatment, Reinforcement, and Replacement” provides requirements for inspecting and maintaining wood poles.
- AM-CE-P166 “Distribution Pad-Mount Equipment Inspection Program” provides requirements for pad-mounted equipment inspections.
- CM-CE-P319 “Inspection process for Distribution manholes and components” provides requirements for distribution manhole inspections.
- SA-CE-929-2001 “Thermographic Assessment of Underground Cables and Cable Accessories” provides requirements for Thermographic assessments of underground equipment.
- OP-CE-P062 “Flooding Inspection, Mitigation, and Response Plan for Substations and Vaults” provides flood planning measures for substations and vaults.
- EP-CE-2033 “Staffing Substations and Visual Inspection of Network Protectors for System Loading Concerns” provides requirements triggered in accordance with system loading.
- CM-CE-402001 “Routine Substation Inspection Procedure” provides requirements for substation inspections.
- CM-CE-332953062 “Circuit Breaker Maintenance Overview” provides requirements for Circuit breaker maintenance.
- CM-CE-033953056 “Substation Inductor Maintenance” provides requirements for inductor inspection.
- AM-CE-121-8001 “Thermography Assessment of 15kV Joints in Substation Cable Spaces” provides requirements for thermography on substation joints.
- OP-CE-P066 “Substation, OH Transmission and Distribution Insulator Contamination Inspection and Maintenance” provides requirements for substation insulator inspection.
- AM-CE-P197 “Transmission Wood Pole Inspection Process” provides requirements for inspecting transmission wood poles (note these poles may carry distribution circuits as well).
- CM-CE-P025 “Scheduled Cathodic Protection Calibration Survey” and CM-CE-027002 “Cathodic Protection Rectifier Surveillance” provides requirements for corrosion control systems.
- CS-CE-09022 “Smart Meter Operations High Temperature Monitoring Emergency Investigation Response” provides requirements for detection of failing customer equipment connections that could lead to thermal events and fires.

Distribution Inspection Programs

The following are the central components of the distribution system inspection and maintenance programs:

Distribution Automatic Throw-Over (ATO) Inspections. The program consists of visual inspection and calibration of Automatic Throw-Over (ATO) switchgear. The ATO switchgear is typically associated with large customers and customers requiring service with greater reliability. The inspection portion of the program is designed to check to see if anything is out of configuration with the ATO gear. This allows pre-emptive maintenance to return the switchgear to normal configuration. The calibration portion of the program is designed to identify repairs needed to the controller of the ATO. Calibration consists of functional testing that simulates loss of source. Refer to maintenance template AM-CE-P034-R3001 for program cycle details. Attachment 01.

Distribution Automation Reclosers. The program consists of visual inspection functional testing, and battery replacement. Distribution automation recloser battery maintenance requires removal of the old battery, installation of the new battery and verification that the recloser is operating correctly following the battery replacement. Functional testing includes opening and closing of the recloser via local and remote control, as well as testing of the Hot-line tag feature. Refer to maintenance template AM-CE-P034-R3035 for program cycle details. Attachment 01.

Distribution Capacitors. The program consists of a visual inspection and functional testing to identify repairs needed to distribution capacitors. The program proactively identifies repair items so that the equipment will function properly when required during peak loading. Refer to maintenance template AM-CE-P034-R3031 for program cycle details. Attachment 01.

Distribution Circuit Patrol and Thermography. The program consists of visual inspection and thermography of aerial circuits. The visual inspection portion of the program identifies broken or missing equipment such as cross-arms, poles, insulators, cutouts, blown lightning arresters, and other potential safety hazards. Unmanned aircraft systems (aka drones) may be utilized to inspect portions of aerial circuits which are difficult to access. The patrol includes mainline and fused taps, and includes conductors (primary and secondary), equipment, protective devices, risers, structures, supports, guying, insulators, hardware, and connections. The thermography portion of the program uses an infrared camera to determine "hot-spots" at equipment and electrical connections. This program does not cover the lateral taps.

Overhead circuit thermography is a non-intrusive technique used to monitor the operating condition of equipment and components. Thermography is a Preventive Maintenance (PM) tool that allows for the identification of anomalies prior to failure and allows for the scheduling of corrective maintenance.

Refer to maintenance template AM-CE-P034-R3026 for program cycle details. Attachment 01.

Distribution Corrosion. The program inspects and maintains the corrosion prevention system associated with the 12 kV and 4 kV underground cable systems at ComEd. This program is structured to maintain the integrity of the existing corrosion protection infrastructure and protect degradation of the underground cable system. Refer to maintenance template AM-CE-P034-R3012 for program cycle details. Attachment 01.

Distribution Manhole. The program consists of visual inspection of underground equipment and structures in manholes. This inspection is designed to find indications of failures that could threaten system reliability. Examples of items identified include leaking splices, bulged joints, broken brackets and other support elements. Refer to maintenance template AM-CE-P034-R3033 for program cycle details. Attachment 01.

Distribution Network Transformers and Protectors. The program consists of visual inspection and calibration of network transformers and protectors. Inspections are designed to check to see if anything is out of configuration with the network protectors. This allows pre-emptive maintenance to return the switchgear to normal configuration. The calibration portion of the program is designed to identify repairs needed to the controller of the network protectors. Calibration consists of functional testing that simulates loss of source. Refer to maintenance templates AM-CE-P034-R3023 (Attachment 01) and AM-CE-P034-R3036 (Attachment 01) for program cycle details.

Distribution Pad-Mounted Equipment (PME). The program consists of visual inspection of pad-mount transformers and switchgear. Refer to maintenance templates AM-CE-P034-R3016 (Attachment 01) and AM-CE-P034-R3019 (Attachment 01) for program cycle details.

Distribution Regulators. The program consists of a visual inspection and functional testing to identify repairs needed to distribution voltage regulators. As with distribution capacitors, the program proactively identifies repair items so that the equipment will function properly when required during peak loading. Refer to maintenance template AM-CE-P034-R3032 for program cycle details. Attachment 01.

Distribution Scada-Mate Switches. The program consists of visual inspection functional testing, and battery replacement. Scada-Mate Switch battery maintenance requires removal of the old battery, installation of the new battery and verification that the switch is operating correctly following the battery replacement. Functional testing includes opening and closing of the recloser via local and remote control. Refer to maintenance template AM-CE-P034-R3035 for program cycle details. Attachment 01.

Distribution Vaults. The program consists of visual and structural inspections. The visual inspection portion of the program is designed to find indications of failures that could threaten system reliability. Examples of items identified include leaking splices and transformers, broken brackets and other structural elements. The structural inspection portion of the program in Chicago is performed by a Licensed Civil Engineering company as required by the City of Chicago Municipal Code 10-28-575. Refer to maintenance template AM-CE-P034-R3018 for program cycle details. Attachment 01.

Distribution Wood Pole Inspection and Treatment. The program consists of inspection and treatment of wood pole infrastructure and to identify those poles that require replacement or reinforcement. During inspection, those poles that show signs of decay are treated to prevent further decay. Pole replacement or reinforcement is executed as part of corrective maintenance. Refer to PCM template AM-CE-P034-R3029 for program cycle details. Attachment 01.

Distribution Vegetation Inspections. The program consists of inspection of 100% of the completed circuits to ensure compliance with the Distribution Clearance Guidelines VM-CE-P061. Attachment 01. Refer to VM-CE-P006 "Vegetation Management QA/QC for Distribution Tree Maintenance Work". Attachment 01.

Substation Inspection Programs

The following are the central components of the substation inspection and maintenance programs:

Substation Circuit Breaker Maintenance and Other Substation Equipment. The program consists of preventive maintenance tasks for various transmission and distribution class circuit breakers, Bifurcating Cabinets, Circuit Switcher, Disconnects, Inductors, and Reclosers. Types of breakers maintained include air, gas, vacuum, and oil. Distribution (typically 34kV and below) circuit breaker maintenance generally consists of visual inspection, operation, and lubrication. Transmission (typically 69kV and above) circuit breaker maintenance consists of visual inspection, diagnostic testing, thermography, fluid sampling, operation and timing tests, gauge verification and compressor maintenance. Targeted transmission class breakers are overhauled on a defined periodicity. Bifurcating Cabinets consist of visual inspections. Circuit Switcher diagnostics testing includes contact resistance testing and normal operation and lubrication. Disconnects maintenance consist of contact resistance testing and operation and lubrications tasks and Inductor maintenance includes inspection and Oil Quality / DGA. Refer to maintenance templates AM-CE-P034-R1001, AM-CE-P034-R1002, AM-CE-P034-R1003, AM-CE-P034-R1006, AM-CE-P034-R1007, AM-CE-P034-R1009, AM-CE-P034-R1005, AM-CE-P034-R1017, AM-CE-P034-R1020, AM-CE-P034-R1023, and AM-CE-P034-R1024 for program cycle details. Attachment 01.

Substation Fire Protection. The program consists of inspection of fire protection systems in substations. The scope includes transformer fire suppression protection, building detection and substation suppression systems at ComEd. Refer to maintenance template AM-CE-P034-R1011 for program cycle details. Attachment 01.

Substation Inspections. The program consists of inspection of monthly, quarterly and annual inspections of substation yards, buildings and batteries along with periodic operation / maintenance of aux generators and sump systems. The data collected during performance of these tasks is used to assess the material condition of the equipment. Conditions identified by these tasks may be used to identify degraded conditions, poor electrical connections or arcing in transformer main windings, transformer tap changer contact degradation, poor electrical connections in open air through-out the yard, leaks of oil/air/SF6 gas, internal gasket or seal degradation and battery problems. Refer to maintenance template AM-CE-P034-R1012, AM-CE-P034-R1013, AM-CE-P034-R1014, AM-CE-P034-R1056, and AM-CE-P034-R1074 for program cycle details. Attachment 01.

Substation Protective Relay Maintenance. The program consists of the planning, general testing procedures and physical inspection for all distribution and transmission protective relays. Distribution (69 kV and below) relay maintenance requires visual inspection of relays and relay panels, validation of instrumentation inputs, settings calibration, and functional trip and automation operation of the respective equipment (breakers, switches, and communications circuits). Transmission (138 kV and above) relay maintenance requires visual inspection of relaying equipment and relaying panels, validation of instrumentation inputs, settings calibration checks, and functional trip and automation operation of the respective equipment (breakers, switches, and communications circuits). Refer to maintenance templates AM-CE-P034-R1031 and AM-CE-P034-R1032 for program cycle details. Attachment 01.

Substation Transformer Maintenance. The program consists of visual inspection, power factor testing, tap changer continuity, frequency response and oil testing. Preventive maintenance activities include heat exchanger cleaning, tap changer mechanism operation and LTC internal inspection. Performance of the PM activities allows problems to be identified, prioritized and addressed prior to major component failure. Examples of items found are high gassing levels which could lead to main tank rupture or winding failure, loose windings on 300 MVA autotransformers that result in loss of a major asset, bushing failures that result in transformer fire, and environmental contamination. Refer to maintenance templates AM-CE-P034-R1019 and AM-CE-P034-R1050 for program cycle details. Attachment 01.

Substation Bus Inspection. The program consists of periodic maintenance tasks and visual inspections necessary to assure proper operation and structural integrity of a substation bus, including bushings, insulators, bus work and bus duct. Refer to maintenance template AM-CE-P034-R1017 for program cycle details. Attachment 01.

Remote Asset Health Monitoring and Data Analytics

In addition to the preventative maintenance programs and inspections, a key component to the safety and reliability of ComEd's distribution system is the over 10,000 distribution assets continuously monitoring a multitude of operational data points across ComEd's real time supervisory control and data acquisition (SCADA) network providing continuous awareness of alarmed or anomalous system conditions which are constantly monitored and responded to 24/7/365. This is complemented by radio frequency (RF) connectivity to the 4.3 million smart meters which are all actively monitored to provide alert to potential anomalous system conditions including high temperature monitoring of the meters and the customer cabinets which contain them to aid in detection of failing customer equipment connections that could lead to thermal events and fires.

Data from monitored assets, such as distribution automation, is utilized to provide real time analysis of system events which aids in outage identification and restoration. When an event occurs on the distribution system the sensing and automation technology enable several critical benefits. They enable the automatic isolation of a faulted condition on the distribution system, the restoration of customers outside of the faulted equipment section, and immediate awareness across the utility communications network of the occurrence and where it occurred. This in turn enables optimized targeted inspection of potentially faulted facilities for efficient safety and repair.

Additionally, data from monitored assets is utilized to identify equipment problems before they present safety, reliability, and operational concerns. Examples include voltage sensors issues on distribution automation equipment or neutral sensors on capacitors. If a wire or connection becomes loose or disconnected these various sensing elements can identify this through the associated voltage and current excursions which enables the targeted inspection of the subject equipment and serving conductor to identify and repair incipient failures.

ComEd's intelligent substations also feature transformer-monitoring devices, which include load tap changing (LTC) control and online dissolved gas in oil analysis on the LTC and main tank compartments. These intelligent substations also possess breaker-monitoring features such as mechanical and electrical operating times of the main contacts and contact wear.

1% Worst Performing Feeder Inspection

Those areas of the system which present as having a lower service reliability across various measures (*i.e.,* 1% worst performing) receive supplemental inspection utilizing both dedicated inspection personnel as well as reliability engineering personnel. (AM-CE-P110 "1% Worst Performing Circuit Program" as example). Attachment 01. Such supplemental inspections occur as specific performance is identified.

Smart Meter Operations

Every meter in the field that is worked on or read by Field and Meter Services (F&MS) Techs and Meter Readers is subject to a preliminary safety inspection that is meant to identify any issues or concerns with the customers equipment, identify public safety concerns, and ensure the employee's safety while performing work. This includes but is not limited to visual inspection of the outside and the inside of metering equipment and surrounding area and performing voltage and temperature checks. ComEd also has numerous meter inspection programs and uses remote system monitoring and data analytics to identify and address potential safety and reliability issues. Both of these areas of work are discussed below.

Smart Meter Operations - Inspections

- 4-year Cyclical Inspections

  Meter Reading inspects every certified AMI meter within the territory on a 4-year cycle. This includes a visual inspection of the meter condition, a Watt-Hour Read of the meter, as well as a temperature scan of the meter. This is done in order to identify, investigate, and resolve any issues with the accuracy of the meter, potentially unsafe conditions, as well as identify tampering conditions.

- Random Sample Inspections/Testing

  The total population of ComEd's meters is divided into groups consisting of meters of the same basic type and purpose. A sample of the meters from each group are taken each year and tested. This inspection tests the accuracy and resiliency of our different meter groups. Refer to CS-CE-191 "Annual Random Sample Procedure". Attachment 01. *See* 83 Ill. Admin. Code Sec. 410.180

- Periodic Exchange/Test

  Consistent with ICC rules, ComEd either exchanges or tests all C&I meters over an 8-year cycle. Refer to CS-CE-190 "Periodic Exchange Program" Attachment 01. *See* 83 Ill. Admin. Code Sec. 410.170

- Customer Requested Meter Tests

  Upon a customer's request, F&MS will test the customer's meter within 30 days after receiving the request, unless the customer agrees to a later time. The test is performed at the meter installation location and in the customer's presence, unless the customer gives consent for the meter to be removed and/or tested outside the customer's presence. *See* 83 Ill. Admin. Code Sec. 410.190.

- Meter Reading of Legacy Meters

  ComEd's Meter Reading group ensures that a Watt-Hour read is made on non-certified AMI or Legacy meters in the ComEd territory. These reads are used for billing purposes on accounts. However, as previously mentioned, an inspection of the meter is performed whenever an in-person meter reading occurs. This ensures accurate billing for our customers as well as identify potential unsafe conditions.

- Meter investigations after remote switch opening

  F&MS performs a meter inspection 30-days after a disconnect without payment as well as 90-days after move-out without successor. These inspections are done in order to identify, investigate, and resolve potentially unsafe conditions, as well as identify tampering conditions that might exist at the premise.

- Auxiliary Maintenance

  Within 90 days after installation or exchange of any meter with associated instrument transformers and/or phase-shifting transformers, F&MS performs a post-installation inspection that is made under load to determine if the meter is accurately measuring customer energy consumption.

  Refer to CS-CE-0061 "Auxiliary Maintenance Order Procedure" Attachment 01. *See* 83 Ill. Admin. Code Sec. 410.155.

Smart Meter Operations – System Monitoring and Data Analytics

- Identification of over-heating customer equipment

  ComEd's AMI meters provide ComEd with meter temperature data every 4 hours. A higher than normal temperature may be the result of direct sun light or some other environmental factor, but it can be an early indication of customer equipment degradation that needs replacement or repair. ComEd uses this meter temperature data along with the 30-minute meter usage data, and weather data and performs extensive data analytics via machine learning to identify potential safety concerns and minimize false-positives. Based on the data analytics, field investigations are created daily to inspect meters and remediate any potentially unsafe conditions that are identified. Investigations are dispatched within 24 hours.

- Identification of potential unsafe conditions resulting from meter tampering and theft

  ComEd also uses AMI data analytics to monitor for theft of electric service. This intentional diversion of electricity often occurs via meter tampering and presents unsafe conditions for the public, building occupants, and our employees. Most meter tampering occurs after the power is disconnected by ComEd at the meter (*e.g.,* disconnections for non-payment of bill or no customer of record in premise) and may come to ComEd's attention by a meter no longer communicating with ComEd's AMI network or by unusual/non-existent energy usage. Based on the data analytics, ComEd generates field investigations daily to inspect the meters and remediate any electric diversion or unsafe conditions identified. Service to customers with non-communicating meters that can't be accessed may be disconnected until access is granted and the potential safety issue is addressed.

- Identifying other meter malfunctions

  ComEd's meter data analytics also identify various other meter malfunctions. Whenever a potential malfunction is identified, field investigations are generated daily to inspect the meters and remediate any adverse conditions that are identified.

The totality of the suite of ComEd's AMI meter data analytics results in quicker and more efficient resolution of potential unsafe conditions, more reliable and accurate meter reads and an overall enhanced customer experience.

Finally, ComEd has deployed a mobile application called Udentify® that allows all employs and authorized contractors to report issues that are identified outside of their normal role/job.

Udentify® App features include:

- Capture GPS Location
- Take Photographs
- Input User Notes and Customer Contact Information
- Emergency Phone Reporting Capability
- Submission and Issue Tracking

B. Please explain how many workers currently perform such inspections, the average time spent in the field by each worker examining equipment and facilities, an estimate of the amount of utility plant, equipment, and property inspected annually by each worker, the qualifications of the workers performing such inspections, how workers are trained, how workers training is update to include changes in requirements, and how the work performed by the workers is supervised.

<u>Inspection Frequencies and Employee/Contractor Staffing</u>

The inspection, testing, and routine maintenance frequencies are described in the maintenance templates in Attachment 02. The primary responsible workgroups for the PM tasks are indicated (indicated with an "X") as well as those workgroups who engage in regular inspection of the subject assets (indicated with an "O").

The charts below indicate the number of workers in the respective workgroups, and the number of supervisors in the workgroups. Depending on the inspection, the inspection frequency can vary between weeks and years and the time to perform the inspection can vary between minutes and hours. As a result, the amount of plant inspected by any one worker varies widely.

ComEd workers that perform such inspections:

Workgroup	**# of Employees**	**# of Supervisors**
Transmission Overhead (TOH)	78	9
Transmission Underground (TUG)	22	2
Area Operating (AO)	145	14
Network Highrise Group (NHG)	46	5
Substation Construction (SSC)	331	44
Corrosion	5	1
T&S Services	26	3
IR Tech	4	1
Battery Tech	4	1
Testing Group (TG)	122	17
Area Maintenance Engineers (AME)	17	-
Distribution Overhead	722	109
Distribution Underground	321	34
Overhead Electrician Special (OES)	241	20
Maintenance Inspectors (MI)	30	3
Distribution Field Engineering (DFE)	9	2
Distribution Automation Field Engineering (DAFE)	11	3
Distribution Engineering	100	12

Contractor workers that perform such inspections:

Procedure[2]	**Description**	**Name of Contractor**	**# of Contractors**
AM-CE-P034-R3018	Distribution Vaults	HBK Engineering	6
AM-CE-P034-R3029	Wood Poles	Osmose	84
AM-CE-P034-R3002	Overhead Thermography	Hurley	6
AM-CE-P034-R1076	34kV and below Battery Energy Storage Systems (BESS)	Lockhead-Martin, Tesla	TBD
AM-CE-P034-R1011	Fire Protection Buildings and Yards	Phoenix, Great Lakes	8
AM-CE-P034-R1012	Substation Building - Roofs, HVAC	Anderson & Shah Roofing, Midwest Mechanical, State	4

[2] All procedures are included in Attachment 01.

Procedure[2]	Description	Name of Contractor	# of Contractors
		Mechanical, Jones Lang LaSalle	
AM-CE-P034-R1013	Substation Yards	Environmental	1 or 2 per contractor, but only for a few days over the entire year
AM-CE-P034-R1019	Power Transformer	MEPPI, Seimens, Great Lakes	1 or 2 per contractor, but only for a few days each over the entire year
AM-CE-P034-R2001	Overhead Transmission, Structures	Osmose	4 (4 FTE for 4 weeks/year)
AM-CE-P034-R2001	Overhead Transmission, Structures	Rodgers Helicopters	2 (helicopter pilot & mechanic, 2FTE)
AM-CE-P034-R2002	Overhead Transmission, Foundations	Rodgers Helicopters	
AM-CE-P034-R2003	Overhead Transmission, Line Switches	Rodgers Helicopters	
AM-CE-P034-R2004	Overhead Transmission, Conductors	Rodgers Helicopters	
AM-CE-P034-R2005	Overhead Transmission, Insulators	Rodgers Helicopters	
AM-CE-P034-R2007	Line High Pressure Fluid Filled (HPFF) Cable System	Prysmian	4 Primarily done by ComEd supplemented by 4FTE for 1 week/year
AM-CE-P034-R2008	Line Solid Type Cable System (XLPE)	Prysmian	6 ~45 days per year
AM-CE-P034-R2009	Cathodic Protection Equipment Underground Transmission	Cathodic Protection Management	3 FTE for ~4 weeks/year
AM-CE-P034-R2009	Cathodic Protection Equipment Underground Transmission	EN Engineering	4 FTE 1 week/year (average & subject to change)
AM-CE-P034-R1031	Protection System Equipment Transmission	Krueger	7
AM-CE-P034-R1074	STATION DC SUPPLY, includes station batteries and battery chargers	Motorola	4

The average amount of time spent in the field examining equipment and facilities varies by worker and workgroup as well, but for the listed workgroups, with the potential exception of Maintenance Inspectors and Distribution Engineering, all of the indicated workgroups spend the vast majority of their time (40hrs per week) building, operating, maintaining assets in the field. However, ComEd does not track the amount of equipment inspected annually by each worker. As a general matter, the number of inspections by individual employee will vary based upon the type of equipment being inspected, variations in field conditions, and other localized, situational and environmental variables. ComEd's Maintenance Inspectors are dedicated to performing inspections.

Training and Qualifications

ComEd has a dedicated Training Department with the primary responsibility of ensuring construction crews have the knowledge and skills necessary to perform their jobs in a safe and competent manner. ComEd's employees that perform system inspections are qualified to perform their jobs through formal training under TQ-EU-Y003 "Training and Qualification Policy" (Attachment 01) which is intentionally focused to ensure ComEd employees are trained in and are familiar with the safety-related work practices, safety procedures, and other safety requirements that pertain to their respective job assignments and applicable construction standards. Initial training provides personnel with requisite knowledge and skills to perform their job function. Continuing training, which is held annually, refreshes and enhances the knowledge and job-related skills for improved job performance.

The following Training Programs for employees performing inspections are owned by the Training Department, but Training Department personnel work hand-in-hand with construction line personnel in all progression training topics (Attachment 01).

- TQ-EU-Y003 Training and Qualification Policy
- TQ-EU-P128 Training Program
- TQ-EU-111 Overhead Construction Training Program
- TQ-EU-P133 Overhead Electrician Special / Troubleman / Service Operator Training Program
- TQ-EU-1028 Overhead Transmission (OHT) Training Program
- TQ-EU-P112 Underground Splicer Training Program
- TQ-EU-P114 Substation Construction & Maintenance (SSC&M) Training Program
- TQ-EU-P1041 Area/Substation Operator Training Program

In addition to continuous updates to core training curriculum, changes in inspection requirements are typically communicated via procedure change notifications, Field Bulletins, Technical Bulletins, and on the job training.

The training received by each workgroup is significant and generally includes combination of classroom time/computer modules and well has hands-on activities. By way of example, the following is the current training curriculum for the overhead construction workgroup, including the training modules that relate to the inspection of equipment, plant and property,

and the Job Performance Measures (JPM) which provide detailed objective criteria against which the ability of a trainee to perform a particular task is measured and documented.

Line workers are a feeder pool for Maintenance Inspectors who routinely perform circuit inspections.

The overhead apprentice training timeline:

- Climbing School 1 week
- Secondary School 15 weeks
- On-the-job training (OJT) 36 weeks
- Single-phase primary School 5 weeks
- On-the-job training (OJT) 60 weeks
- Three-phase primary School 5 weeks

Climbing School (1 week)

A school that provides instruction in basic pole climbing techniques.

Secondary School (i.e. Basic Line School) (15 weeks)

Entry-level overhead construction training that provides the knowledge and skills required for personnel to safely and effectively perform the tasks associated with their job. Focus is on secondary voltage equipment and overhead construction standards.

Training Modules	**Job Performance Measure (JPM)**
M2: Safety Overview	JPM1 Climb Over Obstructions
M3: Tools	JPM2 Inspect & Use Tools (hand, compression, etc.)
M4: Construction Standards	JPM3 Tie Knots (rope inspection)
M5: Advanced Climbing	JPM4 Attach Crossarms
M6: Ropes & Rigging	JPM5 Install Primary Conductors
M7: Aerial Lift Ops	JPM6 Hang/Connect Transformers
M8: Poles & Attachments	JPM 7 Operate Aerial Lift
M9: OH Conductor Installation	JPM8 Perform Bucket Rescue
M10: Testing Devices	JPM9 Install Secondary LSM Open Wire
M11: Single Phase Transformers	JPM10 Install Residential Services
M12: PPE & Protective Equipment	JPM11 Use Low Voltage Tester
M13: Secondary Services	JPM12 Test Phases with Continuity Tester
M14: URD Prep	JPM13 Parallel Transformers
M15: URD Equipment & Trenching	JPM14 Install/Connect URD Cable
M16: URD Transformers, Peds, Raceways	JPM15 Isolate & Dead Test Cable
M17: Cable ID/Fault Locating	JPM16 Restore Equipment Damaged by Storm
M18: Grounding	
M19: Switching & Dist Automation	
M20: SRP	

On-the-Job Training (36 weeks)

After completion of Climbing School and Secondary School, employees are required to complete 36 weeks of on-the-job training which includes practice of skills taught in secondary school before they are allowed to move on to Single-Phase Primary School. An On-The-Job Training (OJT) task book is utilized to demonstrate in the field, competence of skills that were learned in the classroom. This must be completed prior to progression.

A First Line Supervisor assigns Trainees to a Trainer in order for the Trainee to reach proficiency in each task as identified by the OJT Book.

During the OJT period, the trainee receives feedback to ensure his/her mastery of safely and accurately executing OJT tasks skills. The Trainee and Trainer shall record activities in the On-the-Job Training Matrix with date and initials, daily. The Trainer will provide feedback during and after tasks to improve or reinforce successful performance.

The Trainee will present the OJT Book to the FLS for review and signoff. The FLS must observe the performed task to validate competency and mark A (acceptable) or U (unacceptable) in the tasks last entry with date. The FLS will present the OJT Book to the Manager for final review and signoff.

OJT may occur by either performing or simulating the task. Performance is the preferred method of OJT. Performance is typically done after discussion and demonstration; simulation may be necessary to "create" field/office conditions.

Single-Phase Primary School (5 weeks)

Overhead construction training that provides the technical knowledge skills and abilities required to perform tasks on or around single-phase wires where it is not necessary to reach over energized conductors to perform a given task.

Training Modules	**Job Performance Measure (JPM)**
M1: Safety Overview	JPM1 Test Weather head/Meter Sockets
M2: C&M Overhead Review	JPM2 Install New Service Wire
M3: Testing Devices	JPM3 Parallel Transformers
M4: Hotsticks	JPM4 Change Insulator (4kV Climb)
M5: Aerial Lift Ops	JPM5 Change Dead Strain Insulator (4kV Climb)
M6: Energized Single Phase	JPM6 Repair a Tap with Load Pickup
M7: OH Single Phase Transformers	JPM 7 Transfer Double Dead End
M8: Grounding and EPZ; LOTO	JPM8 Replace Transformer 12kV Bucket
M9: Switching, Sectionalizing, Fuses/Cutouts	JPM9 Install Phase Opening 12kV Bucket
M10: Restoration	JPM10 Repair Downed Sing Phase 12kV Bucket
OJT Single Phase	JPM11 Replace Energized Cutout 12kV Bucket
	JPM12 Grounding 3Phase Circuit
	JPM13 Install an LTD
	JPM14 Cut in Section Fuse

On-the-Job Training (60 weeks)

After completion of Single-Phase Primary School, employees are required to complete another 60 weeks of on-the-job training which includes practice of skills taught in the single-phase school before they are allowed to move on to Three-Phase Primary School.

Three-Phase Primary School (5 weeks)

Overhead construction training and associated training that provides the technical knowledge, skills and abilities required for personnel to safely and effectively perform the higher-level tasks associated with the job. Completion of this school (after successful completion of the aforementioned schools) qualifies the worker to perform work on all types of overhead construction.

Training Modules	**Job Performance Measure (JPM)**
M1: Testing & Energized Primary Work	JPM1Changing Insulator 4kV Climb
M2: Switching & System Protection	JPM2 Change Strain Insulator 12kV Climb
M3: 3 Phase Transformers	JPM3 Change Tap 12kV
M4: 3 Phase Transformer Bank Installation/Replace	JPM4 Change Dead End Strain Insulator (4kV Climb)
M5: 3:1 Transformers, Regulators and Cap Banks	JPM5 Remove a Line Splice (12kV)
M6: Advanced Emergency Restoration	JPM6 Change a Crossarm (12kV)
M7: Multiphase URD Transformer/Cable Installation	JPM7 Replace Corner Tap 12kV
	JPM8 Install Wye Closed Delta
	JPM9 Install Wye Open
	JPM10 Install Wye Wye
	JPM11 Equipotential Grounding 3PH Circuit 12kV Bucket
	JPM12 Secondary Line Tracing with Dynatel
	JPM13 Secondary Line Fault Locating with Dynatel
	JPM14 Secondary Fault Locating with SpitFire
	JPM15 VLF Testing & Thumping
	JPM16 Dead Testing with Grounder Hotstick Cutter

After completion of Three-Phase Primary School, employees complete the apprenticeship program.

Maintenance Inspectors (MI) that are responsible for performing circuit inspections have typically completed Line School and worked in the field. Maintenance Inspectors are provided with ComEd's requirements for overhead inspections CM-CE-P321 "Overhead Distribution Circuit Inspection and Maintenance". Attachment 01. It is a comprehensive document that outlines inspection and maintenance requirements for 4kV, 12kV, and 34kV overhead circuits as well as

the responsibilities of the multiple organizations involved in the process. It also outlines tasks for performing inspections and issuing the resultant correction maintenance follow-up actions. Included in the procedure is a checklist of items to look for during the inspection CM-CE-P321-R0001 "Overhead Circuit Inspection Checklist". A supplemental training handbook (Overhead Distribution Circuit Inspection Criteria) which provides examples of various potential inspection findings is also provided to all Maintenance Inspectors. Attachment 03.

The inspection cycles are as follows:

- 34kV- Every 2 years- entire circuit
- 4kV & 12kV - Mainline every two years and fused taps every 4 years

Inspection findings of immediate concern such as broken poles, primary wire on crossarm, and severely leaking transformers and reclosers, are classified as Emergency Maintenance and as priority 10. *See* ComEd's response to 20-NOI-02(E) for information on work prioritization. Priority 10 findings are to be addressed immediately until completed. Findings not classified as Emergency Maintenance are pre-categorized per CM-CE-P321-R0001 "Overhead Circuit Inspection Checklist". Attachment 01.

Similarly, pad-mounted equipment findings not classified as Emergency Maintenance are pre-categorized per AM-CE-P166-R0001 "ComEd Transformer Inspection Checklist" Attachment 01 and AM-CE-P166-R0002 "ComEd Switchgear Inspection Checklist" Attachment 01. A supplemental training handbook (Distribution Pad-Mount Switchgear and Transformer Inspection Criteria) provides Maintenance Inspectors with examples of various potential inspection findings for pad-mounted equipment. Attachment 04. These inspection checklists and supplemental training handbooks are also utilized for annual training with the Maintenance Inspectors.

ComEd utilizes varying levels of supervision to oversee the planning and execution of preventive maintenance programs. For each of the workgroups this includes a level of direct supervision in the performance of inspection activities.

First line supervisors are trained in accordance with CM-CE-P055 "On-Board/Orientation Process For C&M First Line Supervisors" (Attachment 01) to provide the tools and guidelines for effective supervision in their workgroups. For all of those workgroups that include represented (union) employees, the first line supervisors utilize ESup in accordance with HR-CE-1002 "Documenting Represented Employee Performance in ESup" for the purpose of performance management and feedback to represented employees. Attachment 01.

For circuit and pad-mounted equipment inspections performed by Maintenance Inspectors, the quality of each inspector is audited by their supervisor multiple times annually. The audit process is performed by the supervisor reperforming a subject inspection at random and evaluating that the inspection performed had identified the same corrective maintenance items and same priority determination. Variances in the findings are addressed in a field visit by the supervisor and inspector to discuss the differences in identification to develop learnings and drive alignment and ensure integrity of future inspections.

ComEd also provides training to distribution engineering personnel in accordance with TQ-CE-P134 "Engineering Training Programs" and TQ-EU-P131 "New Business DCC/GSR/CPE/Designer Training Program". Attachment 01. Initial training includes theory, knowledge, and performance-based instruction and evaluation to establish knowledge and skills. Initial training consists of training on common entry-level topics as well as performance-based instruction and evaluation on company processes, engineering standards and technical processing related tasks. The New Business Training Program consists of an integrated classroom and or laboratory and or OJT presentation. The classroom/laboratory/OJT has been sequenced to build from basic knowledge, to simple application of skills, to demonstration of more complex skills and knowledge. Training programs associated with specialty tasks for which only a subset of the workforce is trained, will be provided as continuing training programs or OJT as required and requested by the business (through participation in the Training Council / Curriculum Review Committees).

C. Please explain whether your utility uses third parties to verify that inspections are performed timely and accurately and, if so, how such verifications are conducted.

ComEd has internal policies and procedures in place to ensure inspections are performed timely and accurately. ComEd does not utilize third parties to verify inspections.

Upon completion of an inspection, the associated work order is completed in Cascade/Asset Suite or equivalent electronic work management database. Close out comments relative to the scope of work performed, conditions found, and Corrective Maintenance work orders generated are included in the work order completion comments. Once the inspection work order is completed in the system, another work order is automatically created at a set lead time to ensure inspections occur at the required frequency.

The timely completion of inspections is monitored internally using metrics such as "PMs Completed" and "PMs overdue/deferred beyond original grace period". The PM's Completed metric monitors number of PM work orders completed versus target. The targets are set at the beginning of the year based on open PMs for each equipment type. The PMs overdue/deferred beyond original grace period metric tracks the number of overdue or deferred preventative or predictive work orders that exceed their grace period. PMs that exceed their overdue date and do not have a maintenance complete date entered in the work management system of record are considered overdue. Inspections that are delayed intentionally (due to outage restrictions, equipment change outs, etc.) beyond the overdue/late date are considered deferrals. Overdue and deferred PMs are closely monitored by ComEd leadership to be completed as soon as possible.

D. Please explain whether your utility uses third parties to perform inspections and, if so, how your utility ensures that inspections are performed timely and accurately.

ComEd utilizes third parties to perform certain inspections that are retained via a competitive bid process amongst qualified industry service providers. The performance of the following inspections is overseen by a ComEd Program Manager (PM) with monthly tracking and reporting.

Overhead Distribution Circuit Thermography Inspection. ComEd uses a contractor (currently HurleyIR, Inc.) to perform a portion of the programmatic thermography inspections of its overhead circuit population. Spot checks are conducted by a certified thermographer to ensure similar maintenance items and priority were identified. Variances are reviewed with field technician and contractor to ensure integrity of future inspections.

Manhole/Vault Inspection (including civil). ComEd has upwards of 32,000 manholes. ComEd utilizes contracted engineering suppliers (predominantly HBK, but civil inspection services have been provided by multiple providers including but not limited to V3 and DB Sterlin) to perform comprehensive assessments of the civil structures as well as all electrical plant assets contained therein.

Wood Pole Inspection. ComEd uses a contractor (currently Osmose Utilities Services, Inc.) to inspect and treat its wood pole population. During the inspection, the pole is checked for visual defects to serviceability and signs of decay. If any safety hazards are identified by Osmose, they are to be immediately reported for operational response. Hazardous situations identified in the field such as active leaking transformers, downed wires, and wires within public reach are called in to be assessed by ComEd operating personnel. The contractor also provides photos of identified reject poles to aid in work verification.

Fire Protection. ComEd uses contractors (Great Lakes Fire and Safety and Phoenix Fire System) to inspect, test and maintain its Fire Protection systems, including Detection Inspection, Novec Suppression and associated Louvres, Sprinkler System, Manual Water Deluge Systems, Fire Extinguishers, Fire Hydrants, Backflow Preventers, Drain /Refill of Tanks, Internal Inspections, Water Mist Discharge Test, Fire Pumps and Sprinkler Bypass Valves.

Static Var Compensator Units (SVC). The SVCs service to ensure transmission voltage is maintained during transmission system disturbances. This type of voltage support ensures that the transmission system can successfully isolate the source of the disturbance and prevent a large-scale black-out event. The SVC Manufacturer's (MEPPI and Siemens) highly trained technicians visit the SVC site to inspect and maintain the major power electronics components within the SVC (Thyristor Valve, HMI, LCP, TVC, VBE, and Cooling System).

Substation Roofs & HVAC/Ventilation Equipment. Roof, heating, ventilating, and air conditioning equipment inspections and maintenance are performed by a third-party vendor.

Cooling System at TDC784 Wills Tower. ComEd uses contractors (Great Lakes Plumbing) to inspect and test the Cooling System at TDC784 Wills Tower. The Passive Water-Cooling test protects the station in the event of catastrophic cooling failure.

Fiber and Microwave Communications. ComEd uses a contractor (Krueger Tower) to inspect and maintain our microwave communication towers. ComEd uses a contractor (Motorola) to inspect and maintain our microwave communication equipment.

Overhead Transmission Aerial (Structures, Foundations, Switches, Conductors, Insulators). ComEd uses a contractor (Rodgers Helicopters, Inc.) to inspect overhead transmission facilities.

High Voltage Cable Systems (Solid-Dielectric) Manhole Inspections. ComEd uses a contractor (Prysmian) to perform jacket testing on Solid Dielectric (XLPE) cable.

Cathodic Protection Systems - High Pressure Fluid Filled (HPFF) cable pipeline surveys. ComEd uses a contractor (EN Engineering) to perform Cathodic Protection Management

Distribution Vegetation Inspections. ComEd uses a contractor (Davey Tree Expert Co) to perform field inspection of 100% of completed circuits to ensure compliance with the Distribution Clearance Guidelines VM-CE-P061. Attachment 01.

Deficiencies may include:

- Insufficient Clearance – Vegetation that does not meet ComEd's Vegetation Management Distribution Clearance Guidelines.
- Poor Cuts – Pruning cuts that do not meet ANSI A300 standards.
- Skips – A tree or location that has not been worked.
- Dead Overhang – Any dead branches directly above a conductor.
- Vines – Living vine(s) on pole, guy wire, or any other equipment that have not been cut. Vines are typically cut in two places and herbicide is apply to the cut stump.
- 34kV Overhang – Any vegetation directly above a 34kV.
- Removal Deficiency – Stumps not cut flush with the ground or incomplete removal.
- Herbicide Deficiency – Herbicide not applied, herbicide log missing or incorrect.

E. Please explain how issues identified through inspections are addressed including how issues are prioritized and how potentially systematic issues are addressed.

ComEd performs regular maintenance and repairs on its equipment throughout the year.

Maintenance and repairs found during inspections are prioritized in accordance to Work Management procedure WM-EU-P014 "Work Screening and Prioritization." Attachment 01. The highest priority of repair is given to those repairs which correct an immediate safety hazard to the public or employees. Other repairs are prioritized based upon the reliability impact.

In general, repairs may be prioritized into four (4) categories:

- Priority 10 repairs require an immediate response and will be worked 24/7 until they are complete. These items will have direct and immediate impact to safety, CAIDI or SAIFI.
- Priority 20 repairs are required to begin within 24 hours, depending on system conditions (i.e. weather). The work is targeted for completion within 14 days.
- Priority 30 repairs are typically completed within 9 months and should not exceed 1 year
- Priority 40 repairs are longer-term items. They do not pose an impact on the number or length of power outages. Impact on SAIFI/CAIDI would result only if the condition degrades. Repairs shall be completed not to exceed the predominant maintenance cycle interval.

Examples of Priority 10, 20,30, and 40 repairs are described in WM-EU-P014. Attachment 01.

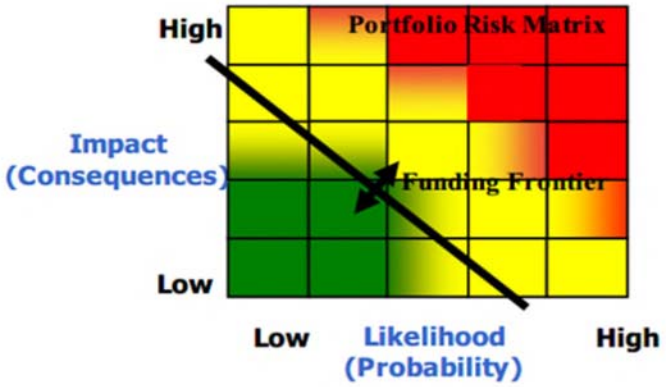
ComEd also has special "Fix it Now" teams that focus on making high-priority repairs to ensure they get done quickly. The Fix-It-Now (FIN) teams typically address the bulk of baseline emergent work (Ex/Priority 10s & 20s and support other budgeted work as the volume of emergent work permits.

Standardized Hyperion reports are available to track the inventory Open and Completed Corrective Maintenance (CM) task.

Periodic Corrective Maintenance (CM) tasks reporting also includes:

- Weekly CM open inventory reporting
- Monthly Key Performance Indicators (KPI) & executive review meeting
- Quarterly CM executive review meeting

Potentially systematic issues are addressed via changes to inspection criteria and integrated into Preventive Maintenance (PM), Corrective Maintenance (CM), and System Performance (SP) investment programs. Non-emergent work is evaluated using a risk scoring model that incorporates the potential impact of Safety, Environmental, or Reliability concerns of our system. Projects are prioritized based upon an objective risk assessment that combines the "impact" (consequences) of the potential failure with the likelihood (or probability) of that failure occurring. The portfolio risk matrix, reflected in the graphic below, quantifies the "impact" and "probability" of a failure on a scale from low to high. Risk modeling allows investments and work to be targeted where it will provide the most benefit to customers.



F. Please explain whether your utility provides safety awareness training or education to contractors and/or the public and, if so, please explain how this training or education is conducted.

Safety Awareness for Construction Companies, Contractors and Others Working in the Proximity of Electrical Equipment

Each year ComEd mails an average of 78,000 information packets to companies throughout the ComEd service territory that have been identified as At Risk Workers, *i.e.*, a third party has identified these companies as working in ComEd's service territory and having an industrial classification which suggests they engage in underground digging and/or work near electrical equipment. ComEd alternates annually between sending them the "Safety Around Power Lines" and "The Power of Making the Right Call" brochures. Attachment 05 and Attachment 06. ComEd's External Affairs organization also works closely with municipalities, municipal leagues, and counties to distribute our Worker Beware Booklet. Attachment 07. ComEd also distributes this booklet at trade expos, safety presentations and industry meetings.

ComEd's Damage Prevention group also provides education on electrical awareness and safe digging practices through distribution of Excavation Handbooks (1) Chicago Excavator handbook, Attachment 08; and (2) JULIE Excavator Handbook, Attachment 09), and Job Site Checklist (Attachment 10), The Damage Prevention group regularly perform safety presentations, contractor audits, and jobsite interviews. They also attend JULIE council meetings. ComEd and all Contractors and vendors must comply with our Rules to Dig By (Attachment 11).

General Public/Youth Safety Education

ComEd.com has a significant focus on educating our communities on what electricity is, what ComEd does as the local electric utility, and the importance of safety around electrical equipment. The Safety section of ComEd's website has general information on electrical safety, construction safety, safety when working around trees and overhead power lines, and information on calling the one-call center at least 48 hours before digging so that underground utilities may be properly located. The Education section of ComEd's website includes, among other things, "Energy Basics", providing what electricity is and how it powers our communities, and information for teachers and students intended to further engage and inform young learners on electricity and safety around electrical equipment.

ComEd uses a variety of other tools to educate the public:

- Bringing Home Safety booklet (Attachment 12) – Each year ComEd distributes Bringing Home Safety booklets to students throughout the service territory. Students are encouraged to share them with their families. The booklets address important topics such as: phone numbers to call in the event of downed wire, safety around powerlines, safe digging, hazards from above, down lines, and emergency situations (e.g., car hits a pole or transformer).

- Safety Town – ComEd's Safety Town program includes over 500 students annually and provides a high voltage demonstration model that shows a variety of relatable electrical hazards with overhead and underground service. ComEd also hosts demonstration projects at its Utility of the Future training labs in Rockford and Chicago. See Attachment 13.
- Advertisements - On average, ComEd routinely purchases newspaper, magazine and Live Radio advertising space to educate the public on the importance of safety around electrical equipment. While these ads run throughout the year, ComEd has a heightened focus on this important messaging in the Spring and Summer for construction and storm seasons. ComEd advertisements are in English, Polish and Spanish. ComEd also uses strategically located Digital Billboards to share safety messages across high-traffic areas within the Chicagoland area. Similar to the radio, newspaper and magazine advertisements, ComEd focuses its billboard time to periods when the public is more likely to be outside doing work near power lines. Primary audiences are contractors, DIY customers, moonlight contractors. The billboards that are utilized are strategically placed within 2 miles radiuses of major home-improvement retail stores. Attachment 14.
- Social Media - ComEd's e-Channels team place an important role in educating the public. Utilizing Facebook, Twitter and YouTube, ComEd provides weekly messaging on safety. Examples are provided in Attachment 15. We also post "Safety Sadie" videos, which are engaging safety videos geared for children. Safety Sadie videos can be found at: https://www.youtube.com/watch?v=1zld9EQVQJQ – Lightning Safety with Sadie; and https://www.youtube.com/watch?v=DCcimjGUsUk – Outdoor Safety With Sadie.
- ComEd's Annual Bill Insert - Each year ComEd includes with its bills an insert on Powerline Safety. The message varies from year to year, but the 2020 Annual Bill Insert message is as follows:

> POWERLINE SAFETY: Water and electricity don't mix—that's why it's important to be aware of your surroundings and watch out for electrical hazards when working or playing around water recreation areas. Look for overhead power lines before performing activities such as casting a fishing line, using a pool skimming tool or raising a boat mast, and NEVER swim around docks with electrical equipment or boats plugged into shore power. Always keep yourself or any conductive material a minimum of 10 feet away from any power line. Call 1-800-Edison-1 before working near power lines. Learn more at ComEd.com/Safety.

- ComEd provides every external group that comes on property to our Rockford or Chicago Training Centers a safety message. This can vary from texting and walking, downed power line awareness, safe driving, etc. For our formal training programs such as *Tools of the Trade* we do a safety message every morning, have safety physically come in and speak to attendees, and conduct safety briefs before every project we do. For programs like Construct, similarly, we provide a safety brief every time on site and do formal training including Flagger Certification on site as well. In addition, our virtual labs aimed at school age children in the schools includes public safety.

While ComEd has found that its suite of various training, educational, marketing and outreach activities to be effective tools in informing the general public of the importance of safety around electrical equipment, we understand a one-size-fits-all approach to education is not effective and we are continuously looking for new and better avenues to inform the public on electrical safety.

First Responders (Fire, Law Enforcement, Community/Public Works)

Often times, first responders are the first on the scene of an emergency. This makes ComEd's partnership with and education of first responders critical to the safety of the first responders and the public. ComEd conducts a special course entitled Responder Training for Utility Emergencies (RTUE). Attachment 16. This is offered through a collaboration between ComEd External Affairs and ComEd Safety, and more than 1700 First Responders have taken advantage of the offered program in the last five (5) years. We also regularly present operational and safety information at various first responder meetings/groups, including, the Illinois Fire Chief Association meeting, the Office of the Illinois State Fire Marshall meeting, the Chicago Office of Emergency Management and Communication, the Mutual Aid Box Alarm System. We also a sponsor and participant in the Biannual Operation Power Play Emergency Response Drill.

Other Partnerships

As previously stated, ComEd continues to seek new opportunities to engage the public and move the needle on safety in a positive direction. To this end, ComEd actively participates in a number of organizations and initiatives focused on electrical safety. Below are a couple of these initiatives:

- Energy Education Council – the counsel consists of investor-owned utilities, electric cooperatives, electric municipalities and the University of Illinois-Extension. The mission of the council is to provide a forum to share information and develop educational programs to promote efficient and safe use of electricity. Safe Electricity is the award-winning, multi-media public awareness program of the Energy Education Council. The program provides life-saving information through many venues, including radio and television public services announcements, videos, news releases and articles, and its comprehensive website, *www.energyedcouncil.org/*. ComEd has an employee on the Board of Directors, as well as the Advisory Board.

- Utility Public Safety Alliance (UPSA) - UPSA is an informal association of more than 50 utilities that focuses on consistent messaging across all utility participants, development of metrics and goals to gauge effectiveness of communication strategies, best practices.

A few additional organizations ComEd actively engages with in order to actively seek to learn and share best practices include such as the Association of Edison Illuminating Companies (AEIC), Centre for Energy Advancement through Technological Innovation (CEATI), Edison Electric Institute (EEI), Electric Power Research Institute (EPRI), Institute of Electrical and Electronics Engineers (IEEE), and the National Electric Energy Testing, Research, and Applications Center (NEETRAC).

Safety Awareness for ComEd's Contractors

ComEd's contractors are expected to meet or exceed the same qualifications and safety expectations that ComEd sets for its own employees. See ComEd's response to 20-NOI-02 1.01A for a description of qualifications for various workgroups. Furthermore, all contractors that work on ComEd property must attend annual on-boarding which provides contractors with ComEd's safety expectations for all contractors working on ComEd property. ComEd also mandates that all contractors it works with have a quality control program, which performs an audit-like function to ensure safe and effective work practices. Another important tool ComEd utilizes to ensure contractor safety is the Contractor Information Webpage, therein contractors are provided access to all ComEd Safety Alerts as well as all relevant procedures.

G. Please explain what processes you have in place to permit the public to report utility plant, equipment, and property that may pose a safety risk to the public, what formats are uses (e.g., phone calls, text messages, e-mails, website reports, etc.) what information is accepted through these processes (e.g., written reports, verbal reports, photographs, etc.) and the processes and procedures you have in place to act upon such reports.

ComEd has a variety of means through which the public can report damage to utility facilities and/or potential safety issues, including 1-800-EDISON1, Social Media, and our External Affairs team. Most reports from the public come to us via calls into 1-800-EDISON1. Issues posing a risk to public safety are escalated to a supervisor or senior clerk to handle. The supervisor or senior clerk records the issue and escalates it internally to the Operations Control Center (OCC) by call or e-mail. The OCC is available 24/7. Within the OCC, any issues posing a risk to public safety are escalated to the Information Supervisor and the Shift Manager on duty. They assign a responsible department to investigate and address the issue. The responsible department is required to address the issue as soon as practicable.

The e-Channels Social Media team also fields safety concerns from the public through social media: Facebook, Twitter, Instagram, LinkedIn, & Nextdoor. The Social Media team monitors social media from 7 a.m. to 7 p.m. and generally responds to customers within 60 minutes. If emergency issues are reported, the Social Media Team will call the Operations Control Center to ensure a ticket is open (or open one if it has not already happened), and then escalate the issue. If non-emergency situations are reported, the Social Media Team will contact the Operations Control Center or other responsible department (Customer Relations,

Operations Control Center, Vegetation Management) to ensure the issue is addressed. Any escalated issue includes the customer's request (including photos or videos shared, if available) and their account information.

ComEd's External Affairs and Large Customer Services organizations provide a specific contact person for municipalities and large commercial and industrial customers to raise questions and concerns. Potential safety issues brought to the attention of our External Affairs and Large Customer representatives are escalated to the Operations Control Center to create a ticket and have the issue investigated and addressed in accordance with the OCC escalation process.

While less frequently, from time to time members of the public may not direct their safety concern directly to ComEd and instead go to the Illinois Commerce Commission, the Office of the Attorney General and the Citizens Utility Board or some other organization. When those safety concerns are brought to the attention of ComEd they are reported by the receiving department to the OCC. A shift manager is assigned to ensure the issue is investigated and addressed in accordance with the OCC escalation process.

As discussed in response to 20-NO1-02 1.01A, many ComEd employees and contractors have specific duties to inspect, report and address safety issues which they identify. However, all ComEd employees and contractors (including back-office personnel) are responsible for reporting safety issues when they are identified and they are encouraged to report safety issues which they observe using Udentify®, a ComEd internal application where safety concerns and damage to equipment can be reported and pictures of the equipment can be uploaded. ComEd employees and contractors may also report potential safety issues which they observe by calling 1-800-EDISON1.

<u>All Interested Parties</u>

A. Please explain any changes that can be made to the Commission's rules and regulations to better ensure that electric and natural gas utility service is provided in a safe and/or reliable manner.

At this time, ComEd does not recommend any changes to the Commission's rules and regulations. One of our threshold concerns with any potential rule change is that the rule would be so prescriptive that it has the unintended consequence of wedding ComEd to a singular technology or procedure that restricts our ability to invest in technology and processes that will result in a safer and more reliable system. Given this risk, the Commission and interested parties may find that the Commission is better off utilizing its oversight tools (e.g., utility reporting requirements within the ICC's current rules, NOIs) to ensure utilities are driving for continuous improvement, developing a corporate culture of safety and educating the public on safety around electrical and gas infrastructure.

B. Please explain any changes the public utilities could make in their practices or procedures to better ensure that electric and natural gas utility service is provided in a safe and/or reliable manner.

Delivering electricity to customers in a safe and reliable manner is not just an imperative at ComEd, it is engrained in our culture. That's why, as discussed in previous responses, we conduct extensive training and adopt hundreds of operational procedures for those working on our system. This training is not just at the outset of one's career, ComEd's employees are provided formal and informal training and education opportunities each year. We mandate reporting of potential safety issues which are identified and provide employees and contractors tools such as Udentify® so reporting can be completed quickly and with the critical information needed to locate and address the issue. *See* ComEd's response to 20-NO1-02 1.01B. We also provide a variety of avenues for the public to report on safety questions and concerns.

We continually seek to improve our system and our work practices – this is why we invest an average of $2 billion annually on system enhancements and each ComEd operational procedure is reviewed and updated (if needed) on at least a triannual basis. We are also keenly focused on learning and integrating what we learn. This includes identifying and addressing system issues through inspections, but it also includes connecting with utility peer companies, numerous academic institutions, industry groups and other organizations that strive for more reliable and safe energy delivery. ComEd integrates its learnings into its daily work and by doing so ComEd is creating a safer and more reliable system. We also encourage innovation. Each year we, along with the other Exelon utilities, host an Innovation Expo for developing and sharing new ideas that will propel ComEd and the industry forward. ComEd's leadership also fosters innovation by encouraging new ideas or technologies to make our work or equipment safer, more efficient, more effective, etc. For example, a ComEd team developed the ComEd Virtual Substation Pilot (launched in Q4 2019 and expected to be operational Q4 of 2020), which, among other things, will aid in training new employees without the presence of real-life field hazards.

ComEd does not at this time have a specific recommendation for a change public utilities could make in their practices or procedures to better ensure that electric and natural gas utility service is provided in a safe and/or reliable manner, but that does not mean progress is not possible. ComEd is continuing to learn and we integrate these learnings into how we do business. To that end, we appreciate the Commission providing this forum for ComEd to engage with and learn from its utility peers and other stakeholders in Illinois.

Dated: September 15, 2020

Respectfully submitted,

COMMONWEALTH EDISON COMPANY