



**Department  
of Public Service**

**2018 ELECTRIC SAFETY STANDARDS  
PERFORMANCE REPORT**

Electric Distribution Systems  
Office of Electric, Gas, and Water  
June 2019

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 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 2018, manual stray voltage testing was performed on approximately one million utility facilities statewide, resulting in the identification of 396 stray voltage conditions; of which 160 (40%) were at voltage levels of 4.5V or higher.<sup>2</sup> The overall total of stray voltage findings increased from the 2017 level but the percentage of findings above 4.5V was lower than 2017. Mobile stray voltage testing was also performed by the utilities in areas required by Commission order.<sup>3</sup> This effort is focused primarily in New York City, yielding 8,645 findings, of

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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.

<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).

which approximately 6,892 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 2018, there were 390 calls from customers reporting shock incidents that resulted in 229 confirmed cases of stray voltage; 87 incidents were caused by problems with utility owned facilities, and 142 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 2018 marked the fourth year of the third five-year inspection cycle and all utilities completed and met the year's inspection cycle criteria. In 2018, the investor-owned utilities identified a total of 102,049 deficiencies. The majority of these deficiencies are not immediate concerns, and there was a 13% reduction in deficiencies requiring immediate repair when compared to 2017. 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 2018.

### STRAY VOLTAGE TESTING

#### Manual Stray Voltage Testing

Table 1 lists the number of stray voltage findings by facility type in 2018 at 1V or above resulting from manual testing.<sup>5</sup> Although the total manual stray voltage

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<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.

<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.

findings reported in Table 1 for 2018 show an increase from 2017, there were fewer findings on street lights, which historically have the highest readings. The overall increase in findings was attributable to a large number of low voltage findings on the Central Hudson transmission grounding system and were determined to be the result of natural occurring neutral to earth voltages by harmonic analysis.

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

2018 Test Cycle					
Company	Streetlights	Underground Distribution	Overhead Distribution	Transmission	Total Findings
Con Edison	109	10	4	0	123
National Grid	55	0	11	27	93
NYSEG	4	0	16	5	25
RG&E	6	0	1	0	7
Central Hudson	7	0	63	77	147
Orange & Rockland	1	0	0	0	1
Municipal Electric	0	0	0	0	0
Total	182	10	95	109	396
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

The total manual stray voltage findings reported in Table 2 for 2018 show a slight decrease from 2017 for findings greater than 4.5V. As has been 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**

2018 Test Cycle					
Company	Streetlights	Underground Distribution	Overhead Distribution	Transmission	Total Findings
Con Edison	91	4	4	0	99
National Grid	18	0	8	8	34
NYSEG	3	0	9	1	13
RG&E	4	0	1	0	5
Central Hudson	5	0	3	1	9
Orange & Rockland	0	0	0	0	0
Municipal Electric	0	0	0	0	0
Total	121	4	25	10	160
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

Mobile Stray Voltage Detection Program

Since the Mobile Stray Voltage Detection Program was established by the Commission in 2008,<sup>6</sup> Con Edison is required to complete 12 system scans, using mobile stray voltage testing equipment, on an annual basis. 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.<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 2018 are summarized below in Tables 3, 4, and 5.

Con Edison's 12 New York City scans show an 11% decrease from last year's mobile survey results. Reductions were seen across all categories of findings. Non-utility facilities, such as energized customer or contractor equipment and various New York State Department of Transportation (DOT) facilities, remain the largest sources of stray voltage in New York City, as has been the case historically.

There was a notable decline in stray voltage findings from 2017 levels from 2017 levels in the City of Buffalo. 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, stray voltage findings increased slightly for the City of Rochester from 2017 to 2018, due primarily to streetlights

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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**

	Facility	1.0-4.4V	4.5-24.9V	>25V	Total
<b>2018 Test Cycle</b>					
New York City					
(12 scans)	Underground	416	213	31	660
	Street Lights/Traffic Signals	422	364	307	1093
	Non-Utility Facilities	4505	2022	365	6892
<b>Total</b>		5343	2599	703	8645
<b>2017 Test Cycle</b>					
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
<b>Total</b>		6491	2488	725	9704

**Table 4: Findings by National Grid for the City of Buffalo Utilizing Mobile Detection**

	Facility	1.0-4.4V	4.5-24.9V	>25V	Total
<b>2018 Test Cycle</b>					
Buffalo	Underground	0	0	0	0
(2 scans)	Street Lights/Traffic Signals	560	84	12	656
	Non-Utility Facilities	0	0	0	0
<b>Total</b>		560	84	12	656
<b>2017 Test Cycle</b>					
Buffalo	Underground	0	0	0	0
(2 scans)	Street Lights/Traffic Signals	518	80	8	606
	Non-Utility Facilities	102	21	0	123
<b>Total</b>		620	101	8	729

**Table 5: Findings by RG&E for the City of Rochester Utilizing Mobile Detection**

	Facility	1.0-4.4V	4.5-24.9V	>25V	Total
<b>2018 Test Cycle</b>					
Rochester	Underground	5	3	0	8
	Street Lights/Traffic Signals	40	15	6	61
	Non-Utility Facilities	11	2	0	13
<b>Total</b>		56	20	6	82
<b>2017 Test Cycle</b>					
Rochester	Underground	5	0	0	5
	Street Lights/Traffic Signals	48	2	7	57
	Non-Utility Facilities	7	6	1	14
<b>Total</b>		60	8	8	76

Shock Reports

In addition to their 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 2017 and 2018 of the electric shock reports received by the utilities where instances of stray voltage were substantiated after field investigation. Table 6 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 2018, shock reports from the public showed a slight increase from last year’s total count. This is attributable to an uptick in incidents that were ultimately found to be issues associated with customer equipment.



**Table 6: Summary of Shock Reports**

<b>2018</b>			
<b>Company</b>	<b>Shock Reports</b>	<b>Company Responsibility</b>	<b>Customer Responsibility*</b>
Con Edison	77	30	47
National Grid	106	43	63
NYSEG	15	5	10
RG&E	1	0	1
Central Hudson	22	5	17
Orange & Rockland	8	4	4
Municipal Electrics	0	0	0
Total	229	87	142
<b>2017</b>			
<b>Company</b>	<b>Shock Reports</b>	<b>Company Responsibility</b>	<b>Customer Responsibility*</b>
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

\* 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 both 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 are inspected at least once every five years. Calendar year 2018 was the fourth year of the third five-year cycle of the inspection program begun in 2005. All utilities, except for Con Edison, met the requirement to inspect a minimum of 80% of their facilities by the end of the fourth year of the current cycle. Con Edison is not required to inspect a minimum of 80% because in Case 16-E-0060, the Commission established a pilot enhancement program for Con Edison's Structure Inspection and Repair programs.<sup>8</sup>

This 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. The increased cost to perform these additional measures is offset by the extension of the inspection cycle. In addition, the pilot provides

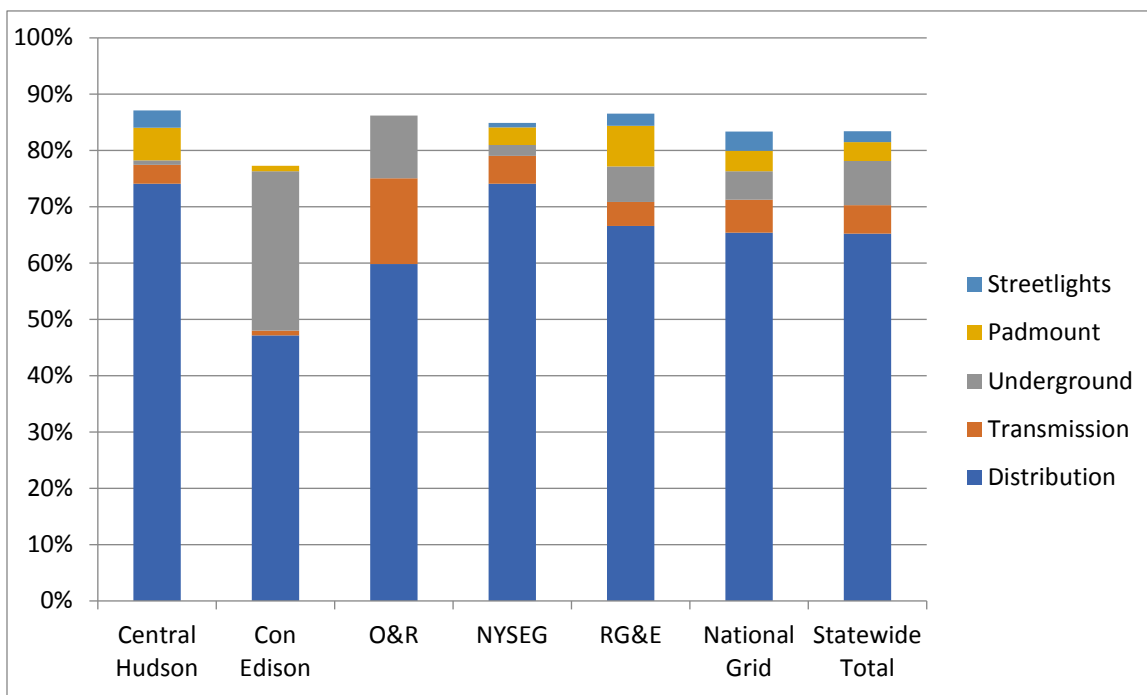
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<sup>8</sup> Case 16-E-0060, Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Electric Service, Order Approving Electric and Gas Rates (issued January 25, 2017), Joint Proposal at 73, footnote 74 and Appendix 15.

for targeted mobile contact voltage scans in areas with a history of repeat stray voltage detection.

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 (Fourth Year of Third Five-Year Cycle)**



Electric Facility Inspection Findings

In 2018, inspections were performed on approximately 740,747 utility facilities across the State. Inspections performed in 2017 totaled approximately 701,470. Table 7 provides a summary of deficiencies for 2017 and 2018 by utility and facility type. NYSEG’s increase of deficiencies on street light facilities, from 10 in 2017 to 495 in 2018, are as a result of the fact that the company inspected 33 street lighting facilities in 2017 compared to 5,007 facilities in 2018. It should also be noted that NYSEG’s total number of deficiencies declined markedly from the 2017 level.

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

2018 Inspection Cycle						
Company	Underground	Distribution	Transmission	Pad Mount	Street Lights	Total
Con Edison	18,582	8,184	6	1,909	0	28,681
National Grid	1,321	43,799	2,677	628	341	48,766
NYSEG	108	9,996	610	136	495	11,345
RG&E	671	2,401	341	50	0	3,463
Central Hudson	0	8,582	275	114	0	8,971
Orange & Rockland	18	697	100	8	0	823
Total	20,700	73,659	4,009	2,845	836	102,049
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

Table 8 lists the number of deficiencies found in 2018 by severity level and facility type. Deficiencies found in 2018 were significantly lower in all categories compared to the 2017 results, realizing an approximately 23% decrease in the aggregate. 2018 marks the second consecutive year wherein there was a significant decrease in the number of deficiencies found during the inspection process. Particularly notable is the fact that Level I conditions decreased 12% from 2017 to 2018, the second consecutive year of a significant reduction in Level I conditions. A review of this category revealed that the Con Edison underground system was responsible for most of the deficiencies in this

category in 2018, as has been the case historically. While Con Edison’s underground system did see a reduction in Level I findings in 2018, Level I findings for pad mount transformers show a significant increase. This increase in Level I findings for Con Edison can be attributed to the increase in inspections performed on pad mount facilities. In 2018, Con Edison inspected 2,821 facilities, while only 1,158 facilities were inspected in 2017. According to Con Edison, the percentage of inspected structures with Level I deficiencies has decreased from 49% in 2017 to 37% in 2018. A majority of the Level 1 findings are related to damaged or missing grating bolts, which anchor the access covers and pad mount transformers in place.

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

2018 Inspection Cycle						
Level	Underground	Distribution	Transmission	Pad Mount	Street Lights	Total
I	2,480	2,374	15	1,116	0	5,985
II	13,662	6,780	490	1,042	402	22,376
III	4,558	64,505	3,504	687	434	73,688
Total	20,700	73,659	4,009	2,845	836	102,049
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

Regarding municipal-owned electric systems, the combined total of deficiencies found was 382, slightly lower than the 2017 total. The municipalities report that nearly all the deficiencies found were on their overhead distribution systems and that all deficiencies were immediately repaired.

Electric Facility Repairs

In 2018, 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 56% of Level II and 7% of Level III deficiencies discovered in 2018. For deficiencies discovered in 2017, 54% of Level II and 8% 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 2014-2018 and the number of repairs recorded as overdue as of December 31, 2018.

**Table 9: 2014 - 2018 Level II Repair Activity by Investor-Owned Utilities**

	<b>Repaired/ Not Due</b>	<b>% Repaired Within Time Frame/Not Due</b>	<b>Not Repaired Overdue</b>
Con Edison	191,309	81%	21,716
National Grid	51,416	93%	671
NYSEG	9,513	48%	6,728
RG&E	2,060	43%	1,438
Central Hudson	1,144	92%	39
Orange & Rockland	1,146	99%	3
Total	256,588	80%	30,595

**Table 10: 2014 - 2018 Level III Repair Activity by Investor-Owned Utilities**

	<b>Repaired/ Not Due</b>	<b>% Within Time Frame/Not Due</b>	<b>Not Repaired Overdue</b>
Con Edison	81,009	63%	43,153
National Grid	232,373	96%	5,876
NYSEG	27,121	85%	10,080
RG&E	10,157	91%	609
Central Hudson	27,427	99%	234
Orange & Rockland	5,153	96%	120
Total	383,240	86%	60,072

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 enhancement program for Con Edison's Structure Inspection and Repair programs is designed to decrease Con Edison's Level II and III overdue repairs by the end of 2020. In 2018, the second year of the pilot, Con Edison completed 15,575 of the backlogged repairs, failing to meet the original goal to repair roughly 21,000 deficiencies that year. The 2018 target was later reduced to 18,000 deficiencies. At the end of 2018, the Company still had approximately 64,900 overdue Level II and III repairs to be completed in 2019 and 2020.

#### 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 2018.

The Electric Safety Standards also establish a performance mechanism to ensure compliance with the standards by the utilities. 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 the electric utilities met the requirements of the performance mechanisms in 2018.



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 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 determine whether utility programs are ensuring compliance with the standards.

CONCLUSION

All the utilities are following the 2018 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 fourth year of the third inspection cycle; in total, approximately 740,747 facilities were visually inspected in 2018. Since all the test and inspection requirements were met, no revenue adjustments should be imposed by the Commission.