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2014 ELECTRIC SAFETY STANDARDS REPORT

Electric Distribution Systems

Office of Electric, Gas, and Water

June 2015

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 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 1.3 million utility facilities statewide in 2014, which identified 580 stray voltage conditions; of which, 343 (59%) were at voltage levels of 4.5V or higher.[2] Findings attributed to streetlights accounted for 273 (47%) of the conditions at voltage levels of 4.5V or higher. Mobile stray voltage testing was also performed by the utilities in areas required by Commission Order.[3] This effort is focused mainly in New York City, yielding approximately 8,600 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 2014, there

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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).

[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).

were 448 calls from customers reporting shock incidents that resulted in 241 confirmed cases of stray voltage; 97 incidents were caused by problems with utility owned facilities, and 144 incidents were traced to defective customer 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[4] 20% of its electric facilities per year to ensure all facilities are inspected within a five year period. Calendar year 2014 marked the fifth year of the second five year inspection cycle and all utilities completed and met the five year inspection cycle criteria. In 2014, the investor-owned utilities identified a total of 219,592 deficiencies. Repairs of deficiencies found during the inspection process shall 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 2014.

STRAY VOLTAGE TESTING

Manual Stray Voltage Testing

Table 1 lists the number of stray voltage findings in 2014 at 1V or above resulting from manual testing by facility type.[5] Stray voltage testing was performed on approximately 1.3 million transmission and distribution facilities across the State, approximately the same number as tested in 2013.

[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] These findings do not include instances of stray voltage discovered by company 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.

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

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
2013 Test Cycle					
Company	**Streetlights**	**Underground Distribution**	**Overhead Distribution**	**Transmission**	**Total Findings**
Con Edison	359	25	21	0	405
National Grid	207	0	59	43	309
NYSEG	20	0	105	198	323
RG&E	7	0	48	83	138
Central Hudson	3	0	17	0	20
Orange & Rockland	0	0	1	0	1
Municipal Electric	0	0	12	0	12
Total	596	25	271	324	1208

In Tables 1 and 2, the manual stray voltage findings reported in 2014 indicate a significant improvement from the previous year. The utilities attribute the improved numbers to be the result of system-wide engineering, design and construction improvements in grounding and wiring systems. The Companies further state that through the implementation of enhanced quality assurance audits, they are better able to verify and maintain system integrity.

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

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
2013 Test Cycle					
Company	**Streetlights**	**Underground Distribution**	**Overhead Distribution**	**Transmission**	**Total Findings**
Con Edison	273	15	17	0	305
National Grid	73	0	5	0	78
NYSEG	15	0	22	21	58
RG&E	5	0	2	7	14
Central Hudson	0	0	1	0	1
Orange & Rockland	0	0	1	0	1
Municipal Electric	1	0	6	0	7
Total	367	15	54	28	464

Mobile Stray Voltage Detection Program

Pursuant to the Commission's Order in Case 07-E-0523,[6] and continuing on an annual basis from that order, 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. Across the State, the majority of the stray voltage findings continues to be low voltage in nature (1.0-4.4V) and related to Streetlight/Traffic Signal

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

control devices, followed by non-utility facilities. The results of the scans completed in 2014 are summarized in Tables 3, 4, and 5 below.

Table 3 shows the results from Con Edison's 12 New York City scans. In 2014 mobile scans were also completed in other areas of its service territory (Yonkers, White Plains, New Rochelle and Mount Vernon) as required by Commission Order. Table 4 depicts the results of those scans. The rate of findings in New York City and the other areas tested by Con Edison shows a 19% increase from last year's mobile surveys. Con Edison's stated that these findings were largely due to miscellaneous facilities that are not owned or operated by Con Edison, such as energized customer or contractor equipment or various DOT facilities. Our analysis indicated that the major contributing factor for these increases was directly correlated to harsh weather conditions. In 2014, excessive snow and rainfall levels were measured, longer than normal duration of days with temperatures below freezing were recorded, and a larger volume of salt than used in recent years was used as a roadway deicer; the latter being more problematic in the Con Edison service territory because of its extensive systems of underground electric distribution networks.

Table 3: Findings by Con Edison Utilizing Mobile Detection in New York City

City	Facility	1.0-4.4V	4.5-24.9V	>25V	Total
2014 Test Cycle					
New York City					
(12 scans)	Underground	516	199	32	747
	Street Lights/Traffic Signals	893	466	309	1,668
	Non-Utility Facilities	4,133	1,671	374	6,178
Total		5,542	2,336	715	8,593
2013 Test Cycle					
New York City					
(12 scans)	Underground	398	149	24	571
	Street Lights/Traffic Signals	1,036	477	246	1,759
	Non-Utility Facilities	3,129	1,220	304	4,653
Total		4,563	1,846	574	6,983

Table 4: Findings by Con Edison Utilizing Mobile Detection in New Rochelle, White Plains, Yonkers, and Mount Vernon

	Facility	1.0-4.4V	4.5-24.9V	>25V	Total
2014 Test Cycle					
	Underground	8	2	0	10
	Street Lights/Traffic Signals	11	2	5	18
	Non-Utility Facilities	9	2	1	12
Total		28	6	6	40
2013 Test Cycle					
	Underground	0	0	0	0
	Street Lights/Traffic Signals	28	11	6	45
	Non-Utility Facilities	46	5	0	51
Total		74	16	6	96

As shown in Table 5, National Grid again identified streetlights in the City of Buffalo as having the highest number of stray voltage findings in its service territory. The 2014 results improved over 2013 and we would expect this trend to continue given National Grid's ongoing efforts to implement its comprehensive street light rehabilitation program to replace old standards, lamps, cables and ductwork in the most problematic street lighting districts in Buffalo. Again, this should yield long term improvements in the number of stray voltage issues identified during ongoing mobile testing.

Table 5: Findings by National Grid Utilizing Mobile Detection

	Facility	1.0-4.4V	4.5-24.9V	>25V	Total
2014 Test Cycle					
Buffalo	Underground	0	0	0	0
(2 scans)	Street Lights/Traffic Signals	572	117	14	703
	Non-Utility Facilities	31	7	2	40
Total		603	124	16	743
2013 Test Cycle					
Buffalo	Underground	0	0	0	0
(2 scans)	Street Lights/Traffic Signals	638	210	14	862
	Non-Utility Facilities	46	6	1	53
Total		684	216	15	915

As shown in Table 6, the City of Rochester experienced a decrease in stray voltage findings from 2013 to 2014. The majority of the findings was on streetlights and mostly found to be in the 1.0v – 4.4v range. Fewer repeat findings in 2014 over 2013 were the leading factor in the improved results. This was due to the improved maintenance and repair efforts performed by trained RG&E linemen rather than outside contractors.

Table 6: Findings by RGE Utilizing Mobile Detection

	Facility	1.0-4.4V	4.5-24.9V	>25V	Total
2014 Test Cycle					
Rochester	Underground	4	4	0	8
	Street Lights/Traffic Signals	139	10	1	150
	Non-Utility Facilities	8	3	1	12
Total		151	17	2	170
2013 Test Cycle					
Rochester	Underground	3	0	0	3
	Street Lights/Traffic Signals	182	32	8	222
	Non-Utility Facilities	13	1	0	14
Total		198	33	8	239

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 7 provides a summary for 2014 of the electric shock reports received by the utilities where investigations yielded actual voltage findings. 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 or equipment.

Similar to our analysis related to Con Edison's mobile stray voltage testing efforts, one of the contributing factors for shock related incidents related to Con Edison's underground system is directly correlated to harsh weather conditions. In 2014, excessive snow and rainfall levels were measured, longer than normal duration of days with temperatures below freezing were recorded, and a larger volume of salt than used in recent years was used as a roadway deicer; the latter being more problematic in the Con Edison service territory because of its extensive systems of underground electric distribution networks.

Table 7: Summary of Shock Reports

2014			
Company	**Shock Reports**	**Company Responsibility**	**Customer Responsibility**
Con Edison	104	49	35
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	241	97	144
2013			
Company	**Shock Reports**	**Company Responsibility**	**Customer Responsibility**
Con Edison	61	23	38
National Grid	92	25	67
NYSEG	14	5	9
RGE	7	2	5
Central Hudson	15	5	10
Orange & Rockland	8	3	5
Municipal Electrics	9	5	4
Total	206	68	138

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.

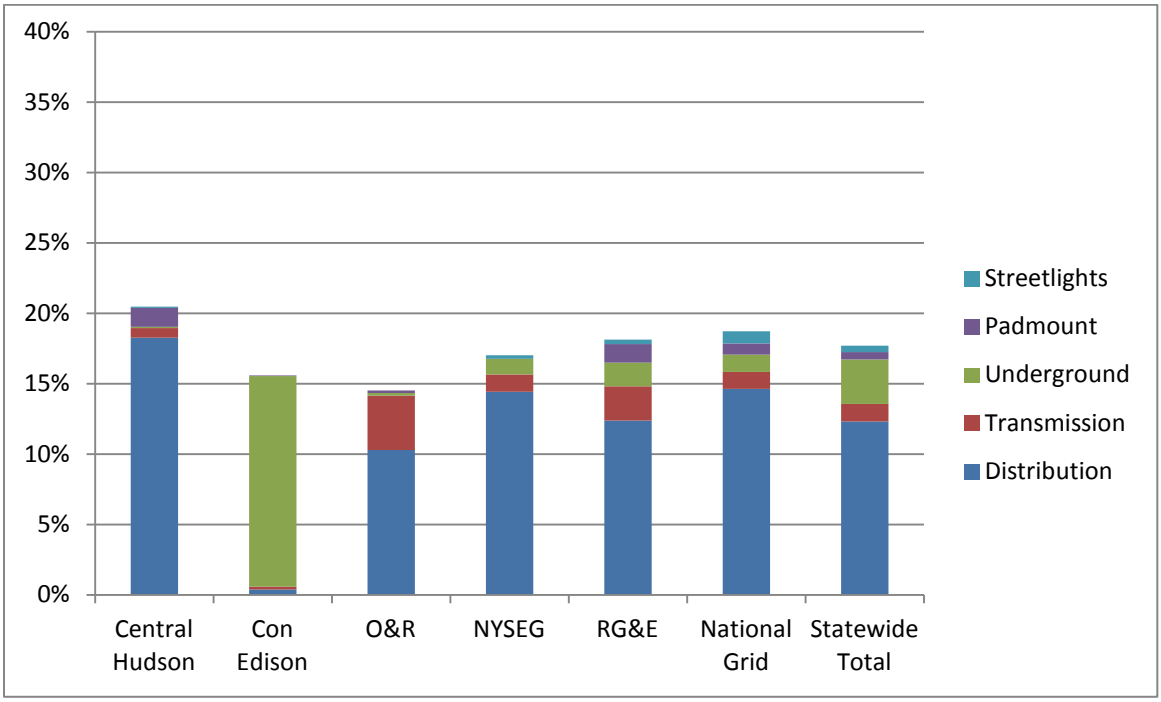
The Safety Standards also require that the utilities utilize a detailed reporting system that captures deficiencies by equipment type (poles, transformers, and cables), priority level, whether actions have been taken, and the timeliness of the repair activities in relation to the assigned priority level.

Electric Facility Inspections

The Electric Safety Standards require utilities to complete inspections on 20% of their total 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 2014 was the final year of the second complete five year cycle of the inspection program, the first encompassing the years 2005-2009. As a result of utility efforts in previous years, the remaining percentage of facilities required to be inspected in 2014 to attain full cumulative system completion was less than 20% for all the utilities. Each utility met the requirement to inspect 100% of their facilities by the end of calendar year 2014.

Figure 1 shows the percentage of visual inspections completed for each of the investor-owned utilities by facility type. As a result of utility efforts in previous years, the remaining percentage of facilities required to be inspected in 2014 to attain full cumulative system completion was less than 20% for all the utilities. Over the last two years there has been ongoing concern with the performance of Con Edison with respect to completing inspections of its underground facilities. Its efforts in 2014 resulted in a 13% increase in total inspections over 2013 for this class of facilities. In 2013 the company was granted a three month extension (until March 2015) to complete 100% of the necessary inspections as a result of Superstorm Sandy. On April 7, 2015, Con Edison provided certification to the Commission that it had completed 100% of its inspection efforts as required.

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



Electric Facility Inspection Findings

In 2014 inspections were performed on approximately 663,000 facilities across the State. Inspections performed in 2013 totaled approximately 828,000. Table 8 provides a summary of deficiencies for 2013 and 2014 by utility and facility type. As shown in the table, the total number of deficiencies discovered increased by approximately 29% from 2013. Nearly all of this increase was driven by a sharp rise in the population of deficiencies attributed to underground facilities for Con Edison and overhead facilities for National Grid. The Con Edison increase can also be attributed to the fact that it increased the number of underground facility inspections in 2014 to allow catch-up from the previous years and after effects of SuperStorm Sandy. Con Edison has regularly held off on underground inspections until the later years in the cycle process to take advantage of already completed underground work efforts and to avoid repeat trips to the same locations.

Table 8: Deficiencies by Facility Type
Found by Investor Owned Utilities

2014 Inspection Cycle						
Company	**Underground**	**Distribution**	**Transmission**	**Pad Mount**	**Street Lights**	**Total**
Con Edison	135,964	75	1	4,457	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
2013 Inspection Cycle						
Company	**Underground**	**Distribution**	**Transmission**	**Pad Mount**	**Street Lights**	**Total**
Con Edison	104,107	4,134	10	3,247	0	111,498
National Grid	1,742	38,096	1,787	379	636	42,640
NYSEG	156	8,352	856	118	185	9,667
RG&E	86	1,630	106	45	1	1,868
Central Hudson	17	2,058	28	63	0	2,166
Orange & Rockland	335	1,790	208	2	0	2,335
Total	106,443	56,060	2,995	3,854	822	170,174

Table 9 lists the number of deficiencies found in 2014 by severity level and facility type. The table also contains the 2013 information for comparison. In 2014, the investor-owned utilities reported finding 19,274 Level I deficiencies, an increase of 19% over 2013. A comparison in this category reveals that the Con Edison underground system was responsible for almost all of the deficiencies in this category found in 2014, which is in line with the results in previous years. Aside from the increased number of inspections completed, the increase in the number of Level I conditions can also be attributed to weather conditions, as previously discussed, contributing directly to an increase in damaged secondary cables, exposed conductors and damaged neutrals.

Table 9: Summary of Deficiencies by Severity Level
Found by Investor Owned Utilities

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
2013 Inspection Cycle						
Level	**Underground**	**Distribution**	**Transmission**	**Pad Mount**	**Street Lights**	**Total**
I	13,688	597	16	1,923	0	16,224
II	79,731	22,463	441	1,411	639	104,685
III	13,024	33,000	2,538	520	183	49,265
Total	106,443	56,060	2,995	3,854	822	170,174

The investor-owned utilities identified 133,302 Level II deficiencies in 2014, an increase from 2013. Once again, Con Edison's underground system is the major driver for the increase, for the reasons cited above. For Level III deficiencies, the majority of those findings were related to an increase in guy anchor[7] deficiencies found in National Grid's service territory. Through continued discussions with the utilities, Staff attributes the overall increase in deficiencies found to be related to increased inspector training and a more conservative approach to identifying deficiencies out in the field.

In 2014, with over 78% of the municipal electrics reporting, the combined total of deficiencies found on municipal systems was 430. This is a significant decrease in deficiencies reported from 2013. The municipal electrics continue to report that most of the problems were classified as part of their overhead distribution systems; all deficiencies were immediately repaired.

[7] Guy anchors ensure guy wires installed with utility poles do not become slack or disengaged from the pole, which can result in a leaning pole that may result in clearance issues with the conductors attached to the poles.

Electric Facility Repairs

The utilities are maintaining an acceptable level of response to repairing deficiencies within the required time frame. Under the Commission's Electric Safety Standards, a repair must be positively confirmed as permanent for it to be removed from the deficiency list. In 2014, the utilities reported repairing over 98% of Level I deficiencies; 95% were repaired within the one week time requirement, which is on par with the historic averages. All outstanding Level I deficiencies were made safe pending permanent repair.

Statewide, the investor-owned utilities reported repairing 94% of Level II and 85% of Level III deficiencies within the associated timeframe. Tables 10 and 11 lists the number of Level II and Level III repairs completed over the 2010 through 2014 timeframe along with the number of repairs recorded as overdue as of December 31, 2014.

Table 10 & 11: 2010 - 2014 Level II Repair Activity by Investor Owned Utilities

Company	Level II			
	Found	Repaired	% Repaired Within Time Frame	Not Repaired Overdue
Con Edison	170,913	156,089	91%	14,824
National Grid	106,061	104,992	99%	1,069
NYSEG	6,971	6,841	98%	130
RG&E	1,847	1,610	87%	237
Central Hudson	521	521	100%	0
Orange & Rockland	2,049	2,046	99%	3
Total	288,362	272,099	94%	16,263

Company	Level III			
	Found	Repaired	% Repaired Within Time Frame	Not Repaired Overdue
Con Edison	28,681	15,556	55%	13,125
National Grid	57,354	56,675	98%	679
NYSEG	3,584	3,269	91%	315
RG&E	608	580	95%	28
Central Hudson	5,898	5,857	99%	41
Orange & Rockland	3,593	2,928	82%	665
Total	99,718	84,865	85%	14,853

Overall, Staff continues to believe that the utilities repair performance is acceptable. The vast majority of the deficiencies not repaired are attributed to Con Edison's underground system where scheduling and completing repairs is a comprehensive effort that typically requires planning and coordination with many entities in New York City that in many instances results in delays beyond Con Edison's control. Again, Staff believes this to be an acceptable level of performance and in line with historic trends.

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 2014.

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, 100% of all required company facilities must be tested. The facility inspection target is set at 95% of the annual requirement. The performance mechanism requires all facilities to be inspected by the end of the fifth year of the cycle. Failure to meet a performance target will result in a negative 75 basis point revenue adjustment (total adjustments of 150 basis point maximum for failure to achieve both performance targets in one year). All utilities met the requirements of the mechanism with respect to stray voltage. For facility inspections, the goal for 2014 was to complete the necessary work to achieve the 100% requirement for the final year of the inspection cycle. As previously discussed, all utilities have met this goal as required by the standards.

COMPLIANCE MONITORING

To ensure proper compliance with the Electric Safety Standards, Staff has maintained frequent contact with all the utilities, individually and collectively, over the past seven years. In early 2005, the investor-owned utilities formed a working group which meets quarterly to discuss issues related to stray voltage testing. 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 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. These sessions have helped the utilities maintain an overall understanding of Staff's expectations and identify best working practices.

Staff also monitors the utilities' compliance with the Electric Safety Standard through field visits. The primary purpose of the field visits is to ensure that stray voltage testing, inspections, and the quality assurance programs are being completed properly. Specifically, Staff verifies that utilities locate and test required facilities for stray voltage. The field visits also enable Staff to monitor the companies' quality assurance programs, and afford Staff the opportunity to randomly sample the utility's testing and inspection records to verify the accuracy of data collected by the utilities.

To further verify the accuracy of utility inspections, Staff also obtains inspection and Quality Assurance/Quality Control (QA/QC) data from the utility and performs a side-by-side comparison of the utility's results with data collected during Staff's inspections. Staff follows up with the utilities by notifying them of any conditions which are noted in Staff's results, but not shown on utility data. The utility is then expected to appropriately reconcile the discrepancy, with Staff's continuing oversight.

CONCLUSION

All of the utilities are in compliance with the 2014 testing requirements and goals established by the 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 fifth and final year of the second inspection cycle; in total approximately 663,000 facilities were visually inspected in 2014. Since all of test and inspection requirements were met, no revenue adjustments should be imposed by the Commission.

The Electric Safety Standards have resulted in the identification of locations with stray voltage levels where mitigation was necessary to maintain public safety. The Standards are an effective means to ensure the safe and reliable operation of

the electric system. Yet, stray voltage attributable to streetlights and traffic control devices continues to be a concern in all utility service territories. Based on the results observed to date, stray voltage testing should be continued for these facilities to identify potentially unsafe conditions. Staff also encourages the utilities to continue development of mitigation programs focused on known areas of concern, such as streetlights.