2017 ELECTRIC SAFETY STANDARDS PERFORMANCE REPORT

Electric Distribution Systems
Office of Electric, Gas, and Water
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SUMMARY

On January 5, 2005, the Commission established Electric Safety Standards to safeguard the public from exposure to stray voltage and to identify and eliminate potentially harmful conditions before serious safety hazards and/or reliability deficiencies develop.[1] The Electric Safety Standards include: (1) stray voltage testing of streetlights and electric facilities that are accessible to the public, using certified voltage detection devices; (2) inspection of utility electric facilities on a minimum of a five-year cycle; (3) recordkeeping, certification, quality assurance and reporting requirements; and, (4) adoption of the National Electric Safety Code as the minimum standard governing utility construction, maintenance, and operations.

The utilities are required to identify and record all voltage findings of 1.0 volt (V) or more as part of the stray voltage testing requirements. In 2017, manual stray voltage testing was performed on approximately one million utility facilities statewide, resulting in the identification of 364 stray voltage conditions; of which, 169 (46%) were at voltage levels of 4.5V or higher.[2] The overall level of stray voltage findings decreased significantly from 2016 and the percentage of findings above 4.5V was identical to that of 2016. Mobile stray voltage testing was also performed by the utilities in areas required by Commission order.[3] This effort is focused primarily in New York City, yielding 9,725

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[1] Case 04-M-0159, Proceeding on Motion of the Commission to Examine the Safety of Electric Transmission and Distribution Systems, Order Instituting Electric Safety Standards (issued January 5, 2005). These Safety Standards are applicable to the investor-owned utilities-- Central Hudson Gas & Electric Corporation (CHGE), Consolidated Edison Company of New York, Inc. (Con Edison), New York State Electric & Gas Corporation (NYSEG), Niagara Mohawk Power Corporation d/b/a National Grid (National Grid), Orange and Rockland Utilities, Inc. (ORU), Rochester Gas and Electric Corporation (RG&E), and the municipal electric utilities.

[2] Readings below 4.5V are considered low voltage in nature and not an immediate safety concern.

[3] Case 06-M-1467, Petition of Orange and Rockland Utilities, Inc. to Modify Its Stray Voltage Testing Program, Order Adopting Changes to Electric Safety Standards (issued December 15, 2008).

findings, of which approximately 7,575 were found on non-utility facilities. In addition to testing programs, utilities are made aware of potential stray voltage locations through information provided to them by the public. In 2017, there were 337 calls from customers reporting shock incidents that resulted in 211 confirmed cases of stray voltage; 85 incidents were caused by problems with utility owned facilities, and 126 incidents were traced to defective customer-owned equipment or wiring. All stray voltage findings identified through testing or from customer calls were made safe.

The Electric Safety Standards require that each utility visually inspect 20% of its electric facilities per year to ensure all facilities are inspected within a five-year period.[4] Calendar year 2017 marked the third year of the third five-year inspection cycle and all utilities completed and met the year's inspection cycle criteria. In 2017, the investor-owned utilities identified a total of 132,192 deficiencies. The majority of these are not immediate concerns, and there was a 47% reduction in deficiencies classified as Level I requiring immediate repair when compared to 2016. Other deficiencies found during the inspection process are required to be repaired within appropriate time frames as set forth in the Safety Standards. All utilities were in full compliance with all testing and inspection requirements in 2017.

Inspection Changes Related to Con Edison

In Case 16-E-0060, the Commission established a pilot enhancement program for Con Edison's Structure Inspection and Repair programs.[5] The pilot allocates efforts and funds toward decreasing the repair backlog while incorporating more robust inspection efforts, including infrared scanning and ampere testing in the underground structures, and offset the increase in cost to do these additional measures by extending the

[4] An inspection requires a qualified and trained individual to evaluate and examine the entire structure to determine its condition and the potential for it to cause or lead to safety hazards or adversely affect reliability.

[5] Case 16-E-0060, Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Electric Service, Order Approving Electric and Gas Rates (issued January 25, 2017), Joint Proposal at 73, footnote 74 and Appendix 15.

inspection cycle for the Underground Inspection Program from five to eight years. In addition, the pilot provides for targeted mobile contact voltage scans in areas with a history of repeat stray voltage detection. The results from the first year of this pilot is reported below in the Electric Facility Repair section (page 14).

STRAY VOLTAGE TESTING

Manual Stray Voltage Testing

Table 1 lists the number of stray voltage findings by facility type in 2017 at 1V or above resulting from manual testing.[6]

Table 1: Stray Voltage Findings from Manual Testing Greater Than 1 V by Facility Type

2017 Test Cycle					
Company	**Streetlights**	**Underground Distribution**	**Overhead Distribution**	**Transmission**	**Total Findings**
Con Edison	102	7	1	0	110
National Grid	86	1	23	9	119
NYSEG	16	0	34	3	53
RG&E	15	0	1	0	16
Central Hudson	7	2	42	0	51
Orange & Rockland	4	0	8	0	12
Municipal Electric	1	0	2	0	3
Total	231	10	111	12	364
2016 Test Cycle					
Company	**Streetlights**	**Underground Distribution**	**Overhead Distribution**	**Transmission**	**Total Findings**
Con Edison	229	12	1	0	242
National Grid	77	1	18	4	100
NYSEG	13	0	28	86	127

[6] These findings do not include instances of stray voltage discovered by utility personnel as part of their routine work or instances found by other means, such as customer reports. This data also does not include instances of stray voltage discovered by mobile detection.

RG&E	1	0	0	22	23
Central Hudson	5	0	5	26	36
Orange & Rockland	3	0	13	0	16
Municipal Electric	1	0	2	0	3
Total	329	13	67	138	547

The total manual stray voltage findings reported in Table 2 for 2017 show a significant decrease from 2016 for findings greater than 4.5V. As is the case historically, many of the incidences are attributable to streetlights.

Table 2: Stray Voltage Findings from Manual Testing Greater Than 4.5 V

2017 Test Cycle					
Company	**Streetlights**	**Underground Distribution**	**Overhead Distribution**	**Transmission**	**Total Findings**
Con Edison	87	7	1	0	95
National Grid	29	0	4	0	33
NYSEG	16	0	0	0	16
RG&E	14	0	1	0	15
Central Hudson	5	0	0	0	5
Orange & Rockland	4	0	1	0	5
Municipal Electric	0	0	0	0	0
Total	155	7	7	0	169
2016 Test Cycle					
Company	**Streetlights**	**Underground Distribution**	**Overhead Distribution**	**Transmission**	**Total Findings**
Con Edison	145	8	1	0	154
National Grid	40	1	4	3	48
NYSEG	9	0	5	13	27
RG&E	0	0	0	14	14
Central Hudson	3	0	0	1	4
Orange & Rockland	2	0	4	0	6
Municipal Electric	0	0	1	0	1
Total	199	9	15	31	254

Mobile Stray Voltage Detection Program

Since established by the Commission in 2008,[7] Con Edison is required to complete 12 system scans on an annual basis using mobile stray voltage testing equipment. In June 2011, the Commission ordered two surveys using mobile stray voltage detection equipment in Buffalo and one each in Yonkers, White Plains, Albany, Niagara Falls, Rochester, and New Rochelle.[8] Across the State, the majority of mobile stray voltage findings continue to be low voltage in nature (1.0-4.4V) and are related to Streetlight and Traffic Signal control devices, followed by non-utility facilities. The results of the scans completed in 2017 are summarized below in Tables 3, 4, and 5.

Con Edison's 12 New York City scans shows a 9% increase from last year's mobile survey results. Non-utility facilities, such as energized customer or contractor equipment or various New York State Department of Transportation (DOT) facilities, remain the largest sources of stray voltage findings in New York City, as has been the case historically. A 16% increase in findings on these facilities comprised the entirety of the overall increase, as findings from other sources decreased from 2016 levels. The City of Buffalo had a notable decline in stray voltage findings from 2016 levels. As shown in Table 4, streetlights account for the highest number of stray voltage findings in the City of Buffalo, as has also been the case historically. As shown in Table 5, the City of Rochester experienced a significant decline in stray voltage findings from 2016 to 2017. The majority of the findings of stray voltage were from streetlights, and mostly in the 1.0v – 4.4V range.

[7] Case 07-E-0523, Con Edison - Electric Rates, Order Establishing Rates for Electric Service (issued March 25, 2008).

[8] Case 10-E-0271, Examination of Mobile Testing Requirements of the Safety Standards, Order Requiring Additional Mobile Stray Voltage Testing (issued June 23, 2011).

Table 3: Findings by Con Edison Utilizing Mobile Detection

	Facility	1.0-4.4V	4.5-24.9V	>25V	Total
2017 Test Cycle					
New York City					
(12 scans)	Underground	464	192	21	677
	Street Lights/Traffic Signals	688	421	343	1452
	Non-Utility Facilities	5339	1875	361	7575
Total		6491	2488	725	9704
2016 Test Cycle					
New York City					
(12 scans)	Underground	536	167	15	718
	Street Lights/Traffic Signals	921	419	337	1677
	Non-Utility Facilities	4627	1608	294	6529
Total		6084	2194	646	8924

Table 4: Findings by National Grid Utilizing Mobile Detection

	Facility	1.0-4.4V	4.5-24.9V	>25V	Total
2017 Test Cycle					
Buffalo	Underground	0	0	0	0
(2 scans)	Street Lights/Traffic Signals	518	80	8	606
	Non-Utility Facilities	102	21	0	123
Total		620	109	0	729
2016 Test Cycle					
Buffalo	Underground	0	0	0	0
(2 scans)	Street Lights/Traffic Signals	728	106	4	838
	Non-Utility Facilities	5	2	1	8
Total		733	108	5	846

Table 5: Findings by RG&E Utilizing Mobile Detection

	Facility	1.0-4.4V	4.5-24.9V	>25V	Total
2017 Test Cycle					
Rochester	Underground	5	0	0	5
	Street Lights/Traffic Signals	48	2	7	57
	Non-Utility Facilities	7	6	1	14
Total		60	8	8	76
2016 Test Cycle					
Rochester	Underground	7	3	0	10
	Street Lights/Traffic Signals	73	18	8	99
	Non-Utility Facilities	16	2	1	19
Total		96	23	9	128

Shock Reports

In addition to testing programs, utilities are made aware of potential stray voltage locations through information provided to them by the public. Utilities are required to respond to and investigate all shock reports, including reports involving domestic animals, regardless of whether or not injuries occurred. Table 6 provides a summary for 2016 and 2017 of the electric shock reports received by the utilities where instances of stray voltage were substantiated after field investigation. The Table also classifies shock reports based on the source of the stray voltage. Investigations of shock reports where the cause of the stray voltage was determined to be due to utility owned or operated equipment are classified as company responsibility. Customer responsibility issues include shock incidents where the cause of the stray voltage was found to be due to the customer's wiring, equipment, or was attributed to other entities such as the City of New York.

In 2017, shock reports from the public remained flat from last year's total count. The 2017 Company Responsibility incident count of 85, however, was up from the 2016 incident count of 66; however, it remained lower the 2015 incident count of 97.

Table 6: Summary of Shock Reports

2017			
Company	**Shock Reports**	**Company Responsibility**	**Customer Responsibility***
Con Edison	66	23	43
National Grid	97	46	51
NYSEG	14	3	11
RG&E	4	2	2
Central Hudson	26	8	18
Orange & Rockland	4	3	1
Municipal Electrics	0	0	0
Total	211	85	126
2016			
Company	**Shock Reports**	**Company Responsibility**	**Customer Responsibility***
Con Edison	62	30	32
National Grid	110	27	83
NYSEG	13	3	10
RG&E	7	0	7
Central Hudson	9	2	7
Orange & Rockland	9	4	5
Municipal Electrics	0	0	0
Total	210	66	144

** The total Shock Reports listed under Customer Responsibility include cases where responsibility was attributed to other non-utility entities, such as the City of New York*

INSPECTION AND REPAIRS OF ELECTRIC FACILITIES

The inspection process involves visual inspection of electric facilities to identify any damage or problem that may cause hazardous conditions or reliability concerns. Inspections are performed by a combination of utility employees and contractors, all of whom first receive training including instruction on the common grading system used by New York electric utilities to classify facility deficiencies. If an inspection reveals a deficiency, the Electric Safety Standards require utilities to make all repairs necessary to eliminate the deficiency based upon its severity:

- Level I discoveries must be repaired within one week of discovery,
- Level II discoveries must be repaired within one year of discovery,
- Level III discoveries must be repaired within three years of discovery, and
- Level IV conditions do not require repair but are identified to be monitored.

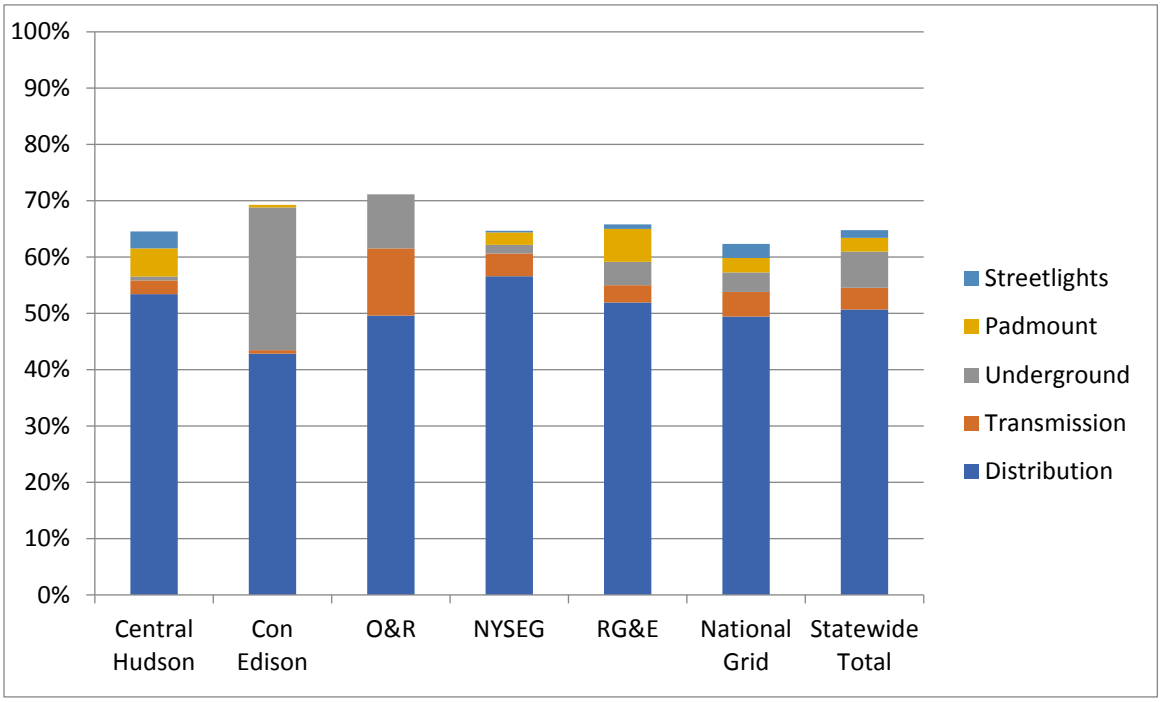
The Electric Safety Standards also require that the utilities use a detailed reporting system that captures deficiencies by equipment type (poles, transformers, and cables), priority level, whether actions have been taken, and the timeliness of the repair activities in relation to the assigned priority level.

Electric Facility Inspections

The Electric Safety Standards require utilities to complete inspections on 20% of their facilities each year, so that 100% of a utility's transmission and distribution facilities will be inspected at least once every five years. Calendar year 2017 was the third year of the third complete five-year cycle of the inspection program begun in 2005. Each utility has met the requirement to inspect a minimum of 60% of their facilities by the end of the third year of the current cycle.

Figure 1, below, shows the percentage of visual inspections by facility type completed for each of the investor-owned utilities.

Figure 1: Percentage of Visual Inspections Completed
Investor-Owned Utilities (Third Year of Third Five-Year Cycle)



Electric Facility Inspection Findings

In 2017 inspections were performed on approximately 701,470 utility facilities across the State. Inspections performed in 2016 totaled approximately 822,000. Table 7 provides a summary of deficiencies for 2016 and 2017 by utility and facility type.

Table 7: Deficiencies by Facility Type
Found by Investor-Owned Utilities

2017 Inspection Cycle						
Company	**Underground**	**Distribution**	**Transmission**	**Pad Mount**	**Street Lights**	**Total**
Con Edison	26,138	19,535	16	957	0	46,646
National Grid	948	54,126	3,865	522	425	59,886
NYSEG	137	14,312	1,012	152	10	15,623
RG&E	733	3,115	317	129	4	4,298
Central Hudson	37	3,936	234	98	0	4,305
Orange & Rockland	36	1,283	88	27	0	1,434
Total	28,029	96,307	5,532	1,885	439	132,192
2016 Inspection Cycle						
Company	**Underground**	**Distribution**	**Transmission**	**Pad Mount**	**Street Lights**	**Total**
Con Edison	61,698	36,795	35	1,354	0	99,882
National Grid	788	63,831	3,119	566	189	68,493
NYSEG	181	10,302	1,154	58	5	11,700
RG&E	165	2,582	437	52	0	3,236
Central Hudson	13	3,864	149	312	0	4,338
Orange & Rockland	27	1,908	150	7	0	2,092
Total	62,872	119,282	5,044	2,349	194	189,741

Table 8 lists the number of deficiencies found in 2017 by severity level and facility type. Deficiencies found in 2017 were significantly lower in all categories compared to the 2016 results, realizing a 30% decrease in the aggregate. Particularly notable is the fact that Type I conditions were nearly cut in half from 2016. In 2017 the investor-owned utilities reported finding 6,816 Level I deficiencies, a decrease of approximately 47% from 2016. Staff's review of this category revealed that the Con Edison underground system was responsible for the majority of the deficiencies in this category in 2017, as has been the case historically.

Table 8: Summary of Deficiencies by Severity Level Found by Investor-Owned Utilities

2017 Inspection Cycle						
Level	**Underground**	**Distribution**	**Transmission**	**Pad Mount**	**Street Lights**	**Total**
I	3,910	2,201	12	693	0	6,816
II	18,734	15,422	699	931	388	36,174
III	5,385	78,684	4,821	261	51	89,202
Total	28,029	96,307	5,532	1,885	439	132,192
2016 Inspection Cycle						
Level	**Underground**	**Distribution**	**Transmission**	**Pad Mount**	**Street Lights**	**Total**
I	9,872	2,025	8	846	0	12,751
II	46,732	15,858	660	1,133	159	64,542
III	6,268	101,399	4,376	370	35	112,448
Total	62,872	119,282	5,044	2,349	194	189,741

The combined total of deficiencies found on municipal systems, was 404, nearly identical to 2016. The municipal systems continue to report that most of the problems they found were with their overhead distribution systems and that all deficiencies were immediately repaired.

Electric Facility Repairs

In 2017, the utilities reported repairing over 99% of Level I deficiencies; 95% were repaired within the one-week time requirement. As required by the Safety Standards, a repair must be considered a permanent repair for it to be removed from the Level I priority list. The remaining Level I deficiencies awaiting repair were made safe pending permanent repair.

Statewide, the investor-owned utilities reported repairing 54% of Level II and 8% of Level III deficiencies discovered in 2017. For deficiencies discovered in 2016, 82% of Level II and 13% of Level III deficiencies were repaired. Tables 9 and 10, below, lists the number of Level II and Level III repairs completed in the five-year period from 2013-2017 and the number of repairs recorded as overdue as of December 31, 2017.

Table 9: 2013 - 2017 Level II Repair Activity by Investor-Owned Utilities

Company	Level II			
	Found	Repaired/ Not Due	% Repaired Within Time Frame/Not Due	Not Repaired Overdue
Con Edison	303,013	249,465	82%	30,720
National Grid	74,752	69,961	94%	635
NYSEG	17,607	11,837	67%	3,658
RG&E	4,774	2,996	63%	798
Central Hudson	1,018	977	96%	17
Orange & Rockland	1,795	1,770	99%	0
Total	402,959	337,006	84%	35,828

Table 10: 2013 - 2017 Level III Repair Activity by Investor-Owned Utilities

Company	Level III			
	Found	Repaired/ Not Due	% Within Time Frame/Not Due	Not Repaired Overdue
Con Edison	134,121	111,284	83%	17,279
National Grid	244,385	222,289	91%	2,491
NYSEG	32,834	28,614	87%	2,882
RG&E	9,560	8,918	93%	377
Central Hudson	21,285	21,255	99%	5
Orange & Rockland	5,770	5,704	98%	21
Total	447,955	387,068	86%	23,055

As shown in Tables 9 and 10, Con Edison continues to have the largest number of overdue repairs associated with Level II and III deficiencies. The pilot is designed to decrease Con Edison's Level II and III overdue repairs by the end of 2020.

In 2017, the first year of the pilot, Con Edison completed 20,477 of the backlogged repairs, exceeding its goal to repair roughly 17,000 deficiencies that year. At the end of 2017, the Company still had approximately 48,000 overdue Level II and III repairs.

In addition, Con Edison redeployed resources for enhanced inspection work and additional mobile surveys with the intention of identifying defects early and reducing manhole and electric shock events. Last year, infrared scanning and ampere testing identified 150 locations for cable replacement, which helped prevent manhole events, and the additional targeted mobile scans contributed to a 23% decrease in electric shock reports originating from utility equipment from 2016.

CERTIFICATION AND PERFORMANCE MECHANISM

To ensure the utilities maintain the necessary focus on the safety and reliability of their electric systems, the Electric Safety Standards require an officer of each utility to annually certify the results of the testing and inspection programs. Each utility provided statements signed by an officer certifying that it performed the requisite number of stray voltage tests and inspections in 2017.

The Electric Safety Standards also establish a performance mechanism to ensure compliance by utilities with the Electric Safety Standards. This mechanism includes two annual performance targets, one for stray voltage testing and one for facility inspections. Given the safety concerns associated with stray voltage, the performance target is 100% of all facilities and streetlights that are required to be tested. The facility inspection target is set at an annually increasing scale beginning at 85% of the annual requirement of 20% of all electric facilities and increasing to 100% in the fifth year of the cycle. Failure to meet a performance target could result in a negative 75 basis point revenue adjustment (a maximum negative adjustment of 150 basis points may be imposed for failure to achieve both performance targets in one year). All of the electric utilities met the requirements of the performance mechanisms in 2017.

COMPLIANCE MONITORING

To ensure proper compliance with the Electric Safety Standards, Staff maintains frequent contact with all electric utilities, individually and collectively, since the inception of the standards. In early 2005, the investor-owned utilities formed a working group to discuss issues related to stray voltage testing and inspection programs. The working group has proven to be an effective means to raise and resolve issues, identify best working practices, and establish a common understanding of the extent and causes of stray voltage across the State. Discussions have evolved from addressing implementation issues, such as data collection, to focusing more on stray voltage mitigation efforts, alternative testing equipment, and repair activities. Staff actively participates in the working group sessions, which are typically held on a bi-annual basis. These sessions have helped the utilities identify best working practices and maintain an overall understanding of Staff's expectations.

Staff also monitors the utilities' compliance with the Electric Safety Standards through field visits. The primary purpose of the field visits is to ensure that stray voltage testing, inspections, and quality assurance programs are being conducted properly. The field visits enable Staff to monitor the utilities' quality assurance programs and provide the opportunity to randomly sample the utility's testing and inspection records to verify the accuracy of the data collected. To further verify the accuracy of inspections, Staff also obtains Quality Assurance and Quality Control data to ensure utility programs are ensuring compliance with the standards.

CONCLUSION

All the utilities are following the 2017 testing requirements and goals established by the Commission's Electric Safety Standards. Stray voltage testing was performed on approximately one million facilities across the State last year. All utilities are also in compliance with the inspection requirement for the third year of the third inspection cycle; in total, approximately 701,470 facilities were visually inspected in 2017.

Since all of test and inspection requirements were met, no revenue adjustments should be imposed by the Commission.