

Filed Session of June 15, 2016



**Department  
of Public Service**

**2015 ELECTRIC SAFETY STANDARDS  
PERFORMANCE REPORT**

Electric Distribution Systems  
Office of Electric, Gas, and Water  
June 2016

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.<sup>1</sup> 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 must identify and record all voltage findings of 1.0 volt (V) or more as part of the stray voltage testing requirements. Manual stray voltage testing was performed on approximately one million utility facilities statewide in 2015, identifying 732 stray voltage conditions; of which, 226 (31%) were at voltage levels of 4.5V or higher.<sup>2</sup> Stray voltage attributed to streetlights accounted for 152 (67%) of the conditions at voltage levels of 4.5V or higher. Mobile stray voltage testing was also performed by the utilities

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<sup>1</sup> 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 (Central Hudson), 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. (Orange & Rockland), Rochester Gas and Electric Corporation (RG&E), and the municipal electric utilities.

<sup>2</sup> Readings below 4.5V are considered low voltage in nature and not an immediate safety concern.

in areas required by Commission order.<sup>3</sup> This effort is focused primarily in New York City, yielding approximately 6,800 findings, primarily 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 2015, there were 446 calls from customers reporting shock incidents that resulted in 268 confirmed cases of stray voltage; 97 incidents were caused by problems with utility owned facilities, and 151 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.<sup>4</sup> Calendar year 2015 marked the first year of the third five year inspection cycle and all utilities completed and met the first year's inspection cycle criteria. In 2015, the investor-owned utilities identified a total of 193,889 deficiencies. Repairs of deficiencies found during the inspection process are required to be completed within appropriate time frames as set forth in the Safety Standards. All utilities were in full compliance with all testing and inspection requirements in 2015.

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<sup>3</sup> 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).

<sup>4</sup> 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.

STRAY VOLTAGE TESTINGManual Stray Voltage Testing

Table 1 lists the number of stray voltage findings by facility type in 2015 at 1V or above resulting from manual testing.<sup>5</sup> Stray voltage testing was performed on approximately one million transmission and distribution facilities across the State.

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

2015 Test Cycle					
Company	Streetlights	Underground Distribution	Overhead Distribution	Transmission	Total Findings
Con Edison	213	17	16	0	246
National Grid	38	0	25	20	83
NYSEG	17	0	37	271	325
RG&E	15	0	0	47	62
Central Hudson	0	1	2	0	3
Orange & Rockland	0	0	8	0	8
Municipal Electric	2	0	3	0	5
Total	285	18	91	338	732
2014 Test Cycle					
Company	Streetlights	Underground Distribution	Overhead Distribution	Transmission	Total Findings
Con Edison	264	21	18	0	303
National Grid	5	0	17	48	70
NYSEG	50	0	13	41	104
RG&E	3	8	2	12	25
Central Hudson	6	3	53	0	62
Orange & Rockland	1	0	4	0	5
Municipal Electric	0	1	10	0	11
Total	329	33	117	101	580

<sup>5</sup> 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.

The sole notable development for 2015 is the increase in the number of stray voltage findings on NYSEG transmission facilities. Although this is a significant increase from 2014, nearly all of the conditions were low voltage in nature (less than 4.5V) and were limited to minor grounding system deficiencies and not issues with the structures themselves. The total manual stray voltage findings reported in Table 2 for 2015 indicate a collective overall improvement from 2014 for stray voltage findings greater than 4.5V. The utilities attribute this improvement to system-wide engineering, design and construction advancements in grounding and wiring systems, and the implementation of enhanced quality assurance audits.

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

2015 Test Cycle					
Company	Streetlights	Underground Distribution	Overhead Distribution	Transmission	Total Findings
Con Edison	107	11	14	0	132
National Grid	17	0	6	2	25
NYSEG	13	0	4	21	38
RG&E	13	0	0	13	26
Central Hudson	0	0	0	0	0
Orange & Rockland	0	0	0	0	0
Municipal Electric	2	0	3	0	5
Total	152	11	27	36	226
2014 Test Cycle					
Company	Streetlights	Underground Distribution	Overhead Distribution	Transmission	Total Findings
Con Edison	197	14	17	0	228
National Grid	1	0	8	2	11
NYSEG	47	0	2	8	57
RG&E	23	4	0	5	32
Central Hudson	3	0	1	0	4
Orange & Rockland	1	0	2	0	3
Municipal Electric	1	3	4	0	8
Total	273	21	34	15	343

Mobile Stray Voltage Detection Program

Pursuant to the Commission's Order in Case 07-E-0523,<sup>6</sup> Con Edison is required to complete 12 system scans on an annual basis using mobile testing equipment. In June 2011, the Commission ordered two surveys in Buffalo and one each in Yonkers, White Plains, Albany, Niagara Falls, Rochester, and New Rochelle.<sup>7</sup> Across the State, the majority of 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 2015 are summarized below in Tables 3, 4, and 5.

Table 3 shows the results from Con Edison's 12 New York City scans. The rate of findings by Con Edison shows a 21% decrease from last year's mobile survey results. This decrease in findings may in part be due to reduced use of salt due to the mild winter. In 2014, significant snow and rainfall occurred, resulting in increased volumes of salt spread on the streets of New York City to deice them. The use of salt is more problematic in the Con Edison service territory because of its extensive system of underground electric distribution networks. In 2015, this was not the case and may have facilitated the significant reduction in findings. 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 for 2015.

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<sup>6</sup> Case 07-E-0523, Con Edison - Electric Rates, Order Establishing Rates for Electric Service (issued March 25, 2008).

<sup>7</sup> 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**

City	Facility	1.0-4.4V	4.5-24.9V	>25V	Total
<b>2015 Test Cycle</b>					
New York City					
(12 scans)	Underground	433	131	16	580
	Street Lights/Traffic Signals	1211	549	252	2012
	Non-Utility Facilities	2953	1066	230	4249
<b>Total</b>		4597	1746	498	6841
<b>2014 Test Cycle</b>					
New York City					
(12 scans)	Underground	524	201	32	757
	Street Lights/Traffic Signals	904	468	314	1686
	Non-Utility Facilities	4142	1673	375	6190
<b>Total</b>		5570	2342	721	8633

As shown in Table 4, streetlights account for the highest number of stray voltage findings in the City of Buffalo. The 2015 results improved over 2014, and that trend is anticipated to continue over time as National Grid continues with its underground cable replacement program. This program commenced in 2009 and is scheduled to be completed in 2019, with approximately 50 miles of cable targeted for replacement. National Grid states that no stray voltage findings have been reported in the segments where the cable has been replaced over the last several years.

**Table 4: Findings by National Grid Utilizing Mobile Detection**

	Facility	1.0-4.4V	4.5-24.9V	>25V	Total
<b>2015 Test Cycle</b>					
Buffalo	Underground	0	0	0	0
(2 scans)	Street Lights/Traffic Signals	507	83	6	596
	Non-Utility Facilities	7	2	0	9
<b>Total</b>		514	85	6	605
<b>2014 Test Cycle</b>					
Buffalo	Underground	0	0	0	0
(2 scans)	Street Lights/Traffic Signals	572	117	14	703
	Non-Utility Facilities	31	7	2	40
<b>Total</b>		603	124	16	743

As shown in Table 5, the City of Rochester experienced a significant decrease in stray voltage findings from 2014 to 2015. The majority of the findings of stray voltage were from streetlights, and mostly within the 1.0v – 4.4v range. As with Con Edison, this is an encouraging development, some of which is likely related to the mild winter.

**Table 5: Findings by RG&E Utilizing Mobile Detection**

	<b>Facility</b>	<b>1.0-4.4V</b>	<b>4.5-24.9V</b>	<b>&gt;25V</b>	<b>Total</b>
<b>2015 Test Cycle</b>					
Rochester	Underground	1	0	0	1
	Street Lights/Traffic Signals	25	6	2	33
	Non-Utility Facilities	3	0	0	3
<b>Total</b>		29	6	2	37
<b>2014 Test Cycle</b>					
Rochester	Underground	4	4	0	8
	Street Lights/Traffic Signals	139	10	1	150
	Non-Utility Facilities	8	3	1	12
<b>Total</b>		151	17	2	170

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 and regardless of whether or not injuries occurred. Table 6 provides a summary for 2014 and 2015 of the electric shock reports received by the utilities where cases 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 caused by 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 attributed to other non-utility entities such as the City of New York.



In 2015, Con Edison showed a slight decrease in the number of confirmed shock reports that were its responsibility. As with stray voltage findings, winter weather conditions have an effect on shock reports, resulting in fewer shock reports.

**Table 6: Summary of Shock Reports**

<b>2015</b>			
<b>Company</b>	<b>Shock Reports</b>	<b>Company Responsibility</b>	<b>Customer Responsibility*</b>
Con Edison	91	40	51
National Grid	118	35	83
NYSEG	27	11	16
RG&E	6	2	4
Central Hudson	19	7	12
Orange & Rockland	5	2	3
Municipal Electrics	2	0	2
Total	268	97	151
<b>2014</b>			
<b>Company</b>	<b>Shock Reports</b>	<b>Company Responsibility</b>	<b>Customer Responsibility*</b>
Con Edison	104	49	55
National Grid	117	35	82
NYSEG	11	1	10
RG&E	3	2	1
Central Hudson	18	7	11
Orange & Rockland	5	2	3
Municipal Electrics	3	1	2
Total	261	97	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 fixed within one week of discovery,
- Level II discoveries must be fixed within one year of discovery,
- Level III discoveries must be fixed within three years of discovery, and
- Level IV conditions do not require repair but are identified to be monitored.

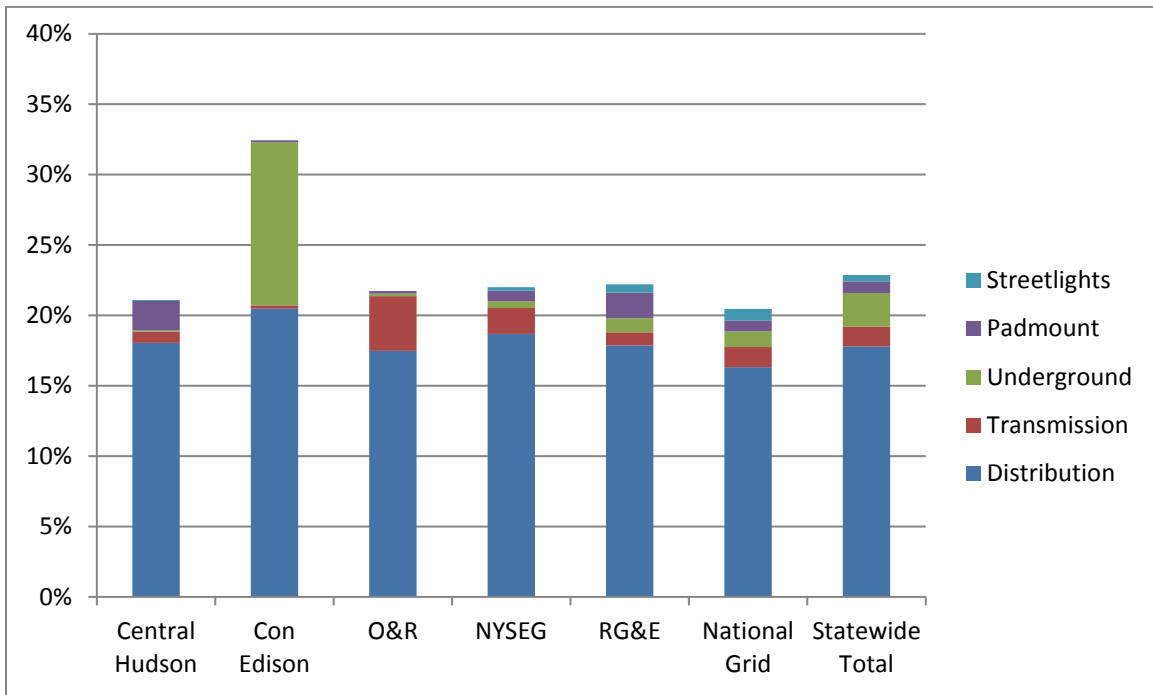
The Electric Safety Standards also require that the utilities use a detailed reporting system that captures deficiencies by equipment type (poles, transformers, and cables), priority level, whether actions have been taken, and the timeliness of the repair activities in relation to the assigned priority 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 2015 was the first year of the third complete five year cycle of the inspection program begun in 2005. Each utility met the requirement to inspect a minimum of 20% of their facilities by the end of calendar year 2015.

Figure 1 shows the percentage of visual inspections by facility type completed for each of the investor-owned utilities. Over the last several years there has been ongoing concern with the performance of Con Edison with respect to completing inspections of its underground facilities, mostly due to the effects from Super Storm Sandy in 2012. Its efforts in 2015 resulted in completion of over 30% of total system assets, including 42% of its overhead facilities and 23% of its underground system, a significant improvement over historic performance.

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



Electric Facility Inspection Findings

In 2015 inspections were performed on approximately 855,000 facilities across the State. Inspections performed in 2014 totaled approximately 663,000. Table 7 provides a summary of deficiencies for 2014 and 2015 by utility and facility type. As shown in the table, the total number of deficiencies discovered decreased by approximately 12% from 2014.

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

2015 Inspection Cycle						
Company	Underground	Distribution	Transmission	Pad Mount	Street Lights	Total
Con Edison	61,667	36,199	16	*	0	97,882
National Grid	761	72,725	3,058	482	242	77,268
NYSEG	92	6,160	1,204	88	15	7,559
RG&E	162	2,785	171	44	8	3,170
Central Hudson	12	5,481	360	433	0	6,286
Orange & Rockland	54	1,465	185	20	0	1,724
Total	62,768	124,815	4,994	1,047	265	193,889
2014 Inspection Cycle						
Company	Underground	Distribution	Transmission	Pad Mount	Street Lights	Total
Con Edison	140,421	75	1	*	0	140,497
National Grid	1,400	56,699	2,959	482	177	61,717
NYSEG	258	6,186	852	113	22	7,431
RG&E	144	1,493	327	62	0	2,126
Central Hudson	37	5,086	8	168	0	5,299
Orange & Rockland	43	2,394	178	7	0	2,622
Total	137,846	71,933	4,325	5,289	199	219,592

\* For Con Edison deficiencies in the Pad Mount category are included in the Underground category

Table 8 lists the number of deficiencies found in 2015 by severity level and facility type. The table also contains 2014 information for comparison. In 2015, the investor-owned utilities reported finding 9,852 Level I deficiencies, a decrease of nearly 50% from 2014. A comparison in this category reveals that the Con Edison underground system was responsible for almost all of the deficiencies in this category in 2015, as was the case in previous years. Both the decrease in Level I deficiencies and those in the Underground category can be attributed to a decrease in the number of gross inspections performed on the underground system in 2015, from a total of 137,000 in 2014 to 83,000 in 2015.

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

2015 Inspection Cycle						
Level	Underground	Distribution	Transmission	Pad Mount	Street Lights	Total
I	8,539	1,159	22	123	9	9,852
II	47,143	16,111	638	567	224	64,683
III	7,086	107,545	4,334	357	32	119,384
Total	62,768	124,815	4,994	1,047	265	193,889
2014 Inspection Cycle						
Level	Underground	Distribution	Transmission	Pad Mount	Street Lights	Total
I	16,604	607	15	2,048	0	19,274
II	103,738	26,147	638	2,619	160	133,302
III	17,504	45,179	3,672	622	39	67,016
Total	137,846	71,933	4,325	5,289	199	219,592

The investor-owned utilities identified 64,683 Level II deficiencies in 2015, a 50% decrease from 2014. Level III deficiencies, however, saw an increase from 2014, driven almost entirely by an increase in findings on the overhead distribution system of Con Edison. In its annual report, the company stated that it inspected 42% of its overhead structures and noted approximately 29,000 deficiencies in the grounding category because of a category that was added to Con Edison's list of system defects in 2015. This category is labeled "Missing tap between primary down guy wire and system neutral" and was responsible for the rise in the total deficiencies for the year. Even though this action resulted in a significant increase in stray voltage findings, Staff takes no issue with the increase in findings as this allow the utilities to proactively address system maintenance issues.

In 2015, with over 80% of the municipal electric systems reporting, the combined total of deficiencies found on municipal systems was 457, nearly the same as 2014. The municipal electric continue to report that most of the problems they found were with their overhead distribution systems and all deficiencies were immediately repaired.

Electric Facility Repairs

In 2015, the utilities reported repairing over 98% of Level I deficiencies; 87% 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 69% of Level II and 7% of Level III deficiencies discovered in 2015. For deficiencies discovered in 2014, 59% of Level II and 11% of Level III deficiencies were repaired. Tables 10 and 11 lists the number of Level II and Level III repairs completed in the five year period from 2011-2015 and the number of repairs recorded as overdue as of December 31, 2015.

**Tables 9 & 10: 2011 - 2015 Level II & III Repair Activity by Investor Owned Utilities**

Company	Level II			
	Found	Repaired/ Not Due	% Repaired Within Time Frame/Not Due	Not Repaired Overdue
Con Edison	295,844	261,985	89%	33,859
National Grid	122,402	121,289	99%	1,113
NYSEG	10,749	10,651	99%	98
RG&E	2,968	2,732	92%	236
Central Hudson	843	839	99%	4
Orange & Rockland	1,456	1,456	100%	0
Total	434,262	398,952	92%	35,310

Company	Level III			
	Found	Repaired/ Not Due	% Within Time Frame/Not Due	Not Repaired Overdue
Con Edison	99,275	85,118	86%	14,157
National Grid	162,245	160,527	99%	1,718
NYSEG	32,479	32,181	99%	298
RG&E	6,200	6,183	99%	17
Central Hudson	16,800	16,759	99%	41
Orange & Rockland	5,588	5,440	97%	148
Total	322,587	306,208	95%	16,379

As shown in Tables 9 and 10 above, Con Edison continues to have the largest number of overdue repairs associated with Level II and III deficiencies. Con Edison, however, filed supplemental testimony in Case 16-E-0060<sup>8</sup> proposing to establish

<sup>8</sup> Case 16-E-0060, Con Edison – Electric Rates.

a pilot enhancement plan to its Structure Inspection and Repair programs. According to Con Edison, this plan would allocate 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 inspection cycle to eight years. Con Edison also proposed targeted mobile contact voltage scans in areas with a history of repeat stray voltage detection. If successful, after the eight-year period, Con Edison will eliminate its backlog of overdue repairs. The enhanced inspection work and additional mobile surveys will identify defects early and help to reduce manhole events. Staff will also be discussing the repair backlog with the other utilities to foster improvement in this category going forward. Overall, we will be monitoring Con Edison’s progress in this area, along with the other electric utilities going forward to ensure that the outstanding repairs are addressed and do not become an ongoing issue from year to year.

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 2015.

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.

### COMPLIANCE MONITORING

To ensure proper compliance with the Electric Safety Standards, Staff has maintained 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 of the utilities are in compliance with the 2015 testing requirements and goals established by the Commission's Electric Safety Standards. Stray voltage testing was performed on approximately 1.3 million facilities across the State last year. All

utilities are also in compliance with the inspection requirement for the first year of the third inspection cycle; in total, approximately 855,000 facilities were visually inspected in 2015. Since all of test and inspection requirements were met, no revenue adjustments should be imposed by the Commission.

It's worth noting at this time that the utilities have met the requirements of the Safety Standards in each year since they were established by the Commission in 2005, in many cases under challenging circumstances resulting from unforeseen events such as major storms, e.g. Super Storm Sandy. In the recent REV Track 2 Order,<sup>9</sup> the Commission states that the existing performance mechanisms have been a fixture of the Commission's regulatory strategy for many years and that some specific mechanisms, such as those associated with the Electric Safety Standards, should be adjusted or eliminated if they are no longer needed. In that Order, the Commission also identifies solutions, such as scorecards, that are widely accepted methods of tracking performance and progress. Given the fact that negative revenue adjustments have not been invoked since the Safety Standards were established, Staff will commence an effort to examine the need for the existing Safety Standard performance mechanism, and explore alternative methods to track and monitor utility compliance.

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<sup>9</sup> Case 14-M-0101, Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision, Order Adopting a Ratemaking and Utility Revenue Model Policy Framework (issued May 19, 2016) at 58.