



**Department  
of Public Service**

**2016 ELECTRIC SAFETY STANDARDS  
PERFORMANCE REPORT**

Electric Distribution Systems  
Office of Electric, Gas, and Water  
June 2017

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 2016, identifying 547 stray voltage conditions; of which, 254 (46%) were at voltage levels of 4.5V or higher.<sup>2</sup> The overall level of stray voltage findings decreased from 2015; however, the number of findings above 4.5V increased slightly when compared to 2015. This increase was associated with streetlights, which accounted for 199 (78%) of the conditions at voltage levels of 4.5V or higher in 2016. Mobile stray voltage testing was also performed by the

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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 (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.

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

utilities in areas required by Commission order.<sup>3</sup> This effort is focused primarily in New York City, yielding approximately 10,000 findings, of which approximately 6,500 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 2016, there were 347 calls from customers reporting shock incidents that resulted in 210 confirmed cases of stray voltage; 66 incidents were caused by problems with utility owned facilities, and 144 incidents were traced to defective customer-owned equipment or wiring. This represented a significant decrease from 2015, when 268 confirmed reports were addressed by the utilities. 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 2016 marked the second year of the third five year inspection cycle and all utilities completed and met the year's inspection cycle criteria. In 2016, the investor-owned utilities identified a total of 189,741 deficiencies. The majority of these are not immediate concerns; 12,751 deficiencies were classified as Level I and required immediate repair. Other 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 2016.

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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 2016 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**

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
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
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

<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 total manual stray voltage findings reported in Table 2 for 2016 show a slight increase from 2015 for findings greater than 4.5V. As is the case historically, the majority of the incidences are attributable to streetlights.

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

<b>2016 Test Cycle</b>					
<b>Company</b>	<b>Streetlights</b>	<b>Underground Distribution</b>	<b>Overhead Distribution</b>	<b>Transmission</b>	<b>Total Findings</b>
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
<b>2015 Test Cycle</b>					
<b>Company</b>	<b>Streetlights</b>	<b>Underground Distribution</b>	<b>Overhead Distribution</b>	<b>Transmission</b>	<b>Total Findings</b>
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

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 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 2016 are summarized below in Tables 3, 4, and 5.

Con Edison's 12 New York City scans shows a 24% 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. As shown in Table 4, streetlights account for the highest number of stray voltage findings in the City of Buffalo. The 2016 results showed a 445 increase over 2015. As shown in Table 5, the City of Rochester experienced a significant increase in stray voltage findings from 2015 to 2016, however, Rochester is still well below the number of findings in the City of Buffalo. The majority of the findings of stray voltage were from streetlights, and mostly in the 1.0v – 4.4v range.

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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>2016 Test Cycle</b>					
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
<b>Total</b>		6084	2194	646	8924
<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

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

	Facility	1.0-4.4V	4.5-24.9V	>25V	Total
<b>2016 Test Cycle</b>					
Buffalo	Underground	0	0	0	0
(2 scans)	Street Lights/Traffic Signals	728	106	4	838
	Non-Utility Facilities	5	2	1	8
<b>Total</b>		733	108	5	846
<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

**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>2016 Test Cycle</b>					
Rochester	Underground	7	3	0	10
	Street Lights/Traffic Signals	73	18	8	99
	Non-Utility Facilities	16	2	1	19
<b>Total</b>		96	23	9	128
<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

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 2015 and 2016 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 2016, shock reports from the public decreased significantly across the board from previous year’s levels, which had remained flat for a significant period of time, averaging approximately 220 reports on an annual basis for the previous five years.



**Table 6: Summary of Shock Reports**

<b>2016</b>			
<b>Company</b>	<b>Shock Reports</b>	<b>Company Responsibility</b>	<b>Customer Responsibility*</b>
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
<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	171

*\* 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.

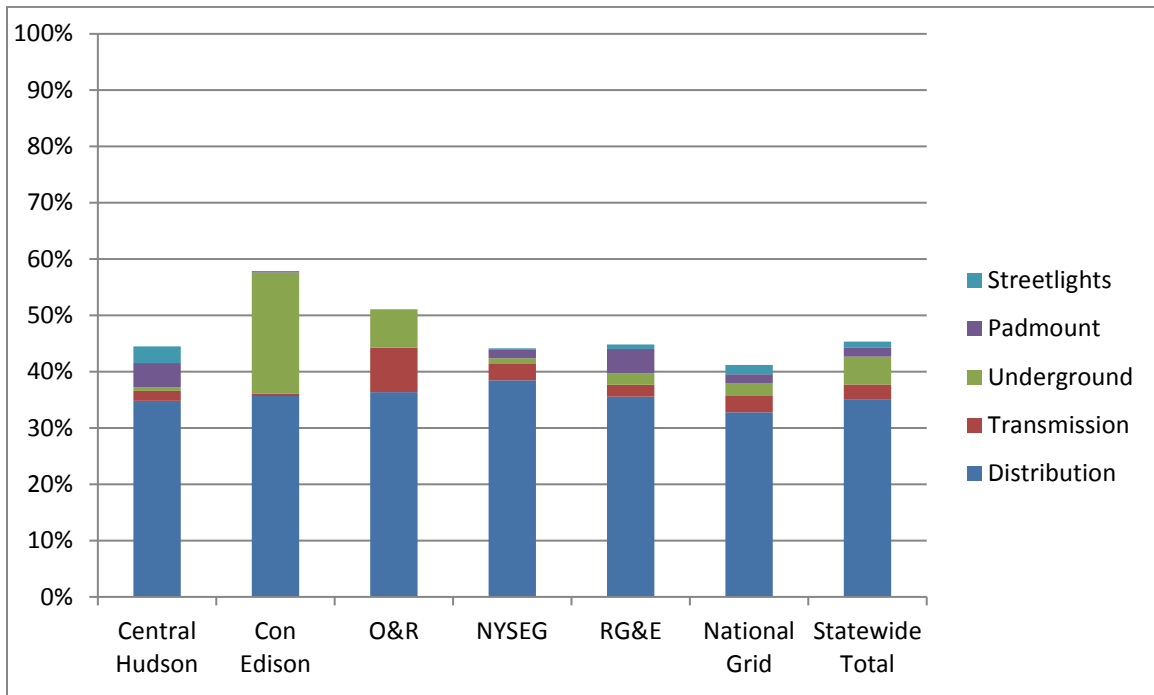
The Electric Safety Standards also require that the utilities use a detailed reporting system that captures deficiencies by equipment type (poles, transformers, and cables), priority level, whether actions have been taken, and the timeliness of the repair activities in relation to the assigned priority 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 2016 was the second 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 40% of their facilities by the end of the second year of the current cycle.

Figure 1 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 (Second Year of Third Five-Year Cycle)**



Electric Facility Inspection Findings

In 2016 inspections were performed on approximately 822,000 facilities across the State. Inspections performed in 2015 totaled approximately 855,000. Table 7 provides a summary of deficiencies for 2015 and 2016 by utility and facility type.

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

<b>2016 Inspection Cycle</b>						
<b>Company</b>	<b>Underground</b>	<b>Distribution</b>	<b>Transmission</b>	<b>Pad Mount</b>	<b>Street Lights</b>	<b>Total</b>
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
<b>2015 Inspection Cycle</b>						
<b>Company</b>	<b>Underground</b>	<b>Distribution</b>	<b>Transmission</b>	<b>Pad Mount</b>	<b>Street Lights</b>	<b>Total</b>
Con Edison	60,484	36,199	16	1,183	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	61,585	124,815	4,994	2,230	265	193,889

Table 8 lists the number of deficiencies found in 2016 by severity level and facility type. In 2016, the investor-owned utilities reported finding 12,751 Level I deficiencies, an increase of nearly 30% from 2015. A comparison in this category reveals that the Con Edison underground system was responsible for the vast majority of the deficiencies in this category in 2016, as was the case in previous years.

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

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
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

The investor-owned utilities identified 64,542 Level II deficiencies in 2016, essentially the same level as in 2015. Level III deficiencies declined from 119,384 to 112,448, a 6% decrease.

In 2016, with over 80% of the municipal electric systems reporting, the combined total of deficiencies found on municipal systems was 423, nearly identical to 2015. The municipal electricians 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; 89% 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 71% of Level II and 7% of Level III deficiencies discovered in 2016. For deficiencies discovered in 2015, 69% of Level II and 7% of Level III deficiencies were repaired. Tables 9 and 10 lists the

number of Level II and Level III repairs completed in the five year period from 2011-2016 and the number of repairs recorded as overdue as of December 31, 2016.

**Table 9: 2012 - 2016 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	323,922	288,775	89%	35,147
National Grid	102,462	101,840	99%	622
NYSEG	14,274	13,140	92%	1,134
RG&E	3,691	3,556	96%	135
Central Hudson	858	846	98%	12
Orange & Rockland	2,099	2,099	100%	0
Total	447,306	410,256	92%	37,050

**Table 10: 2012 - 2016 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	126,499	108,466	86%	18,033
National Grid	201,904	200,262	99%	1,642
NYSEG	36,863	33,886	92%	2,977
RG&E	8,043	7,939	99%	104
Central Hudson	18,826	18,822	99%	4
Orange & Rockland	5,662	5,624	99%	38
Total	397,797	374,999	94%	22,798

Inspection Changes Related to Con Edison

In Case 16-E-0060, the Commission established a pilot enhancement plan to Con Edison's Structure Inspection and Repair programs.<sup>8</sup> 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.

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. By extending the inspection process to eight years, Con Edison is able to redeploy resources and devote them to address the backlog of overdue repairs. The pilot is designed to decrease Con Edison's Level II and III overdue repairs by the end of 2020. Con Edison is in the first year of this pilot and plans to repair approximately 17,000 deficiencies this year. If the pilot is successful, after the eight-year period, Con Edison will eliminate its backlog of overdue repairs. The enhanced inspection work and additional mobile surveys intend to 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, staff 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.

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<sup>8</sup> 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 and Effective January 25, 2017).

### 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 2016.

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 2016.

### 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 2016 testing requirements and goals established by the Commission's Electric Safety Standards. Stray voltage testing was performed on approximately 1 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 822,000 facilities were visually inspected in 2016. Since all of test and inspection requirements were met, no revenue adjustments should be imposed by the Commission.