
2011

CONTACT VOLTAGE TEST &

FACILITY INSPECTION

ANNUAL REPORT

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

Report on the results of contact voltage tests & facility inspections for the period beginning January 1, 2011 and ending on December 31, 2011.

February 15, 2012

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I. Background

The New York State Public Service Commission's ("PSC" or "Commission") Electric Safety Standards ("Safety Standards"), issued on January 5, 2005 in Case 04-M-0159, with subsequent revisions issued on July 21, 2005 and December 15, 2008, require utilities to conduct an annual system-wide contact (stray) voltage detection program and a five-year equipment inspection program to mitigate contact (stray) voltage risks to the public and promote reliability.

The term "stray voltage" is historically associated with neutral-to-earth voltage (NEV) encountered by farm livestock at contact points. Stray voltage is a normally occurring phenomenon that can be found at low levels between two contact points at any property where electricity is grounded.[1] In recent years, the term "contact voltage" has been used to describe voltage resulting from abnormal power system conditions associated with low voltage secondary system faults.

This report describes Consolidated Edison Company of New York, Inc's ("Con Edison" or "the Company") contact voltage detection program and equipment inspection program conducted in 2011.

II. Company Overview

Con Edison is an investor owned utility that provides electric service to approximately 3.2 million customers in a service area of approximately 660 square miles within New York State encompassing New York City and most of Westchester County. The Company operates an electric transmission and distribution ("T&D") system that provides a high level of reliability in a very dense urban environment.

- Distribution

  a. *Underground* – The underground system has approximately 274,000 manholes, service boxes, transformer vaults, and above ground pad mounted structures; approximately 24,000 miles of underground duct; and approximately 94,000 miles of underground cable including primary, secondary and service cables. Underground network cables operating at primary voltages of 27 kV and 13.8 kV supply

[1] Electrical systems — both farm systems and utility distribution systems — are grounded to the earth to ensure safety and reliability. Inevitably, some current flows through the earth at each point where the electrical system is grounded and a small voltage develops. This voltage is called neutral-to-earth voltage (NEV). When NEV is found at animal contact points, it is frequently called stray voltage. Stray voltage is this small voltage that is measured between two points that livestock can simultaneously touch. If these points are simultaneously contacted by an animal, a current will flow through the animal. See, http://www.wisconsinpublicservice.com/business/farm_voltage_questions.aspx#whatis

underground transformers that step the primary voltages down to 120/208 distribution voltages that are used by customers.

b. *Overhead* – The overhead system includes: 154 auto loops, **7 -** 4 kV multi-bank substations, 243 – 4 kV unit substations, approximately 285,000 Con Edison owned poles, and approximately 27,400 miles of overhead wires including primary, secondary, and services. Cables operating at primary voltages of 33 kV, 27 kV, 13.8 kV, and 4 kV supply 49,769 overhead transformers that step the primary voltages down to 120/208/240 distribution voltages that are used by customers.

c. *Streetlights* –Con Edison does not own, install, or maintain streetlights and traffic signals within its service territory. The New York City Department of Transportation (NYCDOT) and the local Westchester municipalities primarily own the streetlights and traffic signals in New York City and Westchester County. There are approximately 185,000 metal pole street lights and metal pole traffic signals within Con Edison's service territory.

- Transmission

a. *Underground* – The underground transmission system delivers power at 69 kV, 138 kV, and 345 kV to various switching substations and area substations. The underground system has approximately 1,900 manholes and approximately 720 circuit miles of cable.

b. *Overhead* - The overhead transmission system consists of 138 kV and 345 kV high voltage cable supported on towers and poles on rights-of-way located for the most part, north of New York City and terminating in Westchester County where the underground transmission system begins.

- Substations and Unit Substations

There are 41 transmission substations, 62 area substations, 243 unit substations, and 11 Public Utility Regulating Stations (PURS).

III. Company and Municipally Owned Facilities

Approximately 778,000 individual facilities in Con Edison's service area must be tested for the presence of contact voltage each year. Approximately 588,000 of these facilities must be inspected every five years. These facilities are broken down into the following five categories:

- *Overhead Distribution* – There are approximately 285,000 distribution pole structures that support electric facilities in Con Edison's overhead distribution system. Distribution overhead facilities are included in both the contact voltage and inspection programs. The contact voltage testing criteria include all utility-owned or joint use wooden poles with utility electrical facilities located on public thoroughfares or customer property, including backyards or alleys. Contact voltage tests are performed on all wooden poles with metallic attachments, such as, ground wires, ground rods, anchor guy wires, riser pipes, or any electrical equipment within reach of the general public.

- *Underground T&D and Underground Residential Distribution* – There are approximately 277,000 underground facilities in Con Edison's T&D systems. A subsurface structure is defined as any manhole (MH), service box (SB), transformer vaults (V,VS), transformer manholes (TM), customer boxes (CB), buried boxes (BB), injunction boxes (IJ), P-Boxes (PB), and T-Tap boxes and switchgears specifically associated with Underground Residential Distribution systems ("URD"). These facilities are tested in either the manual and mobile contact voltage testing program and are included in the facility inspection program. The contact voltage testing criteria include all subsurface structures at grade level, including above ground, pad-mounted structures.

- *Street Lights and Traffic Signals* – There are approximately 185,000 metal pole street lights and are traffic signals within Con Edison's service territory. Streetlights and traffic signals are included in the contact voltage testing program only. Area and street lighting that is privately owned is not included in the contact voltage testing program, as per the Safety Standards. Con Edison does not own any metal pole streetlights, and therefore, these structures are not included in the facility inspection program. The contact voltage testing criteria include all municipally owned metal pole streetlights, traffic signals, and pedestrian crosswalk signals located on publicly accessible thoroughfares and areas that are directly supplied by the Company. All contact voltage testing of street lights is performed at night while the fixtures are energized.

- *Substations* – Con Edison operates and maintains substations at 103 locations and PURS substation facilities at 11 locations (some locations contain more than one facility). Con Edison's substations and PURS stations are included in both the contact voltage program and the facility inspection program. The contact voltage testing criteria consist of perimeter fencing and other electrically conductive materials where such materials are accessible to the general public. These materials include but are not limited to fences, doors, roll-up gates, metallic delivery boxes, dielectric fluid delivery ports and Siamese connections.

- *Unit Substations* – Con Edison operates and maintains 243 – 4kV unit substations including 7 – 4kV multi bank substations. Con Edison's 4kV multi-bank and unit stations are included in both the contact voltage program and the facility inspection program. The contact voltage testing criteria consist of perimeter fencing and other electrically conductive materials where such materials are accessible to the general public. These materials include but are not limited to fences, doors, roll-up gates, metallic delivery boxes, and Siamese connections.

- *Overhead Transmission* – Con Edison's overhead transmission system includes 1,212 individual poles or towers. These transmission structures support circuit voltages of 69 kilovolts and greater. Structures that support circuits of lower voltage in addition to the transmission voltage levels are included in this category. All transmission structures are included in both the contact voltage and facility inspection programs. The contact voltage testing criteria include all structures, guys, and down leads attached to these structures.

IV. Contact Voltage Testing Program

The Safety Standards require that Con Edison complete annual contact voltage testing by December 31 each year.

During the annual period ending December 31, 2011, Con Edison tested for contact voltage on all its T&D facilities with publicly accessible components capable of conducting electricity. In addition, Con Edison tested for contact voltage on all municipally owned metallic streetlights and traffic signals that are located on thoroughfares or areas that are publicly accessible and are directly supplied with electricity by the Company.

In addition, and in compliance with the Safety Standards, Con Edison:

- Immediately safeguarded and /or mitigated all voltage findings greater than or equal to 1.0 volt. The Company uses its best efforts to effectuate a permanent repair within 45 days to all Company-owned equipment determined to have caused a voltage finding and remaining necessary to provide our customers with safe and reliable service. The aforesaid permanent repairs not effectuated within 45 days are periodically monitored and tracked to completion. In instances where the contact voltage finding was determined to be caused by equipment that is not owned by Con Edison, the Company, after making the area safe, notified a responsible person associated with the premises of the unsafe condition and the need for the owner to arrange for a permanent repair.

- Tested all publicly accessible structures, streetlights, sidewalks and metal objects within a 30 foot radius of an energized structure, or contact voltage finding greater than or equal to 1.0 volt.

- Responded to, investigated and mitigated positive findings of shock incidents reported by the public.

Training

Con Edison manages its contact voltage testing program and uses both Company field personnel and contractor forces to conduct the testing of utility owned electric facilities and municipal streetlights.

Training for the contact voltage testing program consists of an eight hour class at our training facility for contractor forces as well as on the job training, performed by Supervisors, for Company field forces. The training is based on Company specifications on how to properly test an electric facility for contact voltage. Topics covered in the training are:

> The PSC Safety Standards
> Scope of the contact voltage testing program
> Performing the test and completing the testing form
> Data entry process
> Status of contact voltage testing to annual goal
> Abnormal systems conditions to be reported
> Performance mechanism

Underground Distribution Contact Voltage Testing

Of the total population of approximately 274,000 underground facilities, 160,268 were fielded for manual testing. The remaining facilities were tested under the mobile contact voltage program. Of the 160,268 underground facilities visited during manual testing, 3,720 did not require contact voltage testing due to inaccessibility, structures taken out of service, or customer owned structures.

Inaccessible underground facilities include:

a. *Locked Gate/Fence* – Structures behind locked gates and fences that are not accessible to the public, i.e., facilities located in fenced areas owned by other utilities, such as, Water Companies.

b. *Company Property* – Structures located on Company property, such as substations, are accessible only to Company personnel and authorized contractors.
c. *Construction* – A structure located within a construction site. These structures are accessible only to construction personnel.

d. *Buried* – A structure below grade that requires excavation to access the structure.

e. *Vaults* – Structures located inside buildings. These structures are accessible only to Company and building maintenance personnel.

f. *Highway* – Structures located on highways and on exit and entrance highway ramps. The performance of contact voltage testing would constitute an unacceptable risk to the employee.

Overhead System Contact Voltage Testing

Of the population of 284,913 overhead facilities (Con Edison owned) visited to be tested for contact voltage, 755 did not require contact voltage testing because of the reasons stated below.

Inaccessible overhead facilities include:

a. *Locked Gate/Fence* – Structures behind locked gates and fences that are not accessible to the public, i.e., facilities located in fenced areas owned by other utilities, such as, Water Companies.

b. *Company Property* – Structures located on Company property, such as substations, are accessible only to Company personnel and authorized contractors.

c. *Construction* – A structure located within a construction site. These structures are accessible only to construction personnel.

d. *Highway* – Structures located on highways and exit and entrance highway ramps. The performance of contact voltage testing would constitute an unacceptable risk to the employee.

e. *Rail Road* – Structures behind railroad fences or on a railroad right-of-way.

Streetlight and Traffic Signal Contact Voltage Testing

Of the total population of approximately 185,000 streetlight and traffic signal facilities, approximately 118,000 facilities to which the Company directly supplies electric service were required to be tested manually. The remaining facilities were tested under the mobile contact voltage program. Of the facilities visited, 331 did not require contact voltage testing because these structures were not publicly accessible.

Inaccessible streetlights and traffic signals include:

a. *Construction* – A structure located within a construction site. These structures are only accessible to construction personnel.

b. *Restricted Access* – Structures located within areas with active public improvement efforts or the World Trade Center.

Underground Transmission Contact Voltage Testing

Of the population of 2,158 facilities to be inspected, there are approximately 1,900 underground transmission structures that are required to be tested for contact voltage. Those facilities that did not require contact voltage testing are not publicly accessible.

Inaccessible transmission facilities include:

a. *Construction* – A structure located within a construction site. These structures are only accessible to construction personnel.

b. *Con Edison Property* – Structures located on or adjacent to Con Edison properties which are secured from the public via fencing or other barriers and are inaccessible to the public.

c. *Bridges* – Structures located on bridges, such as bridge joints

d. *Buried* - A structure below grade that requires excavation to access the structure

Overhead Transmission Contact Voltage Testing

Con Edison visited and tested all of the 1,212 overhead transmission facilities on the Company's overhead transmission system.

Mobile Contact Voltage Testing

In accordance with the PSC's "Order Establishing Rates for Electric Service," issued March 25, 2008 in Case 08-E-0539, Con Edison performed 12 underground system scans using mobile contact voltage detection technology. In accordance with the PSC's "Order Adopting Changes to Electric Safety Standards," issued December 15, 2008 in Case 04-M-0159, the 12 underground system scans must be performed between January 1^{st} and December 31^{st} of each calendar year. In addition, Con Edison performed one underground system scan using mobile contact voltage detection technology, as ordered in 10-E-0271, in 3 cities with a population of at least 50,000 in Westchester County in 2011. These cities are New Rochelle, Yonkers, and White Plains.

Results of the 2011 Contact Testing Program

The results of the 2011 Contact Testing Program are provided in the following appendixes to this report:

- Appendix 1, titled "Contact Voltage Testing Summary"
- Appendix 2a, titled, "Summary of Energized Objects - Mobile Testing"
- Appendix 2b, titled, "Summary of Energized Objects - Manual Testing + Other"
- Appendix 3, titled, "Summary of Shock Reports from the Public."

V. Facility Inspection Program

The Safety Standards require Con Edison to visually inspect at least 20% of its electric facilities annually, and inspect 100% of its electric facilities every five years. In addition, the Safety Standards require that defective equipment found during an inspection be repaired. In accordance with the Safety Standards, Con Edison uses the following severity levels to establish priority for repairs and scheduling:

- *Level I* – Repair as soon as possible but not longer than one week. A Level I deficiency is an actual or imminent safety hazard to the public or poses a serious and immediate threat to the delivery of power. Critical safety hazards present at the time of the inspection shall be guarded until the hazard is mitigated. NOTE: Con Edison requires that company forces repair level I defects before leaving the structure. This includes defects that are not considered an imminent safety hazard. For example: cable in contact with frame/cover, improperly sealed ends and unsealed ducts.

- *Level II* – Repair within one year. A Level II deficiency is likely to fail prior to the next inspection cycle and represent a threat to safety and / or reliability should a failure occur prior to repair.

- *Level III* – Repair within three years. A Level III deficiency does not present immediate safety or operational concerns and would likely have minimum impact on the safe and reliable delivery of power if it does fail prior to repair.

- *Level IV* – Condition found but repairs not needed at this time. Level IV is used to track atypical conditions that do not require repair within a five year timeframe. This level is used for future monitoring purposes and planning proactive maintenance activities.

In accordance with the Safety Standards, when a temporary repair is located during inspection or performed by the Company, best efforts are put forth to make a permanent repair of the facility within 90 days..

Training

Con Edison manages its inspection program and uses both Company field personnel and contractor forces to conduct the inspection of utility owned electric facilities.

Training of the contractor force utilized to perform inspections on our overhead system consists of classes at our learning facility as well as on the job training performed by Contractor Supervisors who have attended a train-the-trainer session with a Con Edison Subject Mater Expert (SME). For Company field forces, the training is based on Company specifications on how to properly inspect an electric facility which is learned through their promotional classes, as well as on the job training performed by their Supervisor.

In addition to the above, the Secondary System Analysis section of Distribution Engineering conducted train-the-trainer sessions in each of the major workout locations since the inception of the program. The participants included the managers, planners, and supervisors of the crews that would be performing the inspections. The Secondary System Analysis Team has also conducted various training seminars at all of the major work out locations which included the following topics:

> The PSC Safety Standards
> Scope of the inspection
> Completing the inspection form
> Data entry process
> Status of inspections to annual goal

Repairs pending
Accounting of the inspection
Performance mechanism

In addition to the train-the-trainer sessions, an E-Learning training module was developed. This training module can be accessed from any computer on the Con Edison network. This class is also part of the curriculum in career advancement for new mechanics.

Results of the 2011 Facility Inspection Program

The results of the 2011 Facility Testing Program and associated facility repairs are provided in Appendix 4, titled "Summary of Deficiencies and Repair Activity Resulting from the Inspection Process."

VI. Annual Performance Targets

Con Edison performed the required contact voltage testing and facilities inspections in accordance with the requirements of the Safety Standards.

In compliance with the Safety Standards, Con Edison has met the annual performance target for contact voltage testing of 100% of publicly accessible electric facilities, streetlights, and traffic signals supplied directly from Con Edison's distribution system for the annual period ending December 31, 2011.

In compliance with the Safety Standards, Con Edison has met the second-year performance target for inspection of 40% of its electric facilities during the first two years (2010 and 2011) of the five-year period ending December 31, 2014. By the end of the second year of this period (December 31, 2011), Con Edison had cumulatively inspected 44.4% of its overall population of electric facilities. The percentages of inspections by structure category are summarized in the table below.

Facility Inspection Program Results

Category	Actual Cumulative Inspected as of 2011
Overhead Distribution	63.46%
Overhead Transmission	100%
Underground / URD Distribution	25.47%
Underground Transmission	53.61%
Substation and PURS Facilities	44.73%
Unit Substations	100%
Company-owned Streetlights*	0

***Con Edison does not own streetlight facilities. These facilities are owned by the City of New York and municipalities located in Westchester County.**

5-Year Inspection Performance Summary

The following tables provide the cumulative percentages of inspections by structure category over the current five-year (2010-2014) inspection cycle.

Overhead Distribution Facilities

Inspection Year	Unique Number of Overhead Distribution Structures Inspected	% of Overall Facilities Inspected (Cumulative)
2010	85,124	31.47%
2011	86,548	63.46%
2012		
2013		
2014		

Overhead Transmission Facilities

Inspection Year	Unique Number of Overhead Transmission Facilities Inspected	% of Overall Facilities Inspected (Cumulative)
2010	1212	100%*
2011	1212	100%*
2012		
2013		
2014		

***Con Edison inspects the entirety of its overhead transmission system once a year**

Underground Distribution and URD Facilities

Inspection Year	Unique Number of Underground / URD Facilities Inspected	% of Overall Facilities Inspected (Cumulative)
2010	43,183	15.54%
2011	27,584	25.47%
2012		
2013		
2014		

Underground Transmission Facilities

Inspection Year	Gross Number of Underground Transmission Facilities Inspected (Gross Inspections)	% of Overall Facilities Inspected (Cumulative)
2010	542	25.12%*
2011	615	53.61%
2012		
2013		
2014		

***Con Edison inspects its underground transmission system at multiple intervals, all less than 5 years. The data above captures all inspections performed. The total number of underground transmission facilities to be inspected is 2158.**

Substation Facilities (including PURS)

Inspection Year	Unique Number of Substation Facilities (including PURS)	% of Overall Facilities Inspected (Cumulative)
2010	26	23.21%
2011	25	44.73%
2012		
2013		
2014		

Unit Substation Facilities

Inspection Year	Unique Number of Unit Substation Facilities Inspected	% of Overall Facilities Inspected (Cumulative)
2010	243	100%
2011	243	100%
2012		
2013		
2014		

VII. Certifications

Pursuant to Section 7 of the Safety Standards, the president or officer of each utility with direct responsibility for overseeing contact voltage testing and facility inspections shall provide an annual certification to the Commission that the utility has, to the best of his or her knowledge, exercised due diligence in carrying out a plan, including quality assurance, that is designed to meet the contact voltage testing and inspection requirements, and that the utility has:

- Tested all of its publicly accessible electric facilities and street lights, as referred to in the body of the February 15 Report, and
- Inspected the requisite number of electric facilities.

The certifications are attached as Exhibit 1 of this report.

VIII. Analysis of Causes of Findings and Contact Voltage

All New York State utilities prepare an inventory of all Findings and report on the number of these Findings each year. Section 1(f) of the Safety Standards defines a Finding as "any confirmed voltage reading on an electric facility or streetlight greater than or equal to 1 volt measured using a volt meter and 500 ohm shunt resistor." Section 1(c) defines Stray Voltage (referred to herein as Contact Voltage) as "voltage conditions on electric facilities that should not ordinarily exist. These conditions may be due to one or more factors, including, but not limited to, damaged cables, deteriorated, frayed, or missing insulation, improper maintenance, or improper installation."

Although not all findings are due to contact voltage, NYS Utilities are required to report on all findings, regardless of whether the voltage is normal to the operating system. In 2011, there were 3,460 sources of contact voltage found as a result of all methods of detection; approximately 90% of these findings were detected by the Mobile Contact Voltage Testing Program.

In accordance with the Safety Standards requirements, when a finding is discovered on an electric facility or streetlight during manual contact voltage testing, the Company must manually test all publicly accessible structures, streetlights, and sidewalks, within a minimum 30 foot radius of the energized object. There were 246 findings identified by manual contact voltage testing, with an additional 38 found as a result of the 30-foot radius testing.

Contact voltage findings resulted from a variety of conditions including deterioration of conductors and insulation, damaged neutrals and connections, and defective customer equipment. The following table contains a breakdown of the 2011 causes of contact voltage findings that were Con Edison responsibility:

2011 Contact Voltage Finding by Source
Con Edison Responsibility

Source of Contact Voltage	Con Ed
UG Service	410
UG Streetlight Service	412
UG Streetlight Con Edison Neutral	176
UG Main	201
Secondary Burnout	124
UG Service Con Edison Neutral	176
Crab	56
UG Main Con Edison Neutral	50
Abandoned Service	33
Sump Pump	49
Abandoned SL Service	19
Overhead Streetlight Service Neutral	9
Corroded Riser	0
Overhead Service	14
Overhead Service Neutral	14
Overhead Streetlight Service	13
Temporary Service	3
Overhead Secondary	9
Defective Transformer Equipment	1
Overhead Primary	5
Defective Riser Bonding	0
Total	**1774**

The following table contains a breakdown of the 2011 causes of contact voltage findings that were the responsibility of entities other than Con Edison ("Non Con Edison Responsibility"):

2011 Contact Voltage Finding by Source
Non Con Edison Responsibility

Source of Contact Voltage	Non Con Edison
Defective Customer Equipment	338
Defective Contractor Equipment	109
Defective Pigtail	1
Dept. of Transportation (DOT)/City Streetlight Neutral	304
Internal City Streetlight Wiring	522
Loose Connection at Lamp Base	394
Open Ended Control Wiring	9
Contractor or Customer Damage	9
Total	**1686**

Mitigation through Detection

Five factors affect the likelihood that a member of the public or animal could experience a shock. These factors are the number of energized structures (ENEs), duration of a mobile system scan, voltage levels associated with the ENEs, population density, and the weather. A table containing the breakdown of Electric Shock Reports (ESRs) reported to Con Edison during 2011 can be found in Appendix 3.

Since the likelihood of an ESR will increase or decrease in proportion to the total number of energized structures, the detection and repair of identified sources of contact voltage is the principal mitigation effort for reducing ESRs. Each completed repair effectively represents a mitigation of possible ESRs. As these repairs accumulate over time, the potential ESRs decrease accordingly.

Although, ENE voltage levels and population density are recognized as contributory factors in ESR occurrences, these two factors are not subject to control such that they can be meaningfully incorporated into ESR or Generation Rate analyses.

The ESRs associated with Con Edison's equipment appear on Chart 1. As mentioned above, weather also plays a role in ESR generation. The significant precipitation in 2011 increased the generation rate of Con Edison responsible ESRs. This weather variable is accounted for in the underlying models and in both the 2012 and long term predictions. The duration between scans ranges from approximately 20 to 25 days per scan. If we continue with a comparable ENE repair rate and scan interval in 2012, as well as experience similar weather patterns, we can expect ESRs to be approximately 2 per scan. This prediction is consistent with the 2011 actual results of 27 shocks due to Con Edison responsibility.

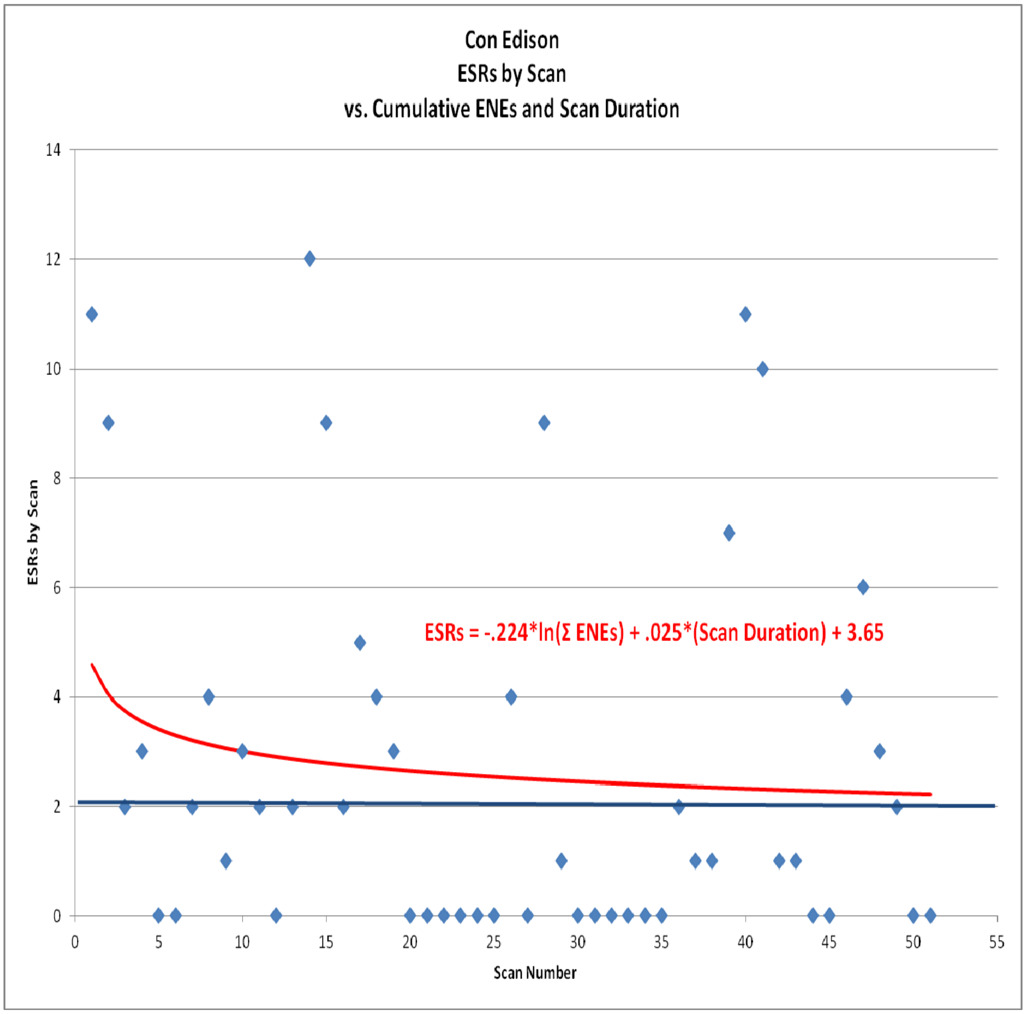


Chart 1

The reduction of ESRs associated with the DOT appears on Chart 2. The duration of scans is 20 to 25 days per scan. If we continue a comparable ENE repair rate and scan duration in 2012, we can expect ESRs at this scan duration level to be approximately 1 every two scans. This demonstrates marginal improvement over current scan durations. In 2011 there were 7 shocks associated with DOT equipment failures. This result is better than predicted, and is likely the result of various programs implemented by both DOT and Con Edison to mitigate shocks.

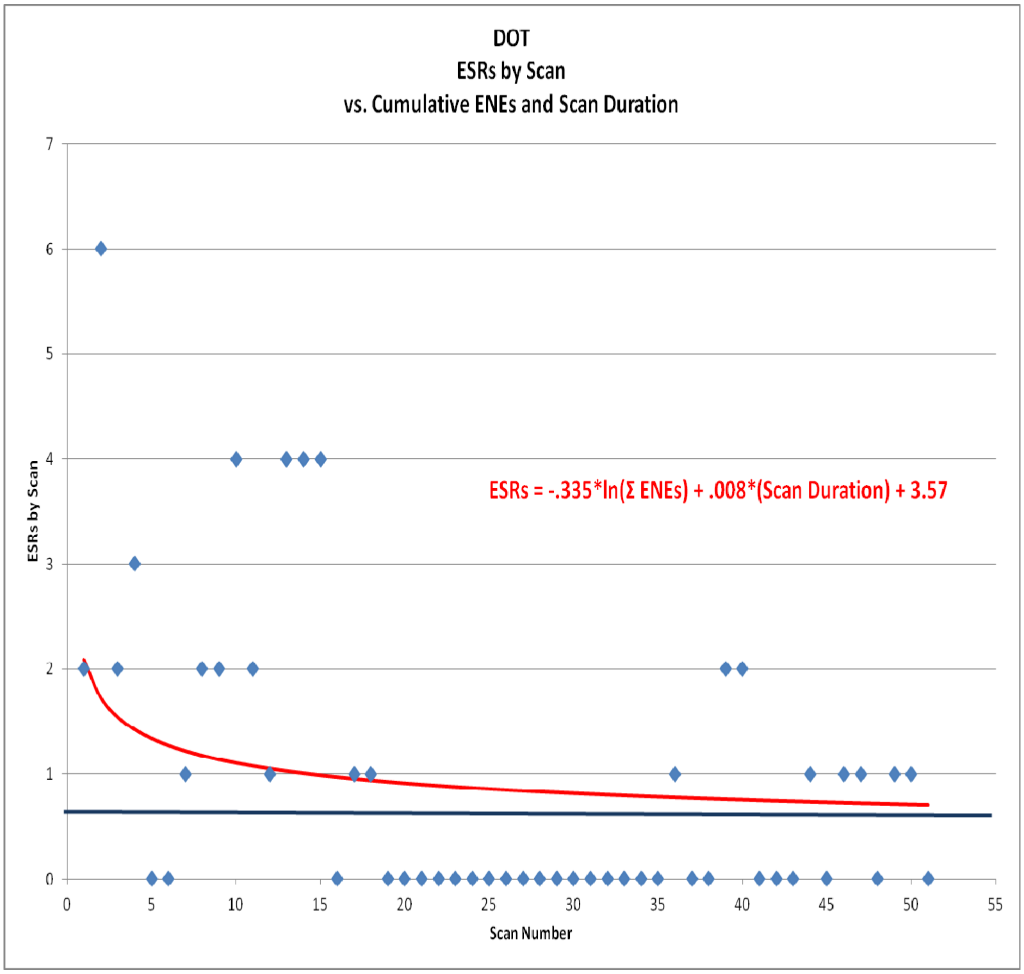


Chart 2

The reduction of ESRs associated with Customer Equipment (Public Access) appears on Chart 3. The duration of scans is 20 to 25 days per scan. If we continue a comparable ENE repair rate and scan duration in 2012, we can expect ESRs to remain at 2 per scan, with no significant reduction anticipated below that level in the near future. The actual performance indicates that these shock events are less sensitive to our mitigation efforts then we initially projected. In 2011, we responded to 21 validated shock reports on publicly accessible customer equipment. This is a 12.5% reduction compared to the number predicted by the model.

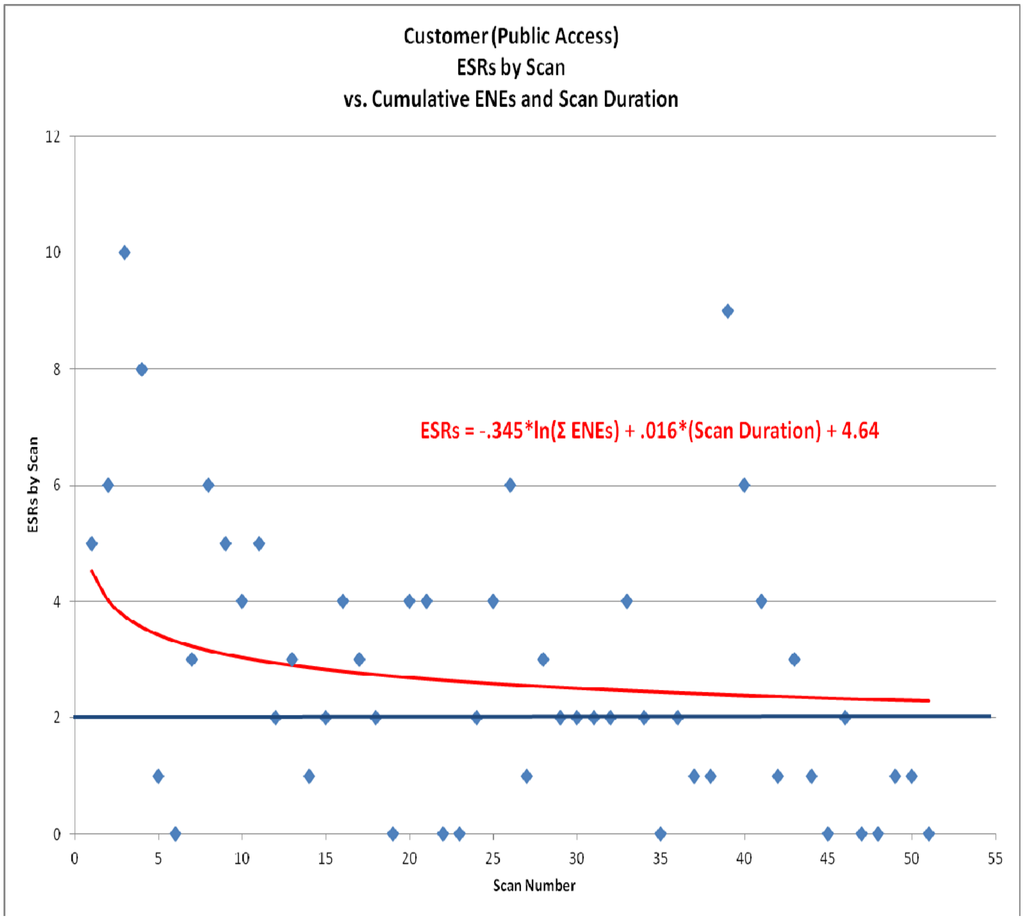


Chart 3

Adverse weather conditions affected Con Edison responsible ESRs the most. A strong correlation was observed between weather and shocks during 2011. Chart 4 shows the impact of rainfall on ESRs during the period of weather from July to October, where we saw a 40% increase in reported electric shocks. During that period, close to 40 inches of rain was recorded in the New York City area.

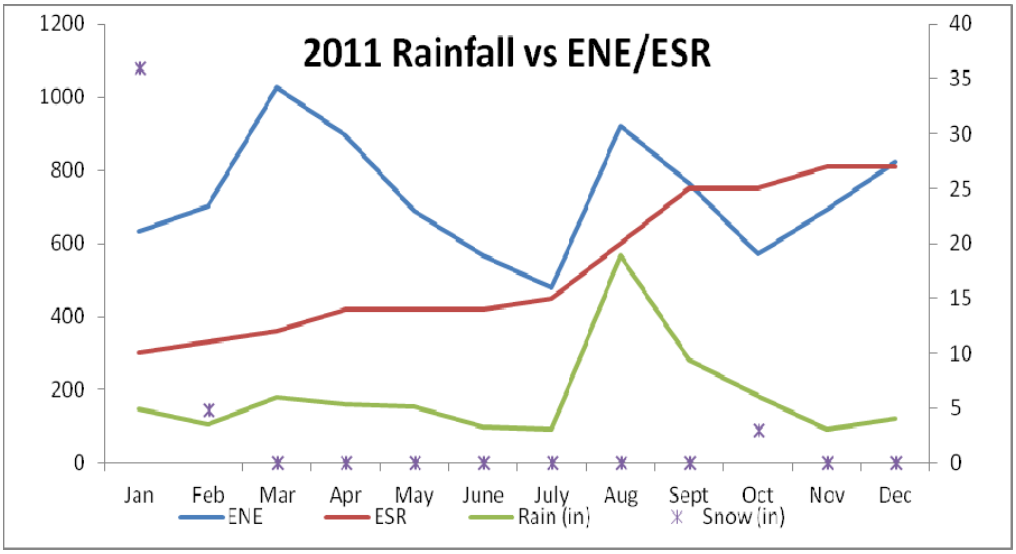


Chart 4

The impact of precipitation is further evident when we look at snow and rainfall year over year. Chart 5 shows system response to ground conditions, as level of precipitation change from 2009 to 2011. As snowfall and rainfall increase from 2009 to 2011, ESRs also increase. We will continue to monitor this correlation in 2012.

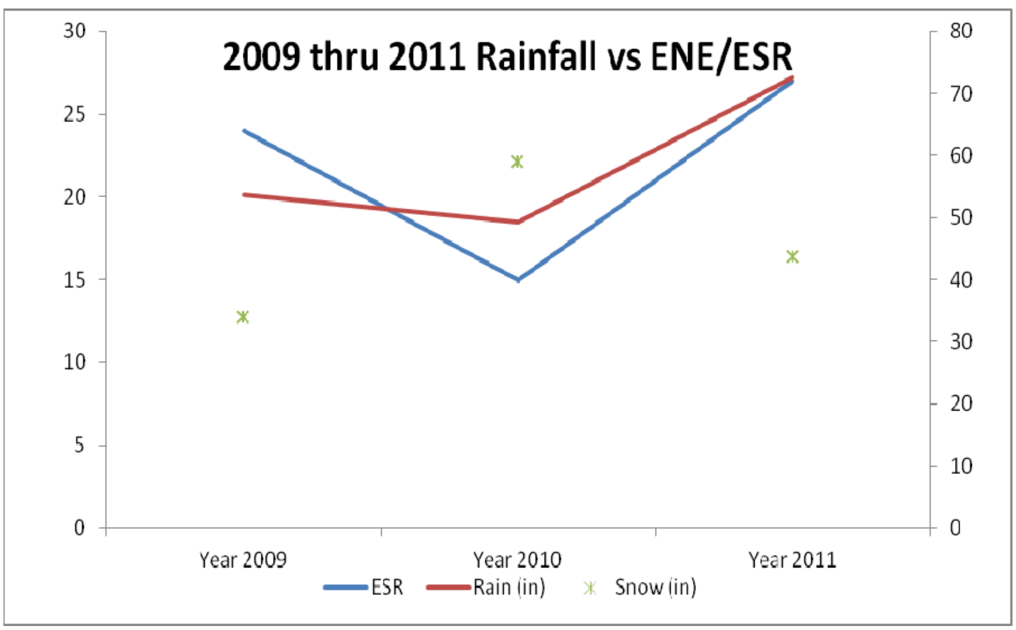


Chart 5

IX. Analysis of Inspection Results

Inspection Breakdown

Facility Inspection Program	2010	2011	2012	2013	2014	5-Year Cumulative Unique Inspections	Percent Completed
Distribution Underground/ URD	43,183	27,584				70,767	25.47%
Distribution Overhead	85,124	86,548				171,672	63.46%
Transmission Underground	542	615				1,157	53.61%
Transmission Overhead	1212	1212				1,212	100.00%
Substations	23	23				46	44.66%
PURS Facilities	3	2				5	45.45%
Unit Substations	243	243				243	100.00%
Total	**130,330**	**116,227**				**245,102**	**44.40%**

Overhead Distribution Structures

Breakdown of Locations with Deficiencies**

Priority Rating	Number of Deficiencies	% Deficiencies Found
1	25	0.24%
2	906	8.68%
3	7,404	70.91%
4	2,107	20.18%
Total:	**10,442**	**100.00%**

Overhead Transmission Facilities

Breakdown of Locations with Deficiencies**

Priority Rating	Number of Deficiencies	% Deficiencies Found
1	0	0.00%
2	0	0.00%
3	299	100.00%
4	0	0.00%
Total:	**299**	**100.00%**

Underground Distribution and URD Facilities

Breakdown of Locations with Deficiencies**

Priority Rating	Number of Deficiencies	% Deficiencies Found
1	16,097	14%
2	6,704	6%
3	3,281	3%
4	89,209	77%
Total:	**115,291**	**100%**

** Locations may have multiple deficiencies

Streetlights

Con Edison does not own streetlight facilities. Streetlight facilities in the Company's service area are owned by the City of New York and municipalities located in Westchester County.

Repair of Deficiencies

During 2011, the Company repaired 97% of the Level I defects found, 63% of the Level II defects found, 18% of the Level III defects found, and 6% of the level IV defects found. Thus, 65% of the Level I, II & III defects found in 2011 were repaired in 2011. The largest portions of open repairs due in 2011 are in our Underground Program (422 repairs). 358 of the 419 repairs reflected as overdue and open in our Underground Program deal with structure damage. This was created by a specification change which allows the inspector to classify structure damage repairs into two categories (Level 1 repair or Level IV repair) based on severity. We continue to monitor and track our pending repairs.

As of February 13, 2012, 399 Level I are reported as open and overdue in the Underground, Overhead, and URD programs. These include 379 repairs associated with the Underground Program, with 343 of those repairs dealing with structure damage.

As of January 1, 2012, a total of 1,121 level II repairs identified in 2010 were reported as open and overdue in the Underground, Overhead, and URD programs. As of February 13, 2012, 891 Level 2 repairs identified in 2010 in the Underground, Overhead, and URD programs were reported as open and overdue with the majority being in our Overhead Program. We are in the process of making these repairs.

Temporary Repairs

Our inspection database identifies temporary repairs that have remained in place more than 90 days as shown in the following chart:

	Level I	Level II	Level III
Underground Distribution	16	106	258
Overhead Distribution	2	2	5
URD	2	10	6

There are two Level I temporary repairs on the overhead system. One is a leaking aerial joint that has been protected to prevent it from impacting the environment. This section of aerial cable is awaiting replacement. The second overhead Level I has since been repaired. The level I temporary repairs on the UG & URD system are currently being reviewed. The majority have been completed in the field and are pending administrative closure.

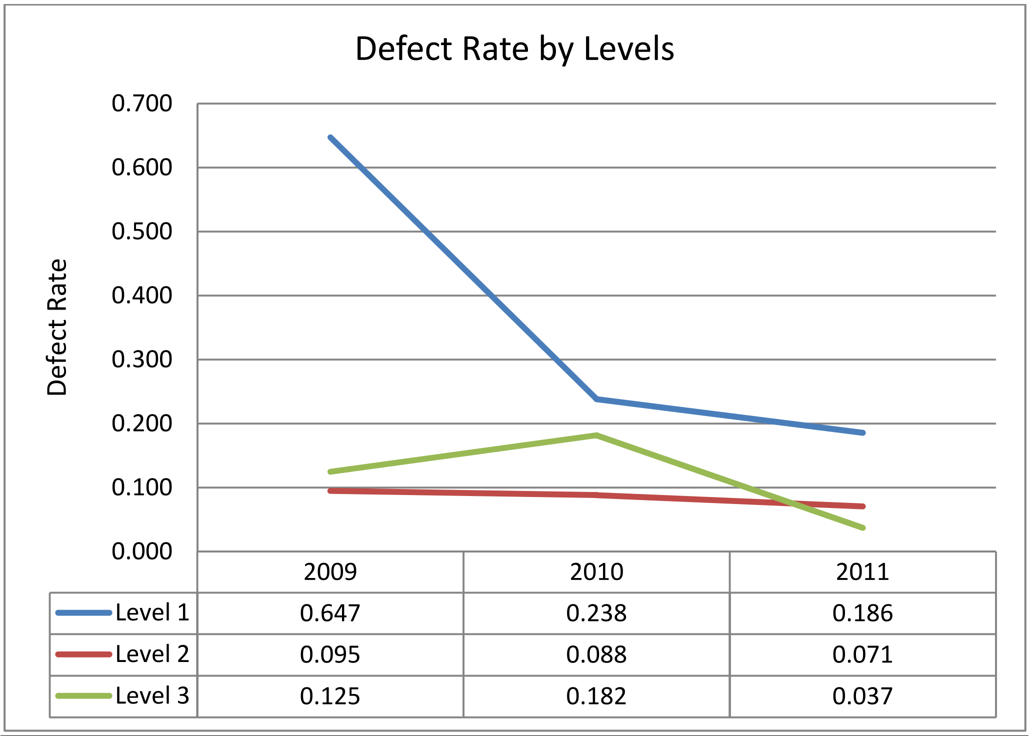
The majority of Level II and III temporary repairs were made during the initial inspection prior to the crew leaving the work site. We are in the process of making these repairs permanent within the one and three year periods applicable to correction of Level II and Level III conditions, respectively.

In 2010, following a phase 0 assessment, the company embarked upon a multi-year project to implement a new work management processes and supporting technology in Electric Operations to facilitate improved cost tracking, work scheduling, status reporting and productivity analysis. Some of these key benefits from deploying a new work management processes and system include additional productivity for field crews, clerical staff, and engineering through more efficient scheduling, reduced data entry, and design standardization. In addition, the company will implement more effective tools for forecasting, planning, and scheduling of resources and materials for capital, O&M and inspection program work. This project, anticipated to take approximately four years, addresses not only the Liberty Consulting audit recommendation to implement a work management system in Electric Operations, but also the process change required to achieve the full benefits associated with implementation.

Once complete all work (including new and existing defects) and inspections will be issued, captured, and tracked within that system. The work management system is a dynamic tool that will enable the Company to be more effective and efficient in scheduling work.

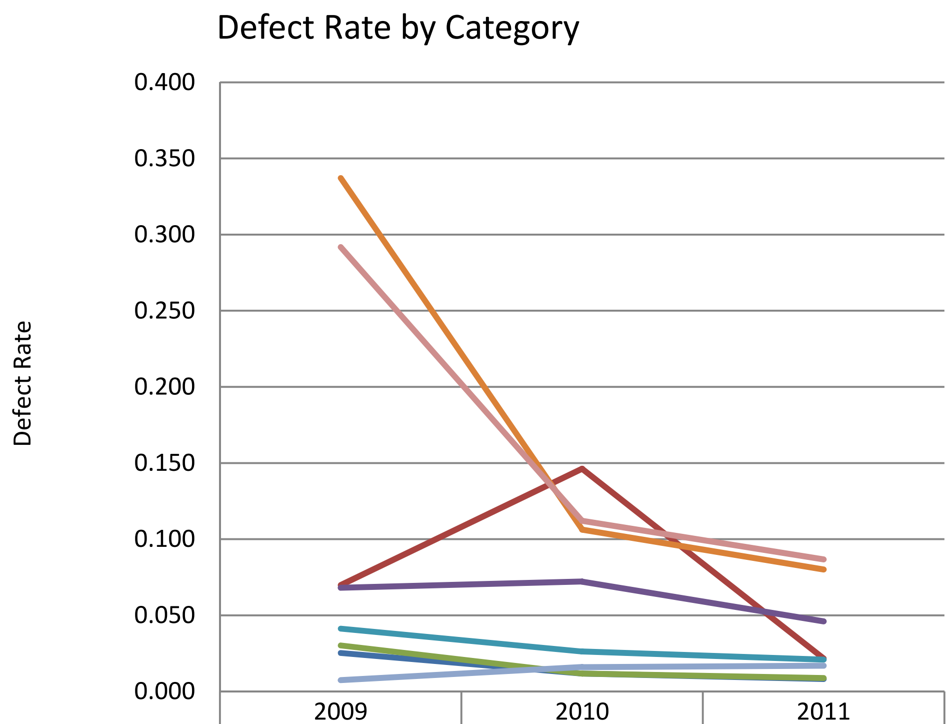
Analysis of Defects Found

The chart below shows the number of defects found per inspection:



	2009	2010	2011
Level 1	0.647	0.238	0.186
Level 2	0.095	0.088	0.071
Level 3	0.125	0.182	0.037

The defect found ratio can be broken down further, by type of repair:



	2009	2010	2011
CableContact	0.025	0.012	0.008
CoverOrStructureDamage	0.070	0.146	0.022
DamagedNeutral	0.030	0.012	0.009
DamagedSecondary	0.068	0.072	0.046
ExposedConductor	0.041	0.026	0.021
ImproperlySealedEnds	0.337	0.106	0.080
SumpPump	0.007	0.016	0.017
UnsealedDucts	0.292	0.112	0.087

For most categories, we see a minor decrease in defect rate from 2009 thru 2011. Three categories that we see a major decrease in defect rate are unsealed ducts, damaged secondary, and improperly sealed ends. A major part of this decrease may be attributed to the start of Cycle II and better categorizing of defects by the company. We are now re-inspecting structures that were previously inspected within the last 5-year with better understanding of procedures and specifications.

During the first 3 years of the prior inspection cycle (2005-2009), cover damage and structure damage were captured in one category. A specification change was made in late 2009 that enabled the inspector to identify these repairs as two separate repairs. This lead to a spike in rate detected during the 2010 program. This also holds true for damaged secondary cable; the rate increase seen in 2010 results from a change in our inspection report form in late 2009 which allows the inspector to report repairs needed to the secondary service, crabs, and removal of split bolt connectors. Also in 2010, we made a change in specification for structure damage. This category was split into one Level I and nine Level 4 categories. Because of this we can distinguish structures that need immediate attention, i.e., Level I, from the Level IV conditions that will be reviewed by engineering.

In 2011, we also saw an increase in sump pump defects (sump pump not working) found. This can be attributed to vaults that currently have an older model sump pump installed. In 2008, the Company changed the specification for purchasing sump pumps to a model which has a more robust seal system which would extend the life of the pump when cycling. The majority of the failed units identified in the 2011 inspection program were sump pumps of the prior vintage. As we find and remove these older pumps, we are replacing them with the new model. Sump pump defects increased from 2009 to 2010 and this increase appears to be leveling off from 2010 to 2011.

Analysis of Underground Inspections Program

The first five year inspection cycle (2005-2009) provided an opportunity for utilities to complete an inventory of assets, and establish a baseline of the current condition of their electric systems. The results of these inspections have been used to develop infrastructure programs to improve public safety and enhance reliability.

At the onset of the program in 2005 most utilities lacked comprehensive inspection programs. Con Edison did have, and still has today, programs that targeted specific assets based on age, condition or operational impact of failure. The frequency for these inspections is based on historical performance of the asset class as well as ongoing failure analysis to detect emergent issues.

Since that time Con Edison has developed a comprehensive program for the inspection of the underground system. The programs includes mechanisms for tracking newly installed assets, systems to ensure that defects are repaired in a timely manner, and processes to identify emergent defect trends and proactively respond with programs to mitigate these defects. Over the last 5 years Con Edison also took the opportunity to perform upgrades to its system through this program. For example, during these inspections, Con Edison sealed thousands of service ducts to prevent water and carbon monoxide migration into customer's premises and made thousands more upgrades to prevent contact voltage by resealing cable ends and ensuring that cable was not in contact with metal manhole covers.

The impacts of these upgrades were immediate and have been important contributors to the improvement in public safety. These upgrades were largely completed during the first inspection cycle and are designed with a lifetime of 30 or more years. The upgraded equipment is not likely to fail before the end of the next 5 year inspection cycle.

Recognizing a diminishing benefit from the five year inspection cycle Con Edison contracted Columbia University's Center for Computational Learning Systems (CCLS) to help better understand the impact of the first 5 years of the inspection program and the impact of future inspection cycles. The CCLS team conducted an analysis of data collected during the last two years of the first inspection cycle, and the first year of the second inspection cycle to determine the impact of the first cycle of inspections. The study was performed on a representative subset of approximately 52,000 structures. The researchers at Colombia University grouped the structures into 8 categories. Category 1 was defined as 5,000 structures the researchers determined were most likely to experience an event based on previous research. The remaining 7 categories were based on attributes of the structure.

The research team then computed the probability of an event occurring in control and treatment groups. The treatment group, a subset of the data, consisted of inspected structures in which a level 1 defect was found and repaired.
The research team at Columbia was unable to detect an impact of inspection on reducing manhole fires and explosions. A small but detectable effect was found on reducing smoking manholes. A small but detectable effect was also noted on a group of events collectively referred to by the research team as “burnouts”. This group of events includes:

- Exposed conductors
- Energized objects
- Flickering lights
- No lights and partial no lights

The study concluded that as a result of the inspection program approximately 1,300 events in the subset or approximately 7,500 events system-wide, across all 8 categories were avoided over the first 5 year period. Of the 1,300 events approximately 200 were smoking manholes. Also of interest is the finding that there was no impact of inspection on the 25% of assets which are grouped into categories 7 and 8.

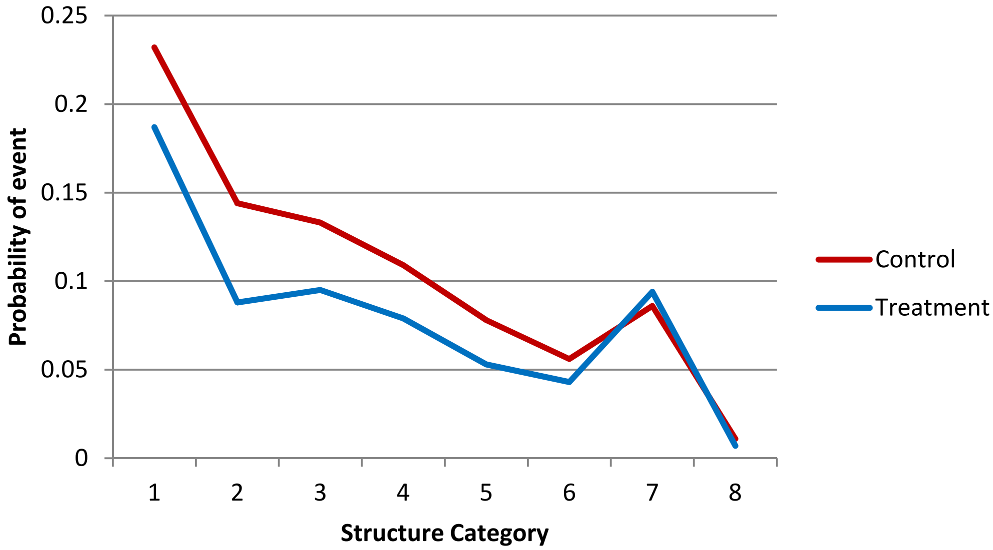


Figure 1: Event probability in CCLS Categories 1 through 8

The benefit derived from the inspection of the 52,000 structures in Manhattan is shown in figure 1. Over a 5 year period there was a reduction in the probability between the treatment group (blue) and the control group (red) of about 5% for categories 1, 2 and 3, with less of an impact on categories 4, 5, and 6. Categories 7 and 8 showed no significant impact. This translates to a reduction of approximately 1,300 secondary events from the inspection of 52,000 structures. The CCLS team concluded that structures in categories 5 and 6 were also most likely to benefit from a onetime reduction in event probability, i.e., a single inspection and would likely not benefit from additional inspections in the near term. The team further concluded that Categories 7 and 8 experienced no measurable benefit as a result of the inspection program.

Con Edison spent approximately $73 Million to perform inspections during the first 5 years of the program; the Columbia study suggests that these expenditures avoided approximately 7,500 events. This means that Con Edison's average incremental cost to avoid an event was $9,700 during the first 5 year cycle. Most the events that the study suggested were avoided as a result of the program do not cause damage to adjacent equipment during failure. Frequently these defects require the same repair i.e. replacement of cable, whether the defect is addressed proactively or reactively. Because there is infrequent collateral damage, the required repair actions are often similar, so the repair costs remain similar whether the defect is addressed proactively or reactively.

Since the study focused largely on the impact of level 1 repairs, the rate of occurrence of these defects will drive the impact of future inspections after the first 5 year cycle, Figure 2 shows the defect rate for those defects likely to cause these events. There has been a dramatic reduction in the number of improperly sealed ends and unsealed ducts. There is a small but noticeable decline in the number of exposed conductors and cases where cable was in contact with the cover.

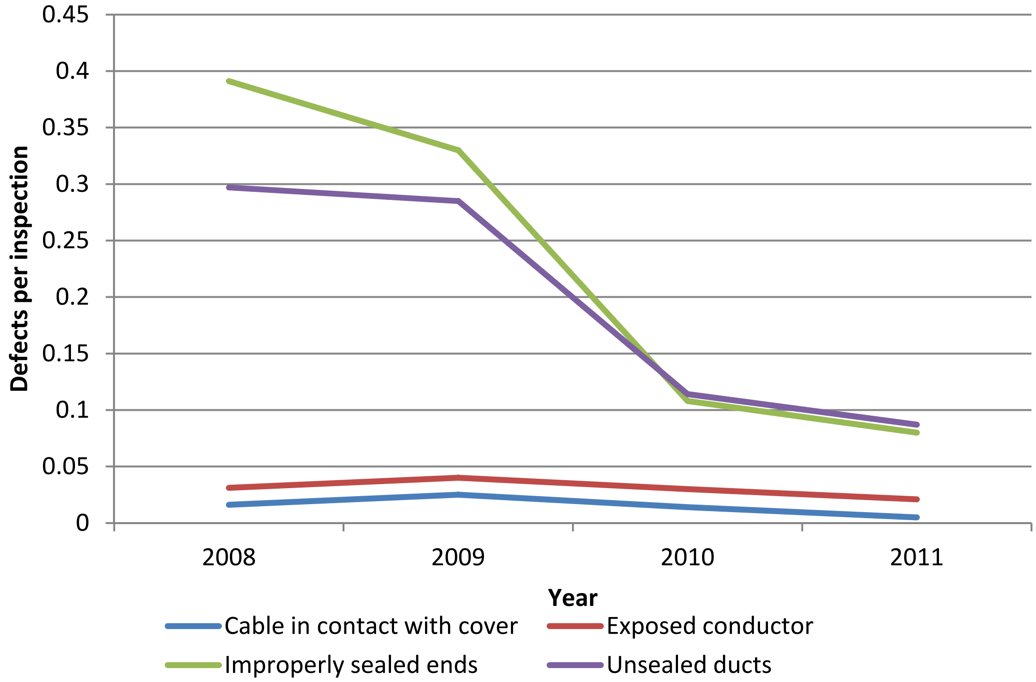


Figure 2: Defect rate of selected defects

The data collected in 2010 and 2011 show more than an 80% decline in the number of level 1 defects from the high in 2009. Since the treatment effect that CCLS was able to detect was directly related to Level 1 repairs, one would expect a commensurate decline in the treatment effect of future inspections. Applying an 80% reduction to the treatment effect of the first cycle of 1,500 annual avoided events would yield a projection of 300 avoided secondary events per year, system wide, in the second cycle of the inspection program.

The most frequently identified level 1 defects on the Con Edison underground system are:

- *Cable in Contact with Cover* – When inspectors identify cases where the cables are in contact with the metallic cover or frame they record the defect as a level 1 defect and affect repairs before leaving the location. The repair often involves moving the cables or installing a protective barrier to prevent the cables from contacting the cover.
  These defects are not imminently dangerous and are unlikely to result in an unsafe condition in the next 7 days or 1 year and so could safely be coded as level 2. In classifying as a level 1 defect Con Edison has chosen to take an extremely conservative position and at the same time leverage the efficiencies of making a repair at the time of the inspection.

- *Improperly Sealed Cable Ends* – Over the course of time, data on failure rates of cable caps has been used to improve the specification for the proper sealing of cable ends. When identified these defects may involve sealing ends of cable which have manufactured seals which do not meet the company's current specification for cable seals. It may also involve sealing the ends of newly installed cable which has not been energized or sealing the ends of recently retired cables. The repair is quickly and easily affected by the crew that is on location performing the inspection. These defects are not imminently dangerous and are unlikely to result in an unsafe condition in the next 7 days or 1 year and so could safely be coded as level 2. Less than 0.15% of all contact voltage investigations conducted since 2004 resulted in a determination of unsealed ends as the root cause of the failure. In classifying as a level 1 defect Con Edison has chosen to take an extremely conservative position and at the same time leverage the efficiencies of making a repair at the time of the inspection.

- *Unsealed Ducts* – If during an inspection a crew identifies a service duct that is not packed or sealed with the appropriate material the crew makes the repair before leaving the location using an aerosol foam material to fill the void between the cable and the duct. The purpose of the sealing the duct is to prevent primarily water as well as gases such as carbon monoxide generated by cable failures from entering the customer's premises from the service box. These defects are not imminently dangerous or common with less than 0.01% of services involved in carbon monoxide events annually. They are unlikely to result in an unsafe condition in the next 7 days, 1 year or 3 years and so could safely be coded as level 2 or a level 3 defect. In classifying as a level 1 defect Con Edison has chosen to take an extremely conservative position and at the same time leverage the efficiencies of making a repair at the time of the inspection.

Since the inception of the current defect coding system in 2009 Con Edison has identified approximately 145,000 level 1 defects, excluding the defects categories listed above there have been less than 2,700 level 1 defects identified. In that same period Con Edison completed more than 260,000 inspections, a detection rate of about 1%, those defects were primarily the result of structural defects and defective equipment. While inspections have a highly positive impact on reducing unsealed ducts and unsealed cable ends (80% reduction), the impact on all other defect types is less clear. Some insight into the future defect rates of these types of defects can be gained by considering the mix of inspections in each year.

In 2008 Con Edison targeted more than 80% of its inspections, in 2009, 88% of the inspections were targeted, and in 2010 less than 25% of the inspections were targeted. The increase in targeted inspections in 2008 and 2009 was a result of the requirement to visit every structure within 5 years. The structures targeted in 2008 and 2009 had no recorded inspection, as a result of routine work, since the beginning of the inspection cycle in 2005. That large increase in aged structures that were inspected in 2008 and 2009 had a very minimal impact on increasing the defect rate of exposed conductors for example, which was about 1% higher than the 2010 defect rate. It is apparent that the generation rate of exposed conductors is very low and that the inspection program had little influence on lowering the generation rate.

Based on the an analysis of the level I defect rate in 2010 and 2011 we project that the current 5 year cycle inspection program (2010-2014) will avoid a total of 1,500 secondary events over a 5 year period.

Impact on Public Safety & Reliability of Alternate Programs

In an effort to explore approaches which could provide the same or greater degrees of safety Con Edison has modeled several different approaches using the data collected during the first inspection cycle and the first two years of the second inspection cycle, data and conclusions from the Columbia University study, as well as performance data from the mobile testing program. A near infinite number of combinations of inspection cycles, testing programs and sampling approaches exist that could be used in an attempt to monitor and improve the underground system, but for the purposes of simplicity the 5 year inspection program will be compared to a 15 year inspection program, rather than to a large variety of programs.

In order to understand the impact of moving from a 5 year inspection cycle to a 15 year inspection cycle, it is important to understand the rate at which structures will receive unique inspections via routine work within each category. A unique inspection is defined as the first visit to the structure within the inspection cycle. Subsequent visits to a structure would generate new inspections which would increase the gross number of inspections performed during the inspection cycle, but would not add to the number of unique inspections performed. In each successive year of the inspection cycle, the probability that an inspection will be unique declines, as demonstrated by the shape of the curve shown in Figure 3. Inspections performed during routine work, also known as ad-hoc inspections, are the lowest cost method of accomplishing an inspection. Longer inspection cycles maximize the benefit of these low cost inspections.

Annual data on the gross number of inspections performed through routine work in Con Edison's underground system, and the number of unique inspections achieved during Con Edison's first 5 year cycle were plotted and then fit to a logarithmic curve which is used to project beyond the 5 year cycle. Based on actual data from the first 5 year inspection cycle the rate of unique inspections follows a curve which can be represented with the formula:

Cumulative Unique Inspections = 65409ln (# Years) + 30888

A single curve generated by this equation can be used to predict the number of unique structures that will be visited during various inspections cycle periods via routine work. The percent system completion curve is shown in figure 3. As the inspection cycle progresses, the number of unique inspections collected via routine work declines.

The steep slope of the curve in the early years of the inspection program indicates a high generation rate of unique inspections during the early part of the inspection cycle. That return starts to diminish around year twelve. This point is found by determining when the line tangent to the curve is parallel to the secant line of the curve. Therefore, the targeting of inspections prior to year twelve of the inspection cycle does not take optimum advantage of routine work.

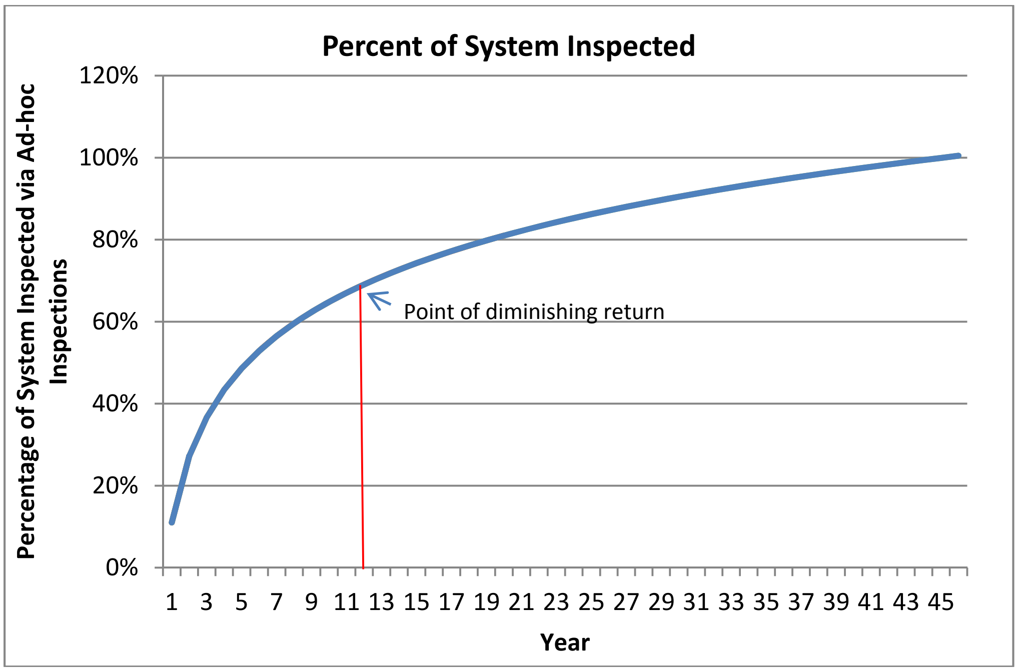


Figure 3: Percent system inspection completed via routine work

By completing inspections during routine work, the cost of performing a targeted inspection is avoided. At the fifth year of the program approximately 48% of the structures would have been inspected during routine work. By the fifteenth year, 74% of the structures would have been inspected during routine work, and by the twentieth year, more than 80% of the structures would have been inspected during routine work. The rate of unique inspections for each of the categories defined by the Columbia University research team is shown in Figure 4.

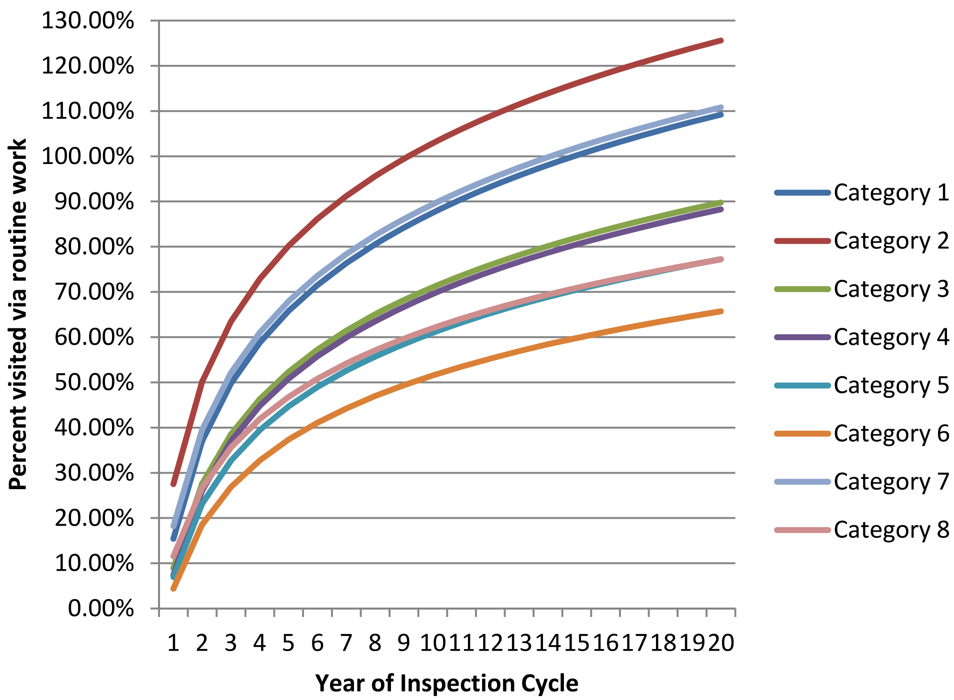


Figure 4: Routine Work inspection model, showing percentage completion by category

The routine work inspection model is based on the actual rate of Con Edison's unique inspections performed during routine work in the first 5 year cycle projected out to a 20 year period. The model shows that the structures that have the highest frequency of events, i.e. Categories 1 and 2, are visited the most and are inspected more frequently. This is likely because these structures generally contain more secondary cable than other structures so crews visit them more frequently for routine work.

The model shows that 65% of Category 1 and 80% of Category 2 structures will be visited as a result of routine work in the first five years. Since these inspections are conducted during routine work, the pattern of structure visits would remain similar, such that in any 5 year period of a 15 year cycle approximately the same percentage would have been visited. Over a longer period of time an increasing number of the structures would have been visited uniquely through routine work.

Since 2005 Con Edison has performed an inspection during each routine visit to a structure. Using this approach, Con Edison was able to avoid the cost associated with targeting these structures for an inspection. This methodology has allowed Con Edison to conduct more than 500,000 inspections over the last 6 years, of which nearly 150,000 were unique in the first inspection cycle from 2005 to 2009 and more than 70,000 were unique in 2010 and 2011. Through this approach, Con Edison has avoided targeted inspection costs more than $110 million since 2005.

Year	Gross ad-hoc Inspections	Unique Ad-Hoc Inspections
2005	60,026	39,913
2006	58,140	32,262
2007	48,040	22,657
2008	81,091	28,469
2009	85,173	25,463
2010	93,079	43,183
2011	83,964	27,584

Table 1: Actual inspection results 2004-2011

These structures are visited because of routine maintenance, repair and construction activities at these locations. Accounting for the decreasing number of level 1 repairs and the frequency of visits in each of the categories, it is projected that a 15 year cycle would yield an annual reduction in secondary events of 150, versus 300 in a 5 year cycle. Since the Columbia study could not identify an effect of inspections on reducing manhole explosions and fires, the projection includes no increase in this type of events. The composition of the additional 150 annual events would be approximately 30 smoking manholes annually and 120 events in the burnout category.

Figure 5 shows the avoided cost achieved by delaying the start of targeted inspections. For any given year of the inspection cycle the line projects the cost of targeting the remaining inspections in that year. The difference between the points of two years is the cost savings in delaying the start of targeting to the later year.

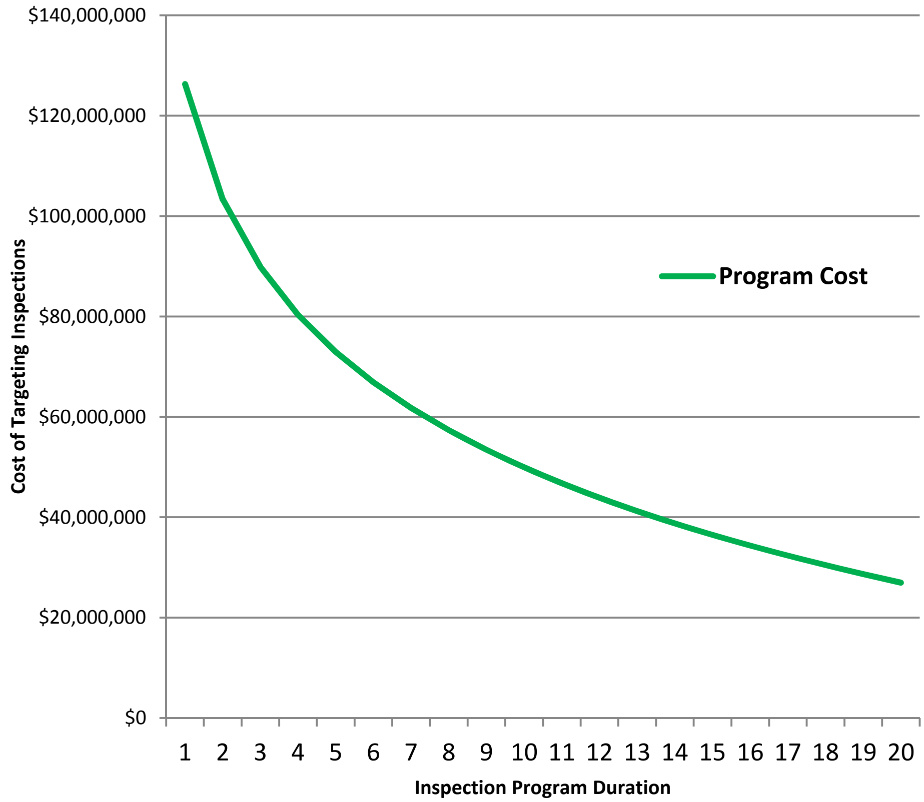


Figure 5: Cost estimates for inspection programs of various durations

It is Con Edison's philosophy that the best methodology for collecting inspections is to record the inspection results collected during routine work. The result of this methodology is that many structures will receive more than one inspection in any given period. The longer the inspection cycle the more likely it is that a structure will receive more than one visit.

As was discussed earlier, as the number of cables in a structure increases, the probability that the structure will be visited increases. This is a result of ordinary work patterns that tend to bring crews to more densely populated structures for routine work more frequently. In a 15 year period it is likely that more than 1.35 million visits would be recorded as a result of routine work on Con Edison's 280,000 underground structures. This is an average of almost 5 visits per structure over the 15 year period with the highest risk structures receiving the most visits. Even with a 15 year inspection requirement structures will be visited frequently as a result of routine work. During these visits inspections will be performed and defects will be classified and tracked until repaired. Each of these inspections includes a classification of defects into the four categories currently as required by the Electric Safety Standards. By performing these inspections during routine work the benefit can be achieved with no incremental cost. In 2010 and 2011, Con Edison performed more than 175,000 total inspections which generated more than 68,000 time bound repairs, more than half of which were repaired by the crew performing the inspection.

Further Improving Safety in Underground Areas

Most secondary events including those used in the Columbia Study are the result of some type of damaged cable insulation. Once the insulation has degraded to the point where electrical tracking begins, customers may experience flickering lights, and the conductor may come into contact with a conductive pathway to the surface and create an energized object, or the tracking may become so severe that the insulation will begin to smoke and in rare cases may cause a fire or explosion. Often a single cable failure can lead to several of these listed outcomes either sequentially or concurrently.

The most common outcomes of these failures are customer complaints of flickering lights and low voltage, followed by proactively detected energized objects. A smaller number of these defects evolve into smoking manholes and the most serious events, manhole fires, explosions, and shocks are the least likely outcomes of damaged cable insulation. This relationship can be represented as a triangle, shown in figure 6, with the least serious, most common events making up the base and the least common more serious events at the top. The environmental conditions around the failure play a large role in determining if and how the events progresses from a flickering light to an energized object to a smoking manhole or fire.

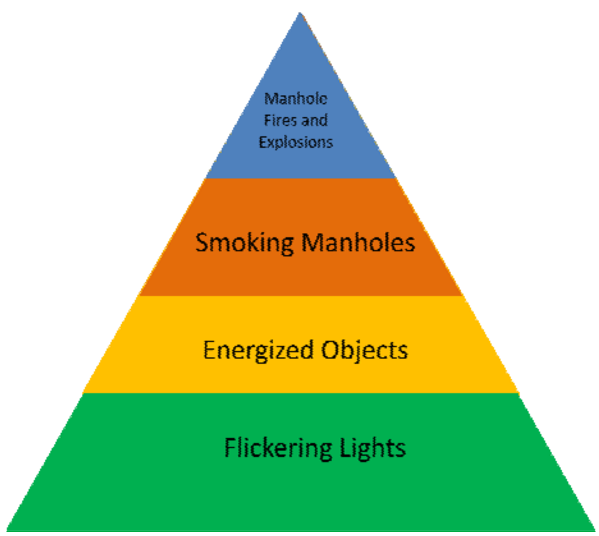


Figure 6: Relative frequency of various secondary events

The final outcome of these events is dependent on a number of variables, many of which are difficult to detect or predict. In 2008 Con Edison initiated a study with the University of Connecticut Institute of Materials Science. The researchers at the University of Connecticut studied representative samples of cable supplied by Con Edison. The objective of the research was to attempt to quantify the conditions which would cause a tracking event to progress from an energized object into a more serious event. The study concluded that the heat from electrical tracking of cable in ducts can produce large amounts of combustible gases as well as residual carbon left behind from the degradation of the insulation. That tracking may also lead to customer complaints of flickering lights and energized objects.

The conditions required for the most serious events are most frequently found in ducts, not in manholes

A subsequent study by the University of Connecticut researchers concluded that whether a manhole evolves into a smoking manhole, manhole fire, or manhole explosion, all manhole events start from self-sustained combustion of the cable insulation. The amount of oxygen available to maintain combustion determines rate and extent of the combustion zone and, therefore, the type of manhole event which develops, and the rate of air flow through the cable duct determines the rate at which oxygen is supplied to the fire.

The researchers stated:

> [U]nder "worst case" conditions, heated gases from the fire front, which are essentially devoid of oxygen, flow down the duct and decompose anaerobic polymer adjacent to the fire zone, resulting in release of large quantities of combustible gases and leaving behind nearly pure carbon which becomes high grade fuel for the fire front. In this way and with worst case air flow conditions, the fire front can propagate down the cable relatively rapidly, decomposing the polymer ahead of the fire front as it goes and releasing large amounts of combustible gases which flow into the duct system where, under worst case conditions, they can cause cascading explosions in multiple manholes.

The conditions outlined by the researchers for the worst case event are not the types of conditions that are found inside of manholes where visual inspections are conducted. Manholes contain less than 5% of the total length of the cable, limiting the amount of fuel that is available to create a serious event. They also tend to be relatively large structures compared with the cross sections of the cable, so when decomposition occurs inside of these structures it is likely occurring in aerobic conditions, the heated gases tend to escape quickly to the top of the structure and have less of an impact on the adjacent cable.

The conclusions from the researchers at the University of Connecticut add to the understanding from the Columbia University Study which found that visual inspections had no impact on reducing serious secondary events. Since the conditions which are likely to lead to a serious event are not likely to occur inside of a manhole structure, there is little chance that that an inspector will find the defect during a visual inspection.

Finding cable failures in the duct is possible with existing technology

Based on the conclusions from the University of Connecticut and Columbia University it is reasonable to expect that the best way to reduce serious events, and thereby less serious events, would be to employ inspection methodologies that can detect secondary cable failures that are located inside of the ducts. Since the cable in the duct, which represents more than 95% of the length of the cable, is inaccessible for visual inspection other, detection methods must be used to detect incipient cable failures.

Con Edison is working aggressively with EPRI and Texas A&M University to develop algorithms that would look out across our networks and have the ability to detect tracking events remotely and alert operators to respond and repair these events.

Full scale implementation of this type of system is still several years away. Today Con Edison uses a fleet of fourteen specially designed vehicles to patrol our underground networks in search of energized objects. Con Edison uses these vehicles to scan our underground network areas twelve time per year. As a result, the electrical cables are proactively checked approximately once per month for tracking failures which may lead to more serious events. Through this program, more than 65% of our mains and services are tested on a monthly basis. The structures in the areas that are tested with the mobile detector are the structures which are most likely to be involved in an event because nearly 80% of the manhole events occur in these areas.

With the use of these mobile detectors between 2008 and 2011, Con Edison discovered approximately 500 defective services, 200 defective mains, and 300 defective street light services annually. In those three categories alone, an average 1,000 sections of cable were detected and removed proactively each year, before they could progress to more serious events.

Data collected over the last several years shows a downward decline in the number of sources of contact voltage detected beginning in 2009, as shown in Figure 7. This downward decline demonstrates that the detections are occurring at a rate that is at least equal to that of the generation rate of these defects. It is difficult to measure or predict the exact generation rate because weather plays a significant role in the manifestation of energized objects as well as other secondary events. The number of detections tends to increase when the ground is wet and to a larger extent when salt has been applied.

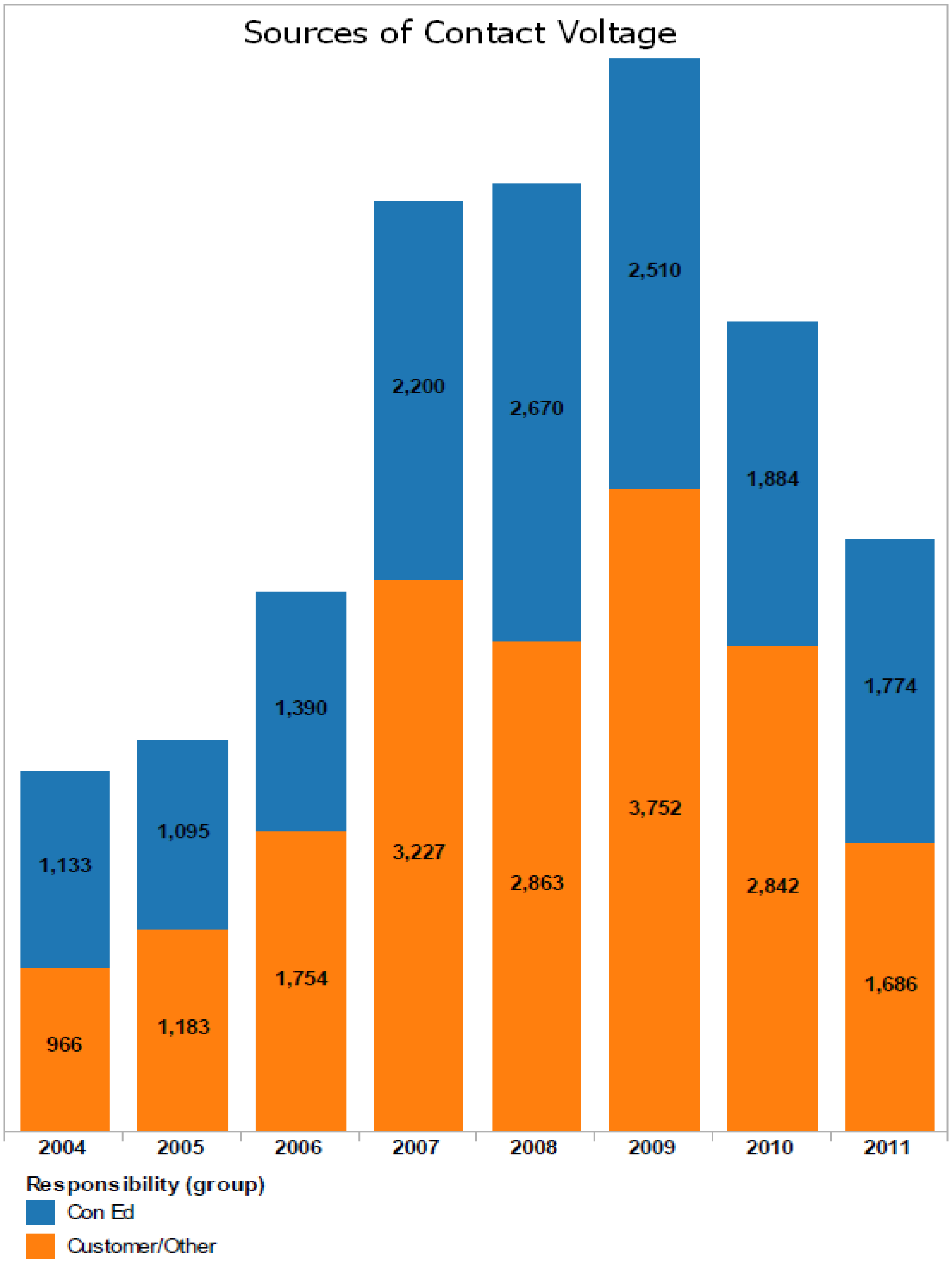


Figure 2: Sources of Contact Voltage, 2004 to 2011

Decreasing the duration an energized object exists reduces risk

Finding and eliminating failures more quickly reduces the risk of the failure evolving into a more serious event. On the spectrum of failures, contact voltage events require very little current to energize a structure on the surface. Initially these failures normally do not draw enough current to cause complaints of low voltage or flickering lights. As the tracking along the insulation progresses and the insulation resistance falls, the current draw increases and customers may begin to complain of low voltage or flickering lights. The increased current draw over a period of time may lead to the decomposition of the cable insulation resulting in a smoking manhole, manhole fire or manhole explosion. In addition the longer an energized object remains in the environment the more likely is someone is to come into contact with it and receive a shock. By detecting these failures sooner, the likelihood that they will progress into more serious event is reduced.

The reduction in risk can be estimated by measuring the average exposure time of energized objects in the environment in the current program and comparing that average to other program options. Under the current program the average maximum duration that an energized object could exist is 30 days, with an expectation that the average energized object exists in the environment for about 15 days between scans. Table 2 shows the percentage reduction in exposure time for various scan frequencies.

Number of Annual Scans	Average Maximum Days	Average Days	Percent Exposure Time Reduction from 12 annual Scans
12	30.4	15.2	0.00%
14	26.1	13.0	14.29%
16	22.8	11.4	25.00%
18	20.3	10.1	33.33%

Table 2: Comparisons of various scan frequencies

For example, an increase in the number of scans from twelve annually to sixteen annually would result in a 25% decrease in exposure time. The 25% reduction in exposure time is equivalent to the elimination of 1,181 sources of contact voltage. Each of those sources has the potential to progress into a more serious event. It is also expected that the number of confirmed electric shock reports will decrease by approximately 12 shocks annually[2].

When the reductions in duration are compared with the number of events that we would expect to avoid as a result of the underground inspection program it is clear that increasing the number of scans is a more effective method than additional five year inspection cycles to reduce the number of secondary events and improve both public safety and reliability, and at the same time reduce costs. These reductions may be achieved through a variety of combinations of inspections and testing which are outlined in table 3.

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[2] This projection is based on a 25% reduction in the 2009-2011 average of 48 substantiated publicly accessible shocks. Shocks which are not publicly accessible would not likely decrease since the SVD is not capable of testing these objects.

	5 Year Inspection Cycle	10 Year Inspection Cycle	15 Year Inspection Cycle	20 Year Inspection Cycle
Annual Scans of Underground Areas in NYC	**12**	**14**	**16**	**18**
Average time between scans (days)	**30.4**	**26.1**	**22.8**	**20.3**
Reduction in exposure time	**0**	**14.3%**	**25.0%**	**33.3%**
Equivalent ENE Reduction	**0**	**(675)**	**(1181)**	**(1575)**
Increase in secondary events from 5 Year program	**0**	**120**	**140**	**150**
Net reduction in secondary events compared to 5 year inspection program with 12 annual scans	**0**	**(455)**	**(1041)**	**(1425)**
Total annual avoided secondary events[3]	**300**	**755**	**1341**	**1725**

Table 3: Comparisons of Costs and Benefits Associated with Various Combinations of Mobile Testing and Inspections

Over the first five years of the inspection program, Con Edison was able to achieve some measureable improvements in public safety and reliability. The work by the researchers at Columbia suggests that in the first 5 years of the inspection program Con Edison avoided 1,500 events annually. In addition, during the first five years of the inspection program Con Edison developed inventory, asset, and repair tracking systems aiding in more efficient management of our underground assets. Those benefits are long lasting and repeated inspection cycles offer little improvement to the existing level of safety and reliability already achieved. In large part this is because the defects that are driving these events are generally undetectable to an inspector inside of a manhole. Most of the infrastructure that causes secondary events is buried; visual inspections provided limited benefit in reducing these events. Failures in the ducts pose the highest risk for fires and explosions because of the environment around the cable, and these failures cannot be detected with a visual inspection inside of the structure.

Con Edison projects that each year for the foreseeable future more than 75,000 inspections will be performed and recorded annually as a result of the capture of

[3] Avoided secondary events as compared to no inspection program

inspections associated with routine work at no incremental cost to the customer. Modifying the existing program to maximize the benefit of those inspections and leveraging available technologies offer much greater public safety and reliability benefit at substantially lower costs than the current inspection program.

X. Quality Assurance

The Safety Standards require electric companies to develop a quality assurance program to "ensure timely and proper compliance with these safety standards." Con Edison has developed a comprehensive quality assurance program to address the contact voltage testing and facility inspections requirements. The quality assurance program includes:

- Contact voltage testing of underground distribution structures including Underground Residential Distribution (URD), overhead distribution structures and municipality owned streetlights
- Contact voltage testing of transmission and substation facilities
- Facility inspections of underground distribution, URD, and overhead distribution structures
- Facility inspections of transmission facilities and substation facilities

This section addresses Con Edison's quality assurance program for the aforementioned contact voltage testing and facility inspections.

Quality Assurance Measures Instituted: Contact Voltage Testing of Underground Distribution Structures, Overhead Distribution Structures, and Municipality Owned Streetlights.

Con Edison developed a quality assurance plan to ensure that contact voltage testing was performed as specified. The reliability and error design parameters used were:

> *95% reliability within a ±10% relative precision level and satisfy established industry sample design criteria.*

1200 quality assurance checks are required to achieve a 95% confidence rate with a ±10% overall error that the contact voltage tests were conducted in accordance with Company specifications.

Specification EO-10315 (Quality Assurance of the Contact (Stray) Voltage and Periodic Distribution Structure Safety Inspection Programs) calls for 1200 quality assurance checks to be performed on the contractor contact voltage testing. The quality assurance checks are randomly selected from a database of all contact voltage tests and includes a field test for contact voltage. Con Edison performed 400 quality assurance checks of the underground distribution structures including underground residential distribution (URD), 400 quality assurance checks of overhead distribution structures and 400 quality assurance checks of municipality owned streetlights. Contact voltage was not found during any of these quality assurance reviews. In addition to the 1200 quality assurance checks discussed above, Con Edison also conducted Random Quality Assurance reviews of "work in progress."

Quality Assurance Measures Instituted: Contact Voltage Testing of Transmission and Substation Facilities.

In accordance with CE-ES-1043, a planner in Transmission Line Maintenance who has knowledge and expertise in overhead transmission, but who did not perform or directly supervise the contact voltage testing, conducted quality assurance inspections at locations on various transmission lines for overhead transmission facilities. Contact voltage was not found during any of these quality assurance reviews

Con Edison performed several types of quality assurance on the underground transmission contact voltage-testing program. Contractors, who also performed testing on underground distribution structures, performed the contact voltage testing of underground transmission facilities. Following this contact voltage testing, Con Edison Construction Management personnel performed audits at several locations. Contact voltage was not found during any of these quality assurance reviews

Substations Operations Methods and Procedures group performed quality assurance for the substation contact voltage-testing program. The quality assurance consisted of a documents search, records review, as well as physical contact voltage testing. Separate records were created for each quality assurance audit. Contact voltage was not found during any of these quality assurance reviews

Quality Assurance performed a quality review on a randomly selected sample of unit substations. Contact voltage was not found during any of these quality assurance reviews

These QA checks confirmed the accuracy of the results from the Contact voltage-testing program.

Quality Assurance Measures Instituted: Inspections of Underground Distribution Structures and Overhead Distribution Structures

A Central Quality Assurance group (QA) was established to oversee work done on the underground electrical system. QA observes specification compliance of the underground inspection program. EO-10315 (Quality Assurance of the Contact Voltage and Periodic Distribution Structure Safety Inspection Programs) establishes standards for the QA program in order to ensure that the underground structure inspections are performed in accordance with the Safety Standards and Con Edison's specifications. The reliability and error design parameters used were:

> *95% reliability within a ±10% relative precision level and satisfy established industry sample design criteria.*

800 quality assurance checks are required to achieve a 95% confidence rate with a ±10% overall error that the inspections were conducted in accordance with Company specifications.

Con Edison employees from the centralized quality assurance department conduct the quality assurance for each of the Company's operating regions. These employees are experienced cable splicers, linemen and mechanics that have been trained in facility inspection and the quality assurance specifications.

The quality assurance personnel performed a complete re-inspection of 400 underground and 400 overhead facilities. The results of the randomly selected facilities are compared with the results to the previous inspected facilities. Deficiencies identified during quality assurance reviews are communicated to field crews, supervisors, planners, and managers who have been required to reinforce inspection procedures with field crews.

Quality Assurance Measures Instituted: Transmission and Substation Facility Inspections.

Company specifications CE-SS-6830 (Low and Medium Feeder Pressure Periodic Inspection Procedure) and CE-SS-6045 (Inspection and Preventive Maintenance and Contact Voltage Testing of Pipe Type Cable Systems) require that quality assurance inspections of randomly selected transmission manholes be performed. These randomly selected manholes are re-inspected or re-tested by trained and knowledgeable employees who did not perform or directly supervise this work.

Substation Operations' quality assurance program consists of periodic document reviews and field observations to ensure that 100% of the required contact voltage tests and a minimum of 20% of the Safety and Reliability Inspections of Substation facilities will be completed by December 31 of each year and that the testing and inspections are properly conducted.

Quality assurance was performed by members of the SSO Methods and Procedures group and consisted of a documents search, records review, and physical critical visual inspection. Critical visual inspection quality assurance was performed. Separate inspection records were created for each quality assurance audit. In addition, all inspection and follow-up work order documentation was reviewed. Work orders are entered into our work management system and processed by appropriate personnel. These work orders are tracked closely until all repairs are completed. All personnel are trained on proper reporting and referral of repairs identified during facility inspections. The quality assurance inspections yielded results indicating that the original inspections were performed in accordance with the applicable specifications.

Appendix 1 : Summary of Stray Voltage Testing

	Total System Units Requiring Testing	Units Completed	Percent Completed	Units with Voltage Found* (>= 1.0v)	Percent of Units Tested with Voltage (>= 1.0v)	Units Classified as Inaccessible
Distribution Facilities	283,595	284,913	100.46%	6	0.002%	755
Yearly Update		284,913	100.46%	6	0.002%	755
Underground Facilities	160,029	160,268	100.15%	2	0.001%	3,720
Yearly Update		160,268	100.15%	2	0.001%	3,720
Street Lights / Traffic Signals	117,956	118,757	100.68%	237	0.200%	331
Yearly Update		118,757	100.68%	237	0.200%	331
Substation Fences	392	392	100.00%	1	0.255%	0
Yearly Update		392	100.00%	1	0.255%	0
Transmission (69kV and Above)	1,329	1,329	100.00%	0	0.000%	8
Yearly Update		1,329	100.00%	0	0.000%	8
TOTAL	563,301	565,659	100.42%	246	0.043%	4,814
Yearly Update		565,659	100.42%	246	0.043%	4,814

*Stray voltage sources on Con Edison structures and streetlights

Data Collected January 1, 2011 through December 31, 2011

Appendix 2a : Summary of Energized Objects* - Mobile Testing

conEdison

	2011 Year Jan 1,2011 - Dec 31, 2011						
	Initial Readings				Readings after Mitigation		
	1.0V - 4.4V	4.5V - 24.9V	> 25V	Total	< 1.0V	1.0V - 4.4V	> 4.5V
Distribution Facilities	6	1	0	7	7	0	0
Pole	0	1	0	1	1	0	0
Ground	1	0	0	1	1	0	0
Guy	4	0	0	4	4	0	0
Riser	1	0	0	1	1	0	0
Other	0	0	0	0	0	0	0
Underground Facilities	311	113	26	450	450	0	0
Service Box	30	12	3	45	45	0	0
Manhole	273	100	23	396	396	0	0
Padmount Switchgear	0	0	0	0	0	0	0
Padmount Transformer	0	0	0	0	0	0	0
Vault - Cover/Door	8	1	0	9	9	0	0
Pedestal	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0
Street Lights / Traffic Signals	1,333	585	320	2,238	2,238	0	0
Metal Street Light Pole	503	335	268	1,106	1,106	0	0
Traffic Signal Pole	740	211	34	985	985	0	0
Traffic Control Box	8	0	0	8	8	0	0
Pedestrian Crossing Pole	79	39	17	135	135	0	0
Other	3	0	1	4	4	0	0
Substation Fences	0	0	0	0	0	0	0
Fence	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0
Transmission (Total)	0	0	0	0	0	0	0
Lattice Tower	0	0	0	0	0	0	0
Pole	0	0	0	0	0	0	0
Ground	0	0	0	0	0	0	0
Guy	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0
Miscellaneous Facilities	3,573	1,545	368	5,486	5,486	0	0
Sidewalk	0	0	0	0	0	0	0
Gate/Fence/Awning	906	397	104	1,407	1,407	0	0
Traffic Sign	227	84	21	332	332	0	0
Scaffolding	48	13	23	84	84	0	0
Bus Shelter	20	21	8	49	49	0	0
Fire Hydrant	95	11	1	107	107	0	0
Phone Booth	13	10	3	26	26	0	0
Control Box	4	5	0	9	9	0	0
Water Pipe	2	0	0	2	2	0	0
Riser	0	0	0	0	0	0	0
Other	2,258	1,004	208	3,470	3,470	0	0
Total	5,223	2,244	714	8,181	8,181	0	0

*Data collected from 1/1/2011 through 12/31/2011

Appendix 2b : Summary of Energized Objects* - Manual Testing + Other

conEdison

	Initial Readings 2011 Year Jan 1,2011 - Dec 31, 2011				Readings after Mitigation		
	1.0V - 4.4V	4.5V - 24.9V	> 25V	Total	< 1.0V	1.0V - 4.4V	> 4.5V
Distribution Facilities	5	7	6	18	18	0	0
Pole	3	5	2	10	10	0	0
Ground	0	0	0	0	0	0	0
Guy	0	0	1	1	1	0	0
Riser	1	1	2	4	4	0	0
Other	1	1	1	3	3	0	0
Underground Facilities	7	11	3	21	21	0	0
Service Box	4	5	2	11	11	0	0
Manhole	1	3	0	4	4	0	0
Padmount Switchgear	0	0	0	0	0	0	0
Padmount Transformer	0	0	0	0	0	0	0
Vault - Cover/Door	0	0	0	0	0	0	0
Pedestal	0	0	0	0	0	0	0
Other	2	3	1	6	6	0	0
Street Lights / Traffic Signals	73	141	51	265	265	0	0
Metal Street Light Pole	39	90	43	172	172	0	0
Traffic Signal Pole	24	35	6	65	65	0	0
Traffic Control Box	2	5	0	7	7	0	0
Pedestrian Crossing Pole	6	10	2	18	18	0	0
Other	2	1	0	3	3	0	0
Substation Fences	0	0	0	0	0	0	0
Fence	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0
Transmission (Total)	0	0	0	0	0	0	0
Lattice Tower	0	0	0	0	0	0	0
Pole	0	0	0	0	0	0	0
Ground	0	0	0	0	0	0	0
Guy	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0
Miscellaneous Facilities	26	28	21	75	75	0	0
Sidewalk	0	0	0	0	0	0	0
Gate/Fence/Awning	3	2	5	10	10	0	0
Traffic Sign	1	0	0	1	1	0	0
Scaffolding	0	0	0	0	0	0	0
Bus Shelter	0	1	0	1	1	0	0
Fire Hydrant	1	1	0	2	2	0	0
Phone Booth	0	0	0	0	0	0	0
Control Box	0	0	1	1	1	0	0
Water Pipe	3	2	0	5	5	0	0
Riser	0	1	0	1	1	0	0
Other	18	21	15	54	54	0	0
Total	111	187	81	379	379	0	0

*Data collected from 1/1/2011 through 12/31/2011

Appendix 3 : Summary of Shock Reports from the Public		
conEdison — 2011 4th Quarter, Jan 1, 2011 - Dec 31, 2011	Quarterly Update	Yearly Update
I. Total Shock Calls Received:	**30**	**178**
Unsubstantiated	11	79
Normally Energized Equipment	8	20
Stray Voltage:	11	79
Person	8	56
Animal	3	23
II. Injuries Sustained	**0**	**2**
Utility Responsibility		
Person	0	0
Animal	0	0
Non Utility Responsibility		
Person	0	0
Animal	0	0
Unsubstantiated		
Person	0	2
Animal	0	0
III. Medical Attention Received	**2**	**8**
Utility Responsibility		
Person	0	0
Animal	0	1
Non Utility Responsibility		
Person	1	1
Animal	0	0
Unsubstantiated		
Person	1	5
Animal	0	1
IV. Voltage Source:	**11**	**79**
Utility Responsibility:		
Issue with primary, joint, or transformer	0	0
Secondary Joint (Crab)	0	3
SL Service Line	1	4
Abandoned SL Service Line	0	0
Abandoned Service Line	0	1
Defective Service Line	1	16
OH Secondary	0	0
OH Service	0	2
OH Service Neutral	0	1
OH SL Service	0	0
OH SL Service Neutral	0	0
Pole	0	0
Riser	0	0
Other	0	0
Customer Responsibility:		
Contractor Damage	0	6
Customer Equipment/Wiring	5	36
Other Utility/Gov't Agency Responsibility:		
SL Base Connection	0	1
SL Internal Wiring or Light Fixture	3	7
Overhead Equipment	0	0
Other	1	2
V. Voltage Range:	**11**	**79**
1.0V to 4.4V	0	11
4.5V to 24.9V	3	26
25V and above	8	42
No Reading	0	0

Appendix 4 : Summary of Deficiencies and Repair Activity Resulting from the Inspection Process

Summary of Deficiencies and Repair Activity Resulting from the Inspection Process - Distribution															
Overhead Facilities	**2009**			**2010**			**2011**			**2012**			**2013**		
Priority Level	**I**	**II**	**III**	**I**	**II**	**III**	**I**	**II**	**III**	**I**	**II**	**III**	**I**	**II**	**III**
Repair Expected	**Within 1 week**	**Within 1 year**	**Within 3 years**	**Within 1 week**	**Within 1 year**	**Within 3 years**	**Within 1 week**	**Within 1 year**	**Within 3 years**	**Within 1 week**	**Within 1 year**	**Within 3 years**	**Within 1 week**	**Within 1 year**	**Within 3 years**
Poles															
Pole Condition															
Number of Deficiencies															
Repaired in Time Frame															
Repaired - Overdue															
Not Repaired - Not Due															
Not Repaired - Overdue															
Grounding System															
Number of Deficiencies			**4,272**			**5,130**			**2,266**						
Repaired in Time Frame			**3,825**			**325**			**52**						
Repaired - Overdue			**0**			**0**			**0**						
Not Repaired - Not Due			**447**			**4,805**			**2,214**						
Not Repaired - Overdue			**0**			**0**			**0**						
Anchors/Guy Wire															
Number of Deficiencies			**34**			**391**			**341**						
Repaired in Time Frame			**12**			**40**			**11**						
Repaired - Overdue			**0**			**0**			**0**						
Not Repaired - Not Due			**22**			**351**			**330**						
Not Repaired - Overdue			**0**			**0**			0						
Cross Arm/Bracing															
Number of Deficiencies		**123**			**435**			**236**							
Repaired in Time Frame		**118**			**215**			**44**							
Repaired - Overdue		**5**			**83**			**0**							
Not Repaired - Not Due		**0**			**0**			**192**							
Not Repaired - Overdue		**0**			**137**			**0**							
Riser															
Number of Deficiencies			**617**			**731**			**660**						
Repaired in Time Frame			**589**			**18**			**8**						
Repaired - Overdue			**0**			**0**			**0**						
Not Repaired - Not Due			**28**			**713**			**652**						
Not Repaired - Overdue			**0**			**0**			**0**						

Conductors															
Primary Wire/Broken Ties															
Number of Deficiencies	3	337	4,862	27	1,189	5,033	15	379	4,000						
Repaired in Time Frame	3	274	4,210	5	715	1,008	6	163	138						
Repaired - Overdue	0	63	0	22	189	0	8	0	0						
Not Repaired - Not Due	0	0	652	0	0	4,025	0	216	3,862						
Not Repaired - Overdue	0	0	0	0	285	0	1	0	0						
Secondary Wire															
Number of Deficiencies			29			548			95						
Repaired in Time Frame			26			68			9						
Repaired - Overdue			0			0			0						
Not Repaired - Not Due			3			480			86						
Not Repaired - Overdue			0			0			0						
Neutral															
Number of Deficiencies		185			19			18							
Repaired in Time Frame		185			15			11							
Repaired - Overdue		0			2			0							
Not Repaired - Not Due		0			0			7							
Not Repaired - Overdue		0			2			0							
Insulators															
Number of Deficiencies		108			414			241							
Repaired in Time Frame		107			225			59							
Repaired - Overdue		1			50			0							
Not Repaired - Not Due		0			0			182							
Not Repaired - Overdue		0			139			0							
Pole Equipment															
Transformers															
Number of Deficiencies	4			33			3								
Repaired in Time Frame	3			18			0								
Repaired - Overdue	1			15			2								
Not Repaired - Not Due	0			0			0								
Not Repaired - Overdue	0			0			1								
Cutouts															
Number of Deficiencies				3			7								
Repaired in Time Frame				1			4								
Repaired - Overdue				2			1								
Not Repaired - Not Due				0			0								
Not Repaired - Overdue				0			2								

Lightning Arrestors															
Number of Deficiencies		**33**			**71**			**32**							
Repaired in Time Frame		**33**			**28**			**12**							
Repaired - Overdue		**0**			**19**			**0**							
Not Repaired - Not Due		**0**			**0**			**20**							
Not Repaired - Overdue		**0**			**24**			**0**							
Other Equipment															
Number of Deficiencies			**95**			**126**			**42**						
Repaired in Time Frame			**72**			**30**			**1**						
Repaired - Overdue			**0**			**0**			**0**						
Not Repaired - Not Due			**23**			**96**			**41**						
Not Repaired - Overdue			**0**			**0**			**0**						
Miscellaneous															
Trimming Related															
Number of Deficiencies															
Repaired in Time Frame															
Repaired - Overdue															
Not Repaired - Not Due															
Not Repaired - Overdue															
Other															
Number of Deficiencies		**1,293**													
Repaired in Time Frame		**1,293**													
Repaired - Overdue		**0**													
Not Repaired - Not Due		**0**													
Not Repaired - Overdue		**0**													
Overhead Facilities Total															
Total															
Number of Deficiencies	**7**	**2,079**	**9,909**	**63**	**2,128**	**11,959**	**25**	**906**	**7,404**						
Repaired in Time Frame	**6**	**2,010**	**8,734**	**24**	**1,198**	**1,489**	**10**	**289**	**219**						
Repaired - Overdue	**1**	**69**	**0**	**39**	**343**	**0**	**11**	**0**	**0**						
Not Repaired - Not Due	**0**	**0**	**1,175**	**0**	**0**	**10,470**	**0**	**617**	**7,185**						
Not Repaired - Overdue	**0**	**0**	**0**	**0**	**587**	**0**	**4**	**0**	**0**						

Summary of Deficiencies and Repair Activity Resulting from the Inspection Process - Transmission

Transmission Facilities	**2009**			**2010**			**2011**			**2012**			**2013**		
Priority Level	**I**	**II**	**III**	**I**	**II**	**III**	**I**	**II**	**III**	**I**	**II**	**III**	**I**	**II**	**III**
Repair Expected	**Within 1 week**	**Within 1 year**	**Within 3 years**	**Within 1 week**	**Within 1 year**	**Within 3 years**	**Within 1 week**	**Within 1 year**	**Within 3 years**	**Within 1 week**	**Within 1 year**	**Within 3 years**	**Within 1 week**	**Within 1 year**	**Within 3 years**
Towers/Poles															
Steel Towers															
Number of Deficiencies			**41**			**42**			**32**						
Repaired in Time Frame			**25**			**42**									
Repaired - Overdue															
Not Repaired - Not Due			**16**						**32**						
Not Repaired - Overdue															
Poles															
Number of Deficiencies									**2**						
Repaired in Time Frame															
Repaired - Overdue															
Not Repaired - Not Due									**2**						
Not Repaired - Overdue															
Anchors/Guy Wire															
Number of Deficiencies															
Repaired in Time Frame															
Repaired - Overdue															
Not Repaired - Not Due															
Not Repaired - Overdue															
Crossarm/Brace															
Number of Deficiencies															
Repaired in Time Frame															
Repaired - Overdue															
Not Repaired - Not Due															
Not Repaired - Overdue															
Grounding System															
Number of Deficiencies		**51**			**60**				**9**						
Repaired in Time Frame		**51**			**60**				**9**						
Repaired - Overdue															
Not Repaired - Not Due															
Not Repaired - Overdue															

Conductors															
Cable															
Number of Deficiencies									**10**						
Repaired in Time Frame															
Repaired - Overdue															
Not Repaired - Not Due									**10**						
Not Repaired - Overdue															
Static/Neutral															
Number of Deficiencies	**1**			**1**					**6**						
Repaired in Time Frame	**1**			**1**					**2**						
Repaired - Overdue															
Not Repaired - Not Due									**4**						
Not Repaired - Overdue															
Insulator															
Number of Deficiencies			**17**	**1**		**17**			**134**						
Repaired in Time Frame			**17**	**1**		**17**			**123**						
Repaired - Overdue															
Not Repaired - Not Due									**11**						
Not Repaired - Overdue															
Miscellaneous															
Right of Way Condition															
Number of Deficiencies		**18**			**20**	**39**			**105**						
Repaired in Time Frame		**18**			**20**	**39**			**22**						
Repaired - Overdue															
Not Repaired - Not Due									**83**						
Not Repaired - Overdue															
Other															
Number of Deficiencies					**2**	**14**			**1**						
Repaired in Time Frame					**2**	**14**									
Repaired - Overdue															
Not Repaired - Not Due									**1**						
Not Repaired - Overdue															
Transmission Facilities Total															
Total															
Number of Deficiencies	**1**	**69**	**58**	**2**	**82**	**112**	**0**	**0**	**299**						
Repaired in Time Frame	**1**	**69**	**42**	**2**	**82**	**112**	**0**	**0**	**156**						
Repaired - Overdue	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**						
Not Repaired - Not Due	**0**	**0**	**16**	**0**	**0**	**0**	**0**	**0**	**143**						
Not Repaired - Overdue	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**						

Summary of Deficiencies and Repair Activity Resulting from the Inspection Process - Underground

Underground Facilities	2009			2010			2011			2012			2013		
Priority Level	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III
Repair Expected	Within 1 week	Within 1 year	Within 3 years	Within 1 week	Within 1 year	Within 3 years	Within 1 week	Within 1 year	Within 3 years	Within 1 week	Within 1 year	Within 3 years	Within 1 week	Within 1 year	Within 3 years
Underground Structures															
Damaged Cover															
Number of Deficiencies		**2,058**			**1,607**			**1,318**							
Repaired in Time Frame		**831**			**1,006**			**763**							
Repaired - Overdue		**1,166**			**475**			**0**							
Not Repaired - Not Due		**0**			**0**			**555**							
Not Repaired - Overdue		**61**			**126**			**0**							
Damaged Structure															
Number of Deficiencies			**5,951**	**325**		**10,619**	**503**								
Repaired in Time Frame			**5,001**	**12**		**6,736**	**38**								
Repaired - Overdue			**0**	**159**		**0**	**107**								
Not Repaired - Not Due			**950**	**0**		**3,883**	**0**								
Not Repaired - Overdue			**0**	**154**		**0**	**358**								
Congested Structure															
Number of Deficiencies															
Repaired in Time Frame															
Repaired - Overdue															
Not Repaired - Not Due															
Not Repaired - Overdue															
Damaged Equipment															
Number of Deficiencies	**8**	**14**	**2,283**	**62**	**198**	**260**	**41**	**218**	**112**						
Repaired in Time Frame	**5**	**12**	**2,276**	**40**	**157**	**125**	**12**	**102**	**39**						
Repaired - Overdue	**3**	**2**	**0**	**22**	**19**	**0**	**12**	**0**	**0**						
Not Repaired - Not Due	**0**	**0**	**7**	**0**	**0**	**135**	**0**	**116**	**73**						
Not Repaired - Overdue	**0**	**0**	**0**	**0**	**22**	**0**	**17**	**0**	**0**						
Conductors															
Primary Cable															
Number of Deficiencies															
Repaired in Time Frame															
Repaired - Overdue															
Not Repaired - Not Due															
Not Repaired - Overdue															

Secondary Cable															
Number of Deficiencies		**4,993**	**12,631**		**3,716**	**4,726**		**2,608**	**3,019**						
Repaired in Time Frame		**3,339**	**9,244**		**3,166**	**3,022**		**2,191**	**1,517**						
Repaired - Overdue		**1,654**	**0**		**496**	**0**		**0**	**0**						
Not Repaired - Not Due		**0**	**3,387**		**0**	**1,704**		**417**	**1,502**						
Not Repaired - Overdue		**0**	**0**		**54**	**0**		**0**	**0**						
Neutral Cable															
Number of Deficiencies		**8,481**			**1,006**			**736**							
Repaired in Time Frame		**7,422**			**802**			**455**							
Repaired - Overdue		**1,059**			**187**			**0**							
Not Repaired - Not Due		**0**			**0**			**281**							
Not Repaired - Overdue		**0**			**17**			**0**							
Racking Needed															
Number of Deficiencies															
Repaired in Time Frame															
Repaired - Overdue															
Not Repaired - Not Due															
Not Repaired - Overdue															
Miscellaneous															
Other															
Number of Deficiencies	**108,186**	**309**		**20,064**	**1,049**		**15,060**	**1,073**							
Repaired in Time Frame	**108,186**	**11**		**19,871**	**702**		**14,906**	**506**							
Repaired - Overdue	**0**	**296**		**193**	**203**		**107**	**0**							
Not Repaired - Not Due	**0**	**0**		**0**	**0**		**0**	**567**							
Not Repaired - Overdue	**0**	**2**			**144**		**47**	**0**							
Underground Facilities Total															
Total															
Number of Deficiencies	**108,194**	**15,855**	**20,865**	**20,451**	**7,576**	**15,605**	**15,604**	**5,953**	**3,131**						
Repaired in Time Frame	**108,191**	**11,615**	**16,521**	**19,923**	**5,833**	**9,883**	**14,956**	**4,017**	**1,556**						
Repaired - Overdue	**3**	**4,177**	**0**	**374**	**1,380**	**0**	**226**	**0**	**0**						
Not Repaired - Not Due	**0**	**0**	**4,344**	**0**	**0**	**5,722**	**0**	**1,936**	**1,575**						
Not Repaired - Overdue	**0**	**63**	**0**	**154**	**363**	**0**	**422**	**0**	**0**						

Summary of Deficiencies and Repair Activity Resulting from the Inspection Process - Pad Mount Transformers

Pad Mount Transformers	2009			2010			2011			2012			2013		
Priority Level	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III
Repair Expected	Within 1 week	Within 1 year	Within 3 years	Within 1 week	Within 1 year	Within 3 years	Within 1 week	Within 1 year	Within 3 years	Within 1 week	Within 1 year	Within 3 years	Within 1 week	Within 1 year	Within 3 years
Pad Mount Transformers															
Damaged Structure															
Number of Deficiencies		229		17	194		31	35	33						
Repaired in Time Frame		52		8	75		17	25	11						
Repaired - Overdue		143		9	31		12	0	0						
Not Repaired - Not Due		0		0	0		0	10	22						
Not Repaired - Overdue		34		0	88		2	0	0						
Damaged Equipment															
Number of Deficiencies		7			31										
Repaired in Time Frame		1			14										
Repaired - Overdue		1			4										
Not Repaired - Not Due		0			0										
Not Repaired - Overdue		5			13										
Cable Condition															
Number of Deficiencies	116	44	9	10	275		58	496	108						
Repaired in Time Frame	111	5	1	8	158		45	248	27						
Repaired - Overdue	5	28	0	2	51		10	0	0						
Not Repaired - Not Due	0	0	8	0	0		0	248	81						
Not Repaired - Overdue	0	11	0	0	66		3	0	0						
Oil Leak															
Number of Deficiencies	1	1		3	2		16	2							
Repaired in Time Frame	0	0		3	2		11	1							
Repaired - Overdue	1	0		0	0		0	0							
Not Repaired - Not Due	0	0		0	0		0	1							
Not Repaired - Overdue	0	1		0	0		5	0							
Off Pad															
Number of Deficiencies				13			9								
Repaired in Time Frame				10			4								
Repaired - Overdue				3			1								
Not Repaired - Not Due				0			0								
Not Repaired - Overdue				0			4								

Lock/Latch/Penta															
Number of Deficiencies	**11**			**42**			**45**								
Repaired in Time Frame	**5**			**42**			**44**								
Repaired - Overdue	**6**			**0**			**0**								
Not Repaired - Not Due	**0**			**0**			**0**								
Not Repaired - Overdue	**0**			**0**			**1**								
Miscellaneous															
Other															
Number of Deficiencies	**469**	**10**		**90**	**122**	**191**	**334**	**218**	**9**						
Repaired in Time Frame	**469**	**0**		**87**	**114**	**45**	**325**	**192**	**4**						
Repaired - Overdue	**0**	**9**		**3**	**4**	**0**	**6**	**0**	**0**						
Not Repaired - Not Due	**0**	**0**		**0**	**0**	**146**	**0**	**26**	**5**						
Not Repaired - Overdue	**0**	**1**		**0**	**4**	**0**	**3**	**0**	**0**						
Pad Mount Total															
Total															
Number of Deficiencies	**597**	**291**	**9**	**175**	**624**	**191**	**493**	**751**	**150**						
Repaired in Time Frame	**585**	**58**	**1**	**158**	**363**	**45**	**446**	**466**	**42**						
Repaired - Overdue	**12**	**181**	**0**	**17**	**90**	**0**	**29**	**0**	**0**						
Not Repaired - Not Due	**0**	**0**	**8**	**0**	**0**	**146**	**0**	**285**	**108**						
Not Repaired - Overdue	**0**	**52**	**0**	**0**	**171**	**0**	**18**	**0**	**0**						

Summary of Deficiencies and Repair Activity Resulting from the Inspection Process - Streetlights

Pad Mount Transformers	**2009**			**2010**			**2011**			**2012**			**2013**		
Priority Level	**I**	**II**	**III**	**I**	**II**	**III**	**I**	**II**	**III**	**I**	**II**	**III**	**I**	**II**	**III**
Repair Expected	**Within 1 week**	**Within 1 year**	**Within 3 years**	**Within 1 week**	**Within 1 year**	**Within 3 years**	**Within 1 week**	**Within 1 year**	**Within 3 years**	**Within 1 week**	**Within 1 year**	**Within 3 years**	**Within 1 week**	**Within 1 year**	**Within 3 years**
Streetlights															
Base/Standar/Light															
Number of Deficiencies															
Repaired in Time Frame															
Repaired - Overdue															
Not Repaired - Not Due															
Not Repaired - Overdue															
Handhole/Service Box															
Number of Deficiencies															
Repaired in Time Frame															
Repaired - Overdue															
Not Repaired - Not Due															
Not Repaired - Overdue															
Service/Internal Wiring															
Number of Deficiencies															
Repaired in Time Frame															
Repaired - Overdue															
Not Repaired - Not Due															
Not Repaired - Overdue															
Access Cover															
Number of Deficiencies															
Repaired in Time Frame															
Repaired - Overdue															
Not Repaired - Not Due															
Not Repaired - Overdue															
Miscellaneous															
Other															
Number of Deficiencies															
Repaired in Time Frame															
Repaired - Overdue															
Not Repaired - Not Due															
Not Repaired - Overdue															

Streetlight Total															
Total															
Number of Deficiencies															
Repaired in Time Frame															
Repaired - Overdue															
Not Repaired - Not Due															
Not Repaired - Overdue															

Summary of Deficiencies and Repair Activity Resulting from the Inspection Process

Year	Prority Level / Repair Expected		Deficiencies Found (Total)	Repaired In-Time Frame	Repaired - Overdue	Not Repaired - Not Due	Not Repaired - Overdue
2009							
	I	Within 1 week	108,799	108,783	16	0	0
	II	Within 1 year	18,294	13,752	4,427	0	115
	III	Within 3 years	30,841	25,298	0	5,543	0
	IV	N/A	36,254	16,454	N/A	19,800	N/A
2010							
	I	Within 1 week	20,691	20,107	430	0	154
	II	Within 1 year	10,410	7,476	1,813	0	1,121
	III	Within 3 years	27,867	11,529	0	16,338	0
	IV	N/A	66,128	9,300	N/A	56,828	N/A
2011							
	I	Within 1 week	16,122	15,412	266	0	444
	II	Within 1 year	7,610	4,772	0	2,838	0
	III	Within 3 years	10,984	1,973	0	9,011	0
	IV	N/A	91,316	5,061	N/A	86,255	N/A
2012							
	I	Within 1 week					
	II	Within 1 year					
	III	Within 3 years					
	IV	N/A					
2013							
	I	Within 1 week					
	II	Within 1 year					
	III	Within 3 years					
	IV	N/A					

Summary of Deficiencies and Repair Activity Resulting from the Inspection Process - Level IV Conditions										
Overhead Facilities	2009		2010		2011		2012		2013	
	Number of Conditions Found	Number of Conditions Repaired	Number of Conditions Found	Number of Conditions Repaired	Number of Conditions Found	Number of Conditions Repaired	Number of Conditions Found	Number of Conditions Repaired	Number of Conditions Found	Number of Conditions Repaired
Overhead Facilities										
Pole Condition										
Pole Condition	7,194	6,930	10,853	94	1,183	8				
Grounding System										
Anchors/Guy Wire										
Cross Arm/Bracing										
Riser										
Conductors										
Primary Wire/Broken Ties										
Secondary Wire										
Neutral										
Insulators										
Pole Equipment										
Transformers										
Cutouts										
Lightning Arrestors										
Other Equipment										
Miscellaneous										
Trimming Related										
Other	4,374	3,974	1,700	29	924	3				
Overhead Facilities Total	11,568	10,904	12,553	123	2,107	11				
Transmission Facilities										
Tower/Poles										
Steel Towers	44	0	50	32						
Poles	0	0	0	2						
Anchors/Guy Wire	0	0	0	0						
Crossarm/Brace	0	0	0	0						
Grounding System	37	10	46	0						
Conductors										
Cable	157	0	185	10						
Static/Neutral	6	3	7	4						
Insulators	184	12	316	133						
Miscellaneous										
Right of Way Conditions	169	4	259	85						
Other	290	145	172	1						
Transmission Facilities Total	887	174	1,035	267	0	0				
Underground Facilities										
Underground Structures										
Damage Covers										
Damage Structures			5,102	166	50,756	689				
Congested Structures			2,018	172	1,796	48				
Damage Equipment										
Conductors										
Primary Cable										
Secondary Cable										
Neutral Cable										
Racking Needed	23,785	5,365	13,033	2,199	9,703	913				
Miscellaneous										
Other			31,832	5,987	25,379	2,528				
Underground Facilities Total	23,785	5,365	51,985	8,524	87,634	4,178				

Pad Mount Transformers										
Underground Structures										
Damage Structures					**414**	**81**				
Damage Equipment										
Damage Cable										
Oil Leak										
Off Pad										
Lock/Latch/Penta										
Miscellaneous										
Other	**14**	**11**	**555**	**386**	**1,161**	**791**				
Pad Mount Transformers Total	**14**	**11**	**555**	**386**	**1,575**	**872**				
Streetlights										
Streetlights										
Base/Standar/Light										
Handhole/Service Box										
Service/Internal Wiring										
Access Cover										
Miscellaneous										
Other										
Streetlight Total										
Total Level IV Conditions										
Overall Total	**36,254**	**16,454**	**66,128**	**9,300**	**91,316**	**5,061**				

Exhibit 1

Certification of Contact Voltage Testing

Robert Schimmenti, on this 13 day of February 2012, certifies as follows:
1. I am Vice President of Consolidated Edison Company of New York, Inc. ("Con Edison" or "the Company").

2. I am responsible for overseeing Con Edison's contact voltage testing program, and in that capacity I have monitored the Company's contact voltage testing program during the twelve months ended December 31, 2011 ("the twelve month period"). During the twelve-month period, Con Edison instituted and diligently carried out a program designed to meet the contact voltage testing requirements of the Public Service Commission's Safety Standards, issued in Case 04-M-0159, Proceeding Instituting Safety Standards.

3. To the best of my knowledge, information, and belief, during the twelve month period, Con Edison identified and tested for contact voltage (i) all publicly accessible electric facilities owned by the Company, and (ii) all publicly accessible streetlights and traffic signals located in public thoroughfares in the Company's service territory and directly supplied by the Company as identified through a good faith effort by the Company, except for such facilities that are identified in the Company's Annual Report, submitted herewith.

Robert Schimmenti

Certification of Inspections

Robert Schimmenti, on this 13 day of February 2012, certifies as follows:

1. I am Vice President of Consolidated Edison Company of New York, Inc. ("Con Edison" or "the Company").

2. I am responsible for overseeing Con Edison's electric facility inspection program, and in that capacity I have monitored the Company's inspection program during the twelve months ended December 31, 2011 ("the twelve-month period"). During the twelve-month period, Con Edison instituted and diligently carried out a program designed to meet the inspection requirements established by the Public Service Commission's Safety Standards, issued in Case 04-M-0159, Proceeding Instituting Safety Standards.

3. To the best of my knowledge, information, and belief, Con Edison has visually inspected the requisite number of electric facilities during the twelve-month period, including the requirement to have conducted a visual inspection of at least 40% of its electric facilities through December 31, 2011.

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Robert Schimmenti

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conEdison