

June 26, 2014

BY HAND DELIVERY & ELECTRONIC MAIL

Luly E. Massaro, Commission Clerk
Rhode Island Public Utilities Commission
89 Jefferson Boulevard
Warwick, RI 02888

RE: Docket 4237 - Commission Investigation relating to Stray and Contact Voltage Occurring in Narragansett Electric Company Territories National Grid 2014 Annual Contact Voltage Compliance Report

Dear Ms. Massaro

Pursuant to the Rhode Island Public Utilities Commission's ("PUC") Order No. 20950 issued in Docket 4237, I have enclosed National Grid's¹ 2014 Annual Contact Voltage Compliance Report. In this docket, the PUC established a contact voltage detection, repair, and reporting program, which would be applicable to National Grid pursuant to the Rhode Island Contact Voltage statute, R.I.G.L. §39-2-25. The Company is required to file the findings and results of its 2014 contact voltage detection testing in an annual report by no later than September 1, 2014. However, the Company is filing the annual report early this year. The Company has confirmed this early filing with the PUC and the Rhode Island Division of Public Utilities and Carriers (the "Division").

Thank you for your attention to this transmittal. If you have any questions, please feel free to contact me at (781) 907-2121.

Very truly yours,



Raquel J. Webster

Enclosure

cc: Steve Scialabba
Leo Wold, Esq.

¹ The Narragansett Electric Company d/b/a National Grid ("National Grid" or the "Company").

The Narragansett Electric Company
d/b/a National Grid

Rhode Island 2014 Contact Voltage Compliance Report

June 26, 2014

Submitted to:
Rhode Island Public Utilities Commission
R.I.P.U.C. Docket No. 4237

Submitted by:

nationalgrid

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Glossary of Terms

Term	Definition
Contact Voltage	A voltage resulting from abnormal power system conditions that may be present between two (2) conductive surfaces that can be simultaneously contacted by members of the general public and/or their animals.
Designated Contact Voltage Risk Areas (“DCVRA”)	Boundaries of areas approved by the Rhode Island Public Utilities Commission in Docket No. 4237 and subsequent proceedings that are based upon the presence of underground electric distribution and situated in pedestrian-dense areas such as neighborhoods, commercial areas, central business districts, tourist-heavy locations, and other places where pedestrians could be exposed to contact voltage.
Guarded – Made Safe	Guarded – Made Safe is defined as an asset being guarded by a person or a protective barrier that prevents public contact if the elevated voltage found is greater than 4.5 volts. If the voltage measures greater than 4.5 volts and less than 8 volts, it is either guarded in person or by installation of a protective barrier that prevents public contact. If the voltage measurement is greater than 8 volts, it is guarded by an equipment elevated voltage inspector or a Company employee that has been trained to stand by on energized facilities; in this instance, an immediate maintenance and repair response is required.

Investigatory Mobile Survey Stop	A stop during a survey where the mobile detection device indicated evidence of elevated voltage (greater than zero (0) volts) and a stop was made to survey for elevated voltage with manual instruments (pen detector). All metallic devices within 30 feet are tested manually for elevated voltage at each stop. The Investigatory Mobile Survey Stop may or may not discover an asset with elevated voltage.
Mobile Event	An Investigatory Mobile Survey Stop where elevated voltage (greater than zero 0 volts) was discovered on an asset (either company or customer-owned). These Mobile Events are divided into three categories: (1) those with readings below 1 volt, (2) those having elevated voltage between 1 volt and 4.5 volts, and (3) those having elevated voltage readings 4.5 volts or greater. The readings above reflect the actual voltage determined by manual shunt meter testing of the asset.
Post-Mitigation Manual Testing	Manual elevated voltage testing performed on assets which had a voltage of greater than 1 volt in the prior year's mobile testing and were subsequently mitigated.
Quality Assurance Manual Testing	Manual elevated voltage testing performed on a random sample of assets in the Designated Contact Voltage Risk Areas after the mobile survey is performed.
Street Light Cycle Manual Testing	Manual elevated voltage testing performed on metallic streetlight standards on a three-year cycle.

Total Harmonic Distortion (THD) Contact Voltage Testing	THD is determined by the use of a Fluke power quality clamp meter or a Fluke scope meter during an investigatory Mobile Survey Stop. THD contact voltage testing applies to any voltage measures greater than 1 volt and less than 4.5 volts that had a total harmonic distortion of less than 10%. A THD of less than 10% will be considered as contact voltage for Mobile testing.
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Section 1

Background and Summary

1. Background and Summary

On June 6, 2012, the Rhode Island Contact Voltage statute, R.I.G.L. §39-2-25, was signed into law. That statute directed the Rhode Island Public Utilities Commission (the “PUC”) to establish a contact voltage detection, repair, and reporting program, which would be applicable to National Grid.¹ On October 4, 2012, the PUC issued an order (“Program Order”)² approving an amended contact voltage program that had been filed by the Company. The Program Order established thirteen Designated Contact Voltage Risk Areas (“DCVRA”)³ for the state of Rhode Island and directed the Company to conduct testing and surveys for contact voltage on all conductive surfaces in public rights of way identified within these DCVRAs.

On January 21, 2013, the PUC issued a subsequent order (“Compliance Order”)⁴ that directed the Company to complete its initial testing and surveying of the thirteen DCVRAs in the first year. The Compliance Order further required the Company to file the findings and results of this testing in an annual report (“DCVRA Annual Report”) by no later than September 1, 2013. The DCVRA Annual Report must identify the specific elevated voltage events found during surveying and testing and explain the appropriate remedial action taken by the Company to ensure public safety. In addition, the

¹ The Narragansett Electric Company d/b/a National Grid (“National Grid” or the “Company”).

² Docket No. 4237, written Order 20871, issued November 9, 2012.

³ The initial thirteen Designated Contact Voltage Risk Areas include Newport, Pawtucket, Woonsocket, and ten designated sections in the city of Providence (College Hill, Downtown, Elmwood, Federal Hill, Lower South Providence, Olneyville, Smith Hill, Upper South Providence, Washington Park and West End). As noted below, a section of Westerly has been added as a fourteenth (14th) DCVRA.

⁴ Docket No. 4237, written Order 20950, issued February 1, 2013

Compliance Order required the Company to provide the PUC with a recommendation of those specific DCVRAs to be surveyed and tested in the next year of the program after the Company reviewed the findings and results of its survey and testing. Finally, the Compliance Order further directed the Company to keep the PUC apprised of any advances in contact voltage technology as part of its annual report.

The PUC directed that the DCVRA Annual Report must be provided in Excel or searchable PDF format and that the DCVRA Annual Report must include the information below by DCVRA:⁵ Exhibit 1 provides a searchable PDF file that includes the information for each mobile event recorded during testing (#1-14 below):

1. A record number for each contact voltage event (*Exhibit 1, Column (a)*)
2. The date and time of the testing (*Exhibit 1, Columns (b),(c)*)
3. The specific location of the testing (*Exhibit 1, Columns (d),(f),(g),(h),(i),(j)*)
4. An identification of whether it was a Company or customer asset (*Exhibit 1, Column (p)*)
5. The type of the equipment that failed (*Exhibit 1, Columns (n),(o)*)
6. The voltage recorded (*Exhibit 1, Columns (k),(l),(m)*)
7. Whether there was any personal injury to public, pet or property damage (*Section 4*)⁶
8. An identification of any other equipment involved (*Exhibit 1, Columns (n),(z)*)
9. Whether there were any prior incidents for the last five years at that location (*Exhibit 1, Column (u)*)
10. The corrective actions taken at the location (*Exhibit 1, Column (e),(z)*)
11. The number of customers if service is interrupted (*Exhibit 1, Column (s)*)
12. The duration of the interruption (*Exhibit 1, Column (t)*)
13. A summary of the investigation into the cause of the incident (*Exhibit 1, Column(z)*)

⁵ Program Order at 28-29.

⁶ Reports of any injury to the public, pets or property are reported in Section 4 below.

14. The date when corrective action was taken and the date repairs were made (i.e. temporary and final) (*Exhibit 1, Columns (y),(aa),(ab),(ac),(ad)*)

In addition, the PUC further directed that the Contact Voltage Annual Report also include information concerning:⁷

15. The aggregated costs of repair for each contact voltage event by DCVRA (*Section 3*)
16. The number of calls to the “Shock Line” (*Section 4*)
17. Any additional back-up information currently included in Section 7.3⁸ of the Company’s current EOP-G016 (*Section 5 and Exhibit 1*)
18. A recommendation on whether any DCVRA should be added or modified with a specific rationale supporting the recommendation (*Section 7*)
19. A recommendation of which DCVRAs should comprise the 20% to be tested in the next year; and (*Section 7*)
20. Any updates the Company discovered concerning the standards (IEEE) and advances in equipment technology (*Section 8*)

On January 16, 2014, the PUC approved the Company’s First DCRVA Annual Report in Docket No. 4237-A. The Order in Docket No. 4237-A amended the Company’s annual contact voltage program requirements to include:

21. The addition of a section of Westerly as a fourteenth DCVRA
22. The estimated number of mobile survey stops (*Section 2*)
23. A glossary and listing of terminology in the report (*Glossary of Terms*)
24. A summary of mobile survey events and readings (*Section 2, Table 1 and Table 2*)
25. The inclusion of before and after readings for the Company’s Total Harmonic Distortion (“THD”) pilot program (*Exhibit 1, Column (ac) and Section 6, Table 7 and Table 8*)

⁷ Program Order at 28-29, Compliance Order at 7-8.

⁸ The Program Order directed the Company to include additional back-up information included in Section 7.2 of the Company’s EOP-G016, Version 1. This EOP has since been revised (Version 2, attached as Exhibit 5) to include section 7.3, which includes the back-up information applicable for mobile elevated voltage testing to be include in the Annual Report.

In addition, in negotiations with the Division, the Company agreed to the following two additional process recommendations to be reported in the DCVRA Annual Report:

26. Implement follow-up scans in DCVRAs with remediation work before the next annual mobile survey to verify that the objects found and repaired are fully addressed. (*Section 2 - Post-Mitigation Manual Testing, Exhibit 2*)
27. Implement a process where random objects are selected in each DCVRA and manually tested for contact voltage following the mobile testing. (*Section 2 - Quality Assurance Manual Testing, Exhibit 3*)

These modifications are incorporated in the charts and exhibits to this filing.

Section 2 of the DCVRA Annual Report provides a summary of the Company's surveying and testing results of the 14 DCVRAs for the period April 1, 2013 to March 31, 2014. Section 3 provides a preliminary summary of the aggregate costs of the contact voltage program (#15 above). Section 4 provides the listing of the number of calls to the Company's "Shock line" and reports of any injury to the public, pets or property (#7 and #16 above). Section 5 includes a copy of the Company's current EOP-G016 (#17 above and Exhibit 5). Section 6 provides additional information on the Company's total harmonic distortion ("THD") pilot program results, which the PUC approved in the First Annual Report Order to be continued for FY 2014. Section 7 includes the Company's recommendation for the percentage of DCVRAs to be completed in the third year of the program (#18 and #19 above). Finally, Section 8 provides the Company's latest understanding of the current state of electrical standards and mobile equipment technology (#20 above).

Section 2

Survey and Testing Results

2. Mobile Survey and Testing Results

In compliance with the First Annual DCVRA Report Order, Premier Utility Services, LLC (“Premier”) conducted the surveying and testing of all 14 DCVRAs over the period of March 12, 2014 to March 28, 2014. All surveying and testing took place at night to include the testing of street lights. In total, the surveying and testing of all 14 DCVRAs covered approximately 131 total miles.⁹ The Company had underground crews and inspectors available to guard any elevated voltage finding discovered during the surveying and testing until such areas could be made safe. When an elevated voltage condition of 4.5 volts or above was found and verified, the site was guarded until it could be made safe by Company personnel. If the site was customer-owned, the owner or municipality was notified by the Company and appropriate action was taken to ensure public safety at that location.

In addition, the testing in each DCVRA included the THD pilot during which any voltage measure greater than 1 volt and less than 4.5 volts that had a total harmonic distortion of less than 10 percent was considered contact voltage. The Company remediated six (6) locations where the THD was less than 10 percent. As such, these locations were safeguarded from the public and appropriate permanent repairs were made. THD was determined by the use of a Fluke power quality clamp meter or a Fluke scope meter. As discussed in more detail in Section 6, although not considered hazardous

⁹ The 131 total miles includes all mileage driven to survey, such as where the survey included both sides of a street not simply linear mileage.

to the public, as part of the testing, the Company also remediated three (3) events where the total harmonic distortion was greater than 10 percent.

Sixteen (16) mobile events were recorded during the mobile scanning survey having 1 volt or greater. These findings were down from the 20 mobile events from the FY 2013 mobile survey. None of the assets tested during the FY 2014 mobile survey were repeats from last year. Table 1 below provides the dates of testing, number of estimated investigatory mobile survey stops, and number of mobile events by shunt voltage readings, summarizing the detail found in Exhibit 1. Of the 16 mobile events investigated, seven were found and documented as having elevated voltage above 4.5 volts. In each of these events, the Company took immediate remedial action by disconnecting the street light, placing protective barriers, and/or repairing the asset.

Table 1

Mobile Events by DCVRA

DCVRA	Dates Tested	Estimated Investigatory Mobile Survey Stops	Mobile Events	Readings less than 1 Volt	Readings Greater than 1 Volt but less than 4.5 Volts		Readings Greater than 4.5 Volts	
					Customer Asset	Company Asset	Customer Asset	Company Asset
				Customer and Company ¹⁰				
PROVIDENCE								
College Hill	3/24/14	58	2			2		
Downtown	3/12/14 to 3/21/14	278	19	12	1	1		5
Elmwood	3/17/14	38	1	1				
Federal Hill	3/18/14 to 3/25/14	26	6	4		2		
Lower So. Prov	3/16/14	13						
Olnyville	3/25/14	12	4	4				
Smith Hill	3/24/14	79	1					1
Upper So. Prov	3/17/14	52	5	4				1
Washington Park	3/16/14	24						
West End	3/17/14 to 3/18/14	54	19	19				
NEWPORT	3/25/14 to 3/27/14	106	27	25		2		
PAWTUCKET	3/28/14	35	1			1		
WESTERLY	3/25/14	0						
WOONSOCKET	3/27/14	53	3	3				
Total		828	88	72	1	8	0	7

As shown in Table 1 above, during the mobile surveying, 828 stops were made to investigate elevated voltage readings where the mobile detection system indicated increased electric field strength in the area surveyed. All available conductive objects and surfaces in the location were tested with the vast majority of these mobile events resulting in a finding of no actionable voltage on a conductive object or surface. Overall, over 3,000 manual checks were made on objects and assets over the 11-day scanning period.

Table 2 below provides the same detail as in Table 1 by Asset Type. As shown below, streetlights are responsible for the majority of elevated voltage readings, consistent with the results from the FY 2013 mobile survey.

Table 2
Mobile Events by Asset Type

Asset Type	Mobile Events	Readings less than 1 Volt	Readings Greater than 1 Volt but less than 4.5 Volts		Readings Greater than 4.5 Volts	
			Customer Asset	Company Asset	Customer Asset	Company Asset
Streetlight	83	68	1	8		7
Traffic Control Box	1	1				
Private Lighting	1					
Traffic Standard	2	2				
No Parking Sign						
Store Fronts						
Other	1	1				
Total	88	72	1	8	0	7

All of the Company's assets that registered greater than 1 volt were permanently repaired between March 31, 2014 and April 22, 2014. In nine of these events, the Company's testing found that the neutral connection was loose or deteriorated, and the Company reconnected and repaired the connection. (Exhibit 1, Events 14-11, 14-31, 14-36, 14-46 through 14-50, and 14-88). In two events, the Company discovered deteriorated or broken lamp wires and replaced the broken lamp wires. (Exhibit 1, Events 14-33 and 14-34). In two events, the Company replaced deteriorated cable or remade cable splices. (Exhibit 1, Events 14-27 and 14-59). While repairs were being made at one location, the customer requested that the Company not replace the street light at that location because they wanted it replaced with a decorative street light (Exhibit 1, Event 14-37). At one location, no elevated voltage was found when the crew went to repair the streetlight on April 22, 2014. The repair was made the evening on which the elevated voltage was discovered (on March 19, 2014), and no record was made of the specific repairs or mitigated voltage after the repairs. (Exhibit 1, Event 14-32). Finally, one event was found to be a customer-owned decorative light, which was referred to the customer to repair. (Exhibit 1, Event 14-35). Table 3 below provides a comparison of the number of mobile events found in the FY 2013 and FY 2014 mobile surveys, by voltage level.

Table 3

Comparison of Number of Mobile Events FY 2013 to FY 2014

Number of Mobile Events	FY 2013	FY 2014
Readings less than 1 Volt	55	72
Readings Greater than 1 Volt but less than 4.5 Volts	7	9
Readings Greater than 4.5 Volts	13	7
Total	75	88

2. Manual Surveying and Testing Results

As previously noted, in Docket No. 4237-A, the Company agreed to conduct additional testing as part of the DCVRA program and to provide the results in the DCVRA Annual Report from (1) manually testing the areas where previous remediation work was completed before this year's mobile survey to ensure the repairs were addressed, or post-mitigation manual testing; and (2) manually testing a number of random assets and objects in each DCVRA to spot verify areas not indicated by mobile technology after this year's mobile survey, or quality assurance manual testing.

Between February 26, 2014 and March 4, 2014, the Company conducted its post-mitigation manual testing of the 20 Company and customer mobile events from the 2013 mobile testing survey where repairs were completed. All of the shunt voltage readings for this post-mitigation manual testing were less than 1 volt, and no further remediation was required. Additional details of the Company's post-mitigation manual testing are provided in Exhibit 2. Columns (a) through (ae) are taken from Exhibit 1 filed in the FY2013 report on August 29, 2013, and Columns (af) through (aj) are from the testing performed on these same assets in the post-mitigation manual testing between February 26, 2014 and March 4, 2014.

With respect to the manual testing of random assets and objects, the Company selected a random sample of 803 Company assets spread throughout the 14 DCVRAs to perform its quality assurance audit. This sample size was based on a total population of approximately 5,000 Company-owned assets in the 14 DCVRAs, using a confidence level of 95% and a confidence interval of 0.004. These included Company assets such as manholes, handholes, street light standards, and underground vaults. The results of this testing is included in Exhibit 3. Between April 21, 2014 and May 2, 2014, these 803 assets were audited by Company personnel and the results revealed that no elevated voltage was found on 765 of these assets. In addition, 36 of these assets were found to be inaccessible to the Company and the public or not located in the field, and, as such, were not tested. However, the audit did find instances of possible elevated voltage on two streetlights in Newport.

The first instance was a Company-owned streetlight (Exhibit 3, Event 14-91) that was found to be below threshold when measured with a shunt meter (0.18 volts), and no further remediation action was necessary. The second instance was a customer-owned streetlight¹¹ in a parking lot (Exhibit 3, Event 14-89), which tested at 35 volts. After this elevated voltage was found, subsequent testing on street lights in close proximity was performed and a second street light in that same parking lot was found to have a voltage of 39 volts (Exhibit 3, Event 14-90). These streetlights were guarded and made safe by disconnecting the lights and subsequently repairing the streetlight and connections.

The events above 1 volt (Exhibit 3, Events 14-89, and 14-90) were not picked up by the mobile survey because the street lights were in the middle of a shopping plaza parking lot and approximately 105 feet away from the street, as shown in the picture in Exhibit 4. These streetlights are outside of the mobile testing survey range of a distance of 30 feet, and the Company would not have expected the elevated voltages to be picked up by a mobile survey from the street.

In addition, to make its manual random testing more comprehensive, the Company also manually tested a number of customer-owned assets for elevated voltage. The Company has no database of customer-owned assets (i.e., traffic standards, traffic control boxes, and decorative street lighting) in DCVRAs and, therefore, could not generate a random sample in the same way as for Company assets. Instead, the Company chose to look at customer street lighting assets for the entire contact voltage-risk area for

the City of Pawtucket because this process could be easily and efficiently administered given the absence of a database. The Company reviewed billing data for street lighting on metal poles in the City of Pawtucket, and a field assessment was then performed to determine whether the street light was in the contact voltage risk area. If the street light was in a contact voltage risk area, a manual elevated voltage test was performed. On May 14 and May 15 of 2014, the Company performed manual testing of 223 customer-owned street lighting assets in the Pawtucket DCVRA. Over this two-day period of manual testing, no elevated voltage was found.

Section 3

Contact Voltage Program Costs

3. Contact Voltage Program Costs

The cost to perform the mobile survey, post-mitigation manual testing, and quality assurance manual testing in the 14 DCVRAs was \$279,173. In addition, the cost to repair Company locations identified during the contact voltage surveying and testing was \$26,858, shown by DCVRA in Table 4 below. The total costs for the FY 2014 contact voltage testing and repair were \$306,031. The Company will reconcile these costs as part of the Company’s FY 2014 Electric Infrastructure, Safety, and Reliability Plan Reconciliation Filing that it will make with the PUC on or before August 1, 2014.

Table 4

Aggregate Contact Voltage Repair Costs

	DCVRA Newport	DCVRA Pawtucket	DCVRA College Hill	DCVRA Downtown	DCVRA Federal Hill	DCVRA Smith Hill	DCVRA Upper S Providence	Total
Repair Costs	\$1,517	\$928	\$10,580	\$7,253	\$1,793	\$2,075	\$2,712	\$26,858

Section 4

“Shock Line” Calls

4. “Shock Line” Calls

The Company agreed to report annual calls to its “Shock Line” as part of its DCVRA Annual Report. “Shock Line” calls to the Company record an event of elevated voltage reported by the public or other entities, such as another utility. For the period April 1, 2013 to March 31, 2014, the Company received nine calls of elevated voltage to its “Shock Line.” Each of these incidents was responded to, tested, mitigated where necessary, and repaired by the Company. Alternatively, notification was given to the customer who owned the asset. There were no reported personal injuries or damage to property from any of these incidents.

Table 5

Date	Town	Street	Asset	Voltage Found	Owner	Injury
07-20-13	Westerly	30 Pearl St	Other	9V	Customer	No
07-20-13	N Kingstown	Laurel Ridge Ln	Other	12V	Customer	No
07-19-13	Westerly	Havens Rd	Other	4.3V	Customer	No
07-07-13	Narragansett	Second St	Other	20V	Customer	No
06-24-13	Jamestown	Fort Getty Rd	Wood Pole	6.9V	Company	No
06-03-13	Glocester	Reynolds Rd	Other	5V	Customer	No
06-03-13	Cumberland	Diamond Hill FDR5 Rd	Other	Not Documented	Customer	No
06-01-13	W Greenwich	Kimberly Dr	Other	Not Documented	Customer	No
06-01-13	Glocester	Reynolds Rd	Other	5V	Customer	No

In one of the reported calls, the Company found that the voltage was below 4.5 volts. This call was on Havens Road in Westerly, where the Company responded to a customer call reporting that they were experiencing stray voltage at a pool. After responding, the Company found a low level of elevated voltage at this location and in some surrounding areas on the same street. However, the Company was unable to identify the specific source. As such, the Company continued to monitor the area. When follow-up testing of the area continued to find a low level of elevated voltage, the Company decided to repair the possible cause. The Company is currently replacing a pole and transformer, as well as installing a neutral isolator.

In five calls, the Company found voltage that exceeded 4.5 volts. The first call was from Reynolds Road in Glocester, where the Company responded to a customer who called and reported experiencing elevated voltage. The Company responded and found 5 volts at the customer's pool and in the surrounding area. The Company relocated a nearby capacitor bank to alleviate elevated voltage. This did not successfully mitigate the elevated voltage, and the Company has taken the capacitor bank offline at this time, which mitigated the elevated voltage. The second call was from Fort Getty Road in Jamestown, where the Company responded to a customer who called and reported experiencing elevated voltage. The Company responded and found 6.9 volts at a shower in the home. The Company replaced its service connections and reconfigured the neutral isolator to mitigate this incident. The third call related to Second Street in Narragansett, where the Company found 20 volts on a water pipe with the meter removed from its

socket. The Company responded and repaired the area by replacing the Company's connectors. The fourth call was from Laurel Ridge Lane in North Kingstown, where the Company found 12 volts on a surface ground rod. The Company contacted the customer and recommended additional ground rods tied to the existing ground rod to mitigate the situation. The Company made a follow-up check at this location after the customer made their repairs and confirmed that it had been made safe. The fifth call was from Pearl Street in Westerly, where the Company detected 9 volts at the ground rod of a pole on the property. The Company responded and replaced corroded connectors at the house and pole to mitigate the elevated voltage.

Finally, no voltage readings were documented on two calls. The first call was from Kimberly Drive in West Greenwich, where the Company responded to a customer call reporting they were getting shocked when making contact with pipes in the basement. The Company responded and determined that it was an inside problem with a solar energy installation. The customer was notified and made repairs. The second call was from Diamond Hill Road in Cumberland, where the Company responded to a customer call reporting elevated voltage at Children's Youth and Learning building. Company personnel investigated this report and could not find any issues with any facilities. Therefore, no repairs were made.

Section 5

Company EOP G016

5. Company EOP G016

In the initial DCVRA Annual Report filed for FY 2013, the Company provided a draft copy of the Company's EOP G016, which has subsequently been approved. There are no additional updates or modifications to EOP G016. A copy of the approved EOP G016 is attached as Exhibit 5.

Section 6

THD Pilot Program

6. THD Pilot Program Results

In the First DCVRA Annual Report Order, the PUC approved the continuation of the THD pilot program for an additional year, agreeing that THD testing will provide the Company and the PUC with additional information and testing results upon which to make a recommendation for continued THD use and possible modifications or changes in the Contact Voltage Program in future periods. The THD pilot testing was performed as part of the second year testing from March 12, 2014 to March 28, 2014. Under THD pilot testing, during contact voltage testing, any voltage measures greater than 1 volt and less than 4.5 volts that had a total harmonic distortion of less than 10% would be considered contact voltage and treated accordingly. That is, these areas would be safeguarded from the public and permanent repairs will be made. However, if the total harmonic distortion is greater than 10% and no visual defects are found, then no further action is required. THD was determined by the use of a Fluke power quality clamp meter or a Fluke scope meter, both of which have the ability to measure THD.

A summary of the results of the THD pilot program is set forth in the table below:

Table 6

THD Readings

Total Readings Greater than 1 Volt but less than 4.5 Volts	Number of Readings with THD < 10%	Number of Readings with THD > 10%
9	6	3

As shown above, the results of the THD pilot indicate a total of nine readings between 1 volt and 4.5 volts. (Exhibit 1, Column 1) Of that total, six were below the distortion level of 10% and, therefore, were considered as contact voltage, and two were greater than 10%. All except for one of these readings occurred on Company-owned streetlights, and the remaining reading occurred on a customer-owned streetlight. In each of these occurrences, the Company took the appropriate Guarded – Make Safe actions.

Table 7 below provides the THD readings of less than 10% by Event ID, DCVRA, street location, the associated voltage reading, initial THD reading, and subsequent THD reading after the Company’s repairs.

Table 7*

Event ID (Exhibit 1)	DCVRA	Streets	Shunt Voltage	THD Before	THD After
14- 31	Prov – Federal Hill	Broadway and Pallas	3.32	8.6	0.00
14-35	Prov-Downtown	Exchange and Westminster	1.5	3.3	Customer- Owned Light – not yet repaired
14-46	Prov-College Hill	Hope and Cushing	2.34	7.3	0.04
14-49	Newport	Rovensky and Bellvue Ave	1.08	3.8	0.10
14-50	Prov – Federal Hill	Kinsley and Dean	4.2	7.9	0.20
14-88	Pawtucket	School and I-95 Overpass	3.92	8.7	0.02

* Repairs for these events are described in Section 2.

Table 8 below provides the THD readings of greater than 10% by Event ID, DCVRA, street location, the associated voltage reading, initial THD reading, and subsequent THD reading after the Company’s repairs.

Table 8*

Event ID	DCVRA	Streets	Shunt Voltage	THD Before	THD After
14-37	Prov-Downtown	College and Benefit	3.4	20	Customer requested standard light not be replaced at this time. Will request decorative light.
14-47	Prov-College Hill	Angell and Ives	2.6	19.3	0.00
14-59	Newport	Narragansett and Clay	2.24	16.9	0.07

* Repairs for these events are described in Section 2.

After reviewing the THD pilot information as well as the overall mobile survey testing results for the past two years, the Company plans to continue using THD testing during the FY 2015 mobile survey cycle. As evidenced by the low number of elevated voltage readings greater than 1 volt and less than 4.5 volts for the past two years (seven in 2013 and nine in 2014), the Company believes that the costs of THD testing are minimal and that THD testing may provide the Company and the PUC with additional information to be considered for any possible modifications or changes to the Contact Voltage Program in future periods.

Section 7

DCVRA Recommendation

7. DCVRA Recommendation

In the Compliance Order, the PUC directed the Company to include in its DCVRA Annual Report a recommendation as to which DCVRAs would be included in the 20 percent to be surveyed and tested in the next year of the Contact Voltage and Repair Program.¹² In preparing its recommendation, as discussed below, the Company relied on the results of its first two years of surveying and testing. In addition, the Company has also examined additional areas of the state that may qualify as a new DCVRA. At this time, the Company would recommend no changes to the current DCVRAs.

Regarding surveying and testing for the third year, the Company has again considered two options. The first option would be to again survey and test 100 percent of the DCVRAs in FY 2015. Testing 100 percent of the DCVRAs in FY 2015 would provide the Company and the PUC with three consecutive years of elevated voltage results for each DCVRA. This option would be operationally efficient because mobile testing for the entire state could be completed in approximately two weeks. While surveying and testing 100 percent of the DCVRAs in FY 2015 would be more expensive than only the 20 percent testing required, the Company would expect these costs to be similar to those incurred in FY2014. Given the similar number of events found in FY 2014 as compared to FY 2013, the Company concludes that testing 100 percent of the DCVRAs for another year is a reasonable approach. When balanced against the more

timely information and safety benefits of potential elevated voltage and the administrative efficiency of completing the surveying in the same period, the Company believes that it is appropriate to incur these increased costs for one more year. Again, if approved by the PUC, the Company will negotiate with the vendor as allowed for in the existing contract.

Alternatively, if the PUC does not agree that surveying and testing for 100 percent of the DCVRAs for FY 2015 is warranted, Table 9 below provides the Company's recommendation for the specific DCVRAs to be tested over each of the next four years. In compiling this schedule, the Company considered the 20 percent statutory requirement and recognized those areas that had more events and higher level readings from the previous mobile surveys. As detailed in the Company's amended Contact Voltage program, to test 20 percent of the DCVRAs each year, the Company will test a minimum of three DCVRAs each year. The Company has "rounded up" in determining how to meet the 20 percent requirement, and recommends a four-year cycle rather than a five-year cycle. A four-year cycle would allow the Company to avoid testing of only a portion of a DVCRA and allows for full completion of a cycle prior to starting the next cycle.

Again, the four-year cycle was based on the number and voltage level of contact voltage events in the first two years' testing. The schedule has the larger areas (as

measured by miles required to scan) in the earlier years, and the mileage surveyed decreases for each of the following years.

Moreover, the Company is proposing to shift the timeframe for the testing from March, when the testing has been performed in the first two years, to the fall for FY 2015, and then to the spring for FY 2016. Ultimately, the Company would like to perform this testing in the April-June time period. The advantage of testing in the April-June time period is that the likelihood of snow banks restricting access or severe winter weather impacting the testing would have passed. This will also put the testing just prior to the summer months of what is expected to be the heaviest period of pedestrian traffic in a number of DCVRAs. Administratively, this would also better align testing and repairs with the fiscal year for the Infrastructure, Safety, and Reliability Plan. Rather than pushing the FY 2015 testing farther out to accomplish this, the Company is proposing the next testing in October of 2014 (for FY 2015), followed by testing in approximately May of 2015 (for FY 2016). The Company also proposes to conduct the testing around May of each year, thereafter.

Table 9

Region	Miles Traveled to Scan DCVRA (1)	Scheduled Year for Next Scan (2)
Providence-Zone 1-College Hill	13.0	2
Providence-Zone 2-Downtown	34.0	1
Providence-Zone 3-Elmwood	5.2	4
Providence-Zone 4-Federal Hill	7.0	2
Providence-Zone 5-Lower South Providence	1.6	4
Providence-Zone 6-Olneyville	2.0	4
Providence-Zone 7-Smith Hill	9.0	2
Providence-Zone 8-Upper South Providence	6.5	1
Providence-Zone 9-Washington Park	7.6	4
Providence-Zone 10-West End	7.8	3
Newport	20.0	1
Pawtucket	10.0	3
Woonsocket	7.0	3
Westerly	0.3	3
Total	131.0	
Year One	60.5 miles	
Year Two	29.0 miles	
Year Three	25.1 miles	
Year Four	16.4 miles	

- (1) Miles Traveled to Scan DCVRA is based on actual results from the FY 2014 Scan and may include traveling down the same street twice, such as once in either direction or twice in different lanes on a one way street, to cover the entire DCVRA.
- (2) Year 1 = FY 2015 (April 1, 2014 to March 31, 2015), Year 2 = FY 2016 (April 1, 2015 to March 31, 2016), etc.

Section 8

Standards and Equipment Update

8. Standards and Equipment Update

In its Compliance Order, the PUC directed the Company to continue monitoring advances in mobile technology and keep the PUC apprised of these efforts.¹³ At this time, the Institute of Electrical and Electronics Engineers (“IEEE”) Working Group has not completed its work. As such, the IEEE has not published any final documentation or final recommendations on elevated voltage. In addition, the Company is not aware of any additional change to mobile testing technology. As for FY 2015, the Company plans to continue using its existing manual technology and chosen vendor mobile technology for the third year of the Contact Voltage Program. The Company would then re-bid this work for FY 2016.

Exhibit 1
2014 Elevated Voltage Mobile Survey Results

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)	(s)	(t)	(u)	(v)	NEW COLUMN (w)	(x)	(y)	(z)	(aa)	(ab)	NEW COLUMN (ac)	(ad)	(ae)	(af)	
Event ID	Date Found	Time Found	Zone Name	Action Taken	Address Number	Street	Cross Street	Latitude	Longitude	Voltage	Shunt Voltage	3rd Harmonic	Asset Type	Asset number	Asset Owner?	Ground Source	Work Order #	# of Customers Interrupted	Duration of Interruption	Prior EV Hit?	>= 4.5 Volts	NGrid Verification Voltage	Repair Crew	Repair Date	Type of Repair	Repair Due Date	Mitigated Repair Voltage	Mitigated Repair THD	Repair Status	Shunt Voltage Category	Asset Comments	
14-1	03/12/2014	0:03	Providence-Zone 2-Downtown	Below Threshold	583	S Water St	Tockwotten St	41.81658	-71.40097	1.5	0.64	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-2	03/17/2014	23:07	Providence-Zone 10-West End	Below Threshold	755	Westminster St	Dean St	41.81812	-71.42061	2.2	0.6	N/A	Streetlight			Ground Rod	90000128974	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-3	03/17/2014	23:11	Providence-Zone 10-West End	Below Threshold	767	Westminster St	Dean St	41.81796	-71.40294	1.7	0.4	N/A	Streetlight			Ground Rod	90000128974	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-4	03/17/2014	23:16	Providence-Zone 10-West End	Below Threshold	797	Westminster St	Sawins Ln	41.81773	-71.42124	3.3	0.5	N/A	Streetlight			Ground Rod	90000128974	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-5	03/17/2014	23:23	Providence-Zone 10-West End	Below Threshold	797	Westminster St	Sawins Ln	41.81776	-71.42138	1.9	0.6	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-6	03/17/2014	23:29	Providence-Zone 10-West End	Below Threshold	803	Westminster St	Sawins Ln	41.8176	-71.42154	1.7	0.6	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-7	03/17/2014	23:36	Providence-Zone 10-West End	Below Threshold	809	Westminster St	Sawins Ln	41.81765	-71.42168	1.4	0.6	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-8	03/17/2014	23:42	Providence-Zone 10-West End	Below Threshold	835	Westminster St	Sawins Ln	41.81747	-71.42181	3.8	0.5	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-9	03/17/2014	23:50	Providence-Zone 10-West End	Below Threshold	849	Westminster St	Winter St	41.81739	-71.42209	1.8	0.6	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-10	03/17/2014	0:07	Providence-Zone 3-Elmwood	Below Threshold	852	Elmwood Ave	Cadillac Dr	41.78938	-71.4213	3.2	0.84	N/A	Streetlight			Ground Rod	90000128964	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-11	03/17/2014	20:45	Providence-Zone 8-Upper South Providence	Guarded	567	Broad St	Parkis Ave	41.80891	-71.42085	19.4	10.74	6.1	Streetlight	52	Company	Ground Rod	90000128969	0	NA	No	At or Above 4.5 Volts	19	Internal	04/22/2014	Separate Ground & Neutral	Thursday, May 01, 2014	0.00	0.00	Repair Complete	4.5 - 24.9 Volts		
14-12	03/17/2014	22:03	Providence-Zone 8-Upper South Providence	Below Threshold	2	Borden St	Eddy St	41.81327	-71.40817	1.4	0.89	N/A	Streetlight			Ground Rod	90000128969	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-13	03/17/2014	22:05	Providence-Zone 8-Upper South Providence	Below Threshold	2	Borden St	Eddy St	41.81304	-71.40788	1.2	0.82	N/A	Streetlight			Ground Rod	90000128969	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-14	03/17/2014	22:06	Providence-Zone 8-Upper South Providence	Below Threshold	2	Borden St	Eddy St	41.81281	-71.40758	1.26	0.31	N/A	Streetlight			Ground Rod	90000128969	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-15	03/17/2014	22:08	Providence-Zone 8-Upper South Providence	Below Threshold	593	Eddy St	Borden St	41.81256	-71.40734	2.01	0.71	N/A	Streetlight			Ground Rod	90000128969	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-16	03/18/2014	0:18	Providence-Zone 10-West End	Below Threshold	1640	Westminster St	Messer St	41.81579	-71.43722	1.57	0.11	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-17	03/18/2014	1:05	Providence-Zone 10-West End	Below Threshold	378	Cranston St	Parade St	41.81195	-71.4308	1.1	0.1	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-18	03/18/2014	1:17	Providence-Zone 10-West End	Below Threshold	840	Westminster St	Fricke St	41.81726	-71.42204	4.3	0.7	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-19	03/18/2014	1:21	Providence-Zone 10-West End	Below Threshold	814	Westminster St	Sawins Ln	41.81744	-71.42167	1.8	0.3	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-20	03/18/2014	1:23	Providence-Zone 10-West End	Below Threshold	800	Westminster St	Sawins Ln	41.81755	-71.42144	2.3	0.7	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-21	03/18/2014	1:25	Providence-Zone 10-West End	Below Threshold	760	Westminster St	Sawins Ln	41.8177	-71.42111	2.9	0.8	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-22	03/18/2014	1:29	Providence-Zone 10-West End	Below Threshold	754	Westminster St	Cahir St	41.81787	-71.42075	1.8	0.3	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-23	03/18/2014	1:34	Providence-Zone 10-West End	Below Threshold	744	Westminster St	Cahir St	41.81811	-71.42026	3	0.24	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-24	03/18/2014	1:42	Providence-Zone 10-West End	Below Threshold	720	Westminster St	Cahir St	41.81832	-71.41981	1.1	0.2	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-25	03/18/2014	1:45	Providence-Zone 10-West End	Below Threshold	718	Westminster St	Stewart St	41.81843	-71.41955	1.5	0.24	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-26	03/18/2014	3:08	Providence-Zone 10-West End	Below Threshold	492	Broadway	Harkness St	41.81854	-71.43449	2.42	0.24	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-27	03/18/2014	23:38	Providence-Zone 2-Downtown	Guarded	100	South St	Hospital Ave	41.81664	-71.4097	11.58	9.09	18.8	Streetlight	Unknown	Company	Ground Rod	90000128963	0	NA	No	At or Above 4.5 Volts	9	Internal	04/07/2014	Repaired Cable	Friday, May 02, 2014	0.80	0.00	Repair Complete	4.5 - 24.9 Volts		
14-28	03/18/2014	21:20	Providence-Zone 2-Downtown	Below Threshold	20	Point St	Eddy St	41.81718	-71.40564	1.6	0.25	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-29	03/18/2014	21:24	Providence-Zone 2-Downtown	Below Threshold	24	Point St	Eddy St	41.81733	-71.40527	4.5	0.33	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-30	03/18/2014	21:27	Providence-Zone 2-Downtown	Below Threshold	26	Point St	Eddy St	41.81745	-71.40486	1.7	0.16	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-31	03/18/2014	3:28	Providence-Zone 4-Federal Hill	Below Threshold	200	Broadway	Pallas St	41.82098	-71.42407	16.5	3.32	8.6	Streetlight	21	Company	Ground Rod	90000128965	0	NA	No	Below 4.5 Volts	16	Internal	04/09/2014	Repaired Neutral	Friday, May 02, 2014	0.18	56.20	Repair Complete	1- 4.4 Volts		
14-32	03/19/2014	1:27	Providence-Zone 2-Downtown	Guarded	303	Eddy St	Dyer St	41.81995	-71.40841	66.2	18.04	3.2	Streetlight	7	Company	Ground Rod	90000128963	0	NA	No	At or Above 4.5 Volts	0.0	Internal	04/22/2014	No Work Required	Saturday, May 03, 2014	0.00	0.00	Repair Complete	4.5 - 24.9 Volts	When the crew went to make the repair on 4-22-14, the repair had already been made (on 3-19-14), but with no record of the specific repair or mitigated repair voltage.)	
14-33	03/19/2014	2:29	Providence-Zone 2-Downtown	Installed Barriers	2	Ship St	Eddy St	41.81933	-71.40881	8.13	5.4	3.9	Streetlight	68	Company	Ground Rod	90000128963	0	NA	No	At or Above 4.5 Volts	10	Internal	04/03/2014	Replaced Lamp Wire	Saturday, May 03, 2014	0.07	23.00	Repair Complete	4.5 - 24.9 Volts		
14-34	03/19/2014	2:55	Providence-Zone 2-Downtown	Guarded	86	Pine St	Eddy St	41.82211	-71.41037	69.6	15.13	10.5	Streetlight	Unknown	Company	Ground Rod	90000128963	0	NA	No	At or Above 4.5 Volts	66	Internal	04/02/2014	Replaced Lamp Wire	Saturday, May 03, 2014	0.00	0.00	Repair Complete	4.5 - 24.9 Volts		
14-35	03/20/2014	0:41	Providence-Zone 2-Downtown	Installed Barriers	78	Exchange St	Westminster St	41.82519	-71.41037	5.1	1.5	3.3	Streetlight	2	Customer	Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	Lamp is Customer owned Decorative Lamp on an alley that use to be a street. No access to wires at lamp - Provided information to contact the City (04/10/2014 09:00)
14-36	03/20/2014	21:27	Providence-Zone 2-Downtown	Guarded	357	S Main St	Williams St	41.82142	-71.4043	55	53.4	13.5	Streetlight	12	Company	Ground Rod	90000128963	0	NA	No	At or Above 4.5 Volts	55	Internal	04/01/2014	Remade All Connections	Sunday, May 04, 2014	0.58	17.60	Repair Complete	>25 Volts		
14-37	03/20/2014	0:49	Providence-Zone 2-Downtown	Installed Barriers	2	College St	Benefit St	41.82589	-71.40736	11.7	3.4	20	Streetlight	1	Company	Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	Courthouse does not want light replaced with non decorative pole. We were prepared to put light back told not to due to being converted to dec light - Provided information to contact the City (04/10/2014 09:00)
14-38	03/20/2014	3:16	Providence-Zone 2-Downtown	Below Threshold	UNK	Francis St	Washington St	41.82501	-71.41236	2.9	0.21	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-39	03/20/2014	3:22	Providence-Zone 2-Downtown	Below Threshold	UNK	Francis St	Exchange Terr	41.82547	-71.41277	3.6	0.45	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-40	03/20/2014	3:26	Providence-Zone 2-Downtown	Below Threshold	UNK	Sabin St	Exchange Terr	41.82493	-71.41487	2.5	0.42	N/A	Traffic Standard		Customer	Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-41	03/20/2014	23:57	Providence-Zone 2-Downtown	Below Threshold	575	S Water St	Tockwotten St	41.81639	-71.40072	1.3	0.77	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	
14-42	03/21/2014	0:05	Providence-Zone 2-Downtown	Below Threshold	593	S Water St	Tockwotten St	41.81669	-71.40107	3.4	0.18	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1- 4.4 Volts	

Exhibit 1
 2014 Elevated Voltage Mobile Survey Results

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)	(s)	(t)	(u)	(v)	NEW COLUMN (w)	(x)	(y)	(z)	(aa)	(ab)	NEW COLUMN (ac)	(ad)	(ae)	(af)					
Event ID	Date Found	Time Found	Zone Name	Action Taken	Address Number	Street	Cross Street	Latitude	Longitude	Voltage	Shunt Voltage	3rd Harmonic	Asset Type	Asset number	Asset Owner?	Ground Source	Work Order #	# of Customers Interrupted	Duration of Interruption	Prior EV HIT?	>= 4.5 Volts	NGrid Verification Voltage	Repair Crew	Repair Date	Type of Repair	Repair Due Date	Mitigated Repair Voltage	Mitigated Repair THD	Repair Status	Shunt Voltage Category	Asset Comments					
14-43	03/21/2014	0:20	Providence-Zone 2-Downtown	Below Threshold	27	Tockwotten St	S Water St	41.8167	-71.40001	2.3	0.44	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts										1-4.4 Volts					
14-44	03/21/2014	0:23	Providence-Zone 2-Downtown	Below Threshold	39	Tockwotten St	S Water St	41.81705	-71.39979	3.9	0.58	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts											1-4.4 Volts				
14-45	03/21/2014	0:27	Providence-Zone 2-Downtown	Below Threshold	57	Tockwotten St	S Main St	41.81726	-71.3993	5.1	0.65	N/A	Streetlight			Ground Rod	90000128963	0	NA	No	Below 4.5 Volts											1-4.4 Volts				
14-46	03/24/2014	20:40	Providence-Zone 1-College Hill	Installed Barriers	231	Hope St	Cushing St	41.83015	-71.39863	3.75	2.34	7.3	Streetlight	29	Company	Ground Rod	90000128961	0	NA	No	Below 4.5 Volts	1.8	Internal	04/11/2014	Remade Grounds	Thursday, May 08, 2014	0.04	0.00	Repair Complete	1-4.4 Volts						
14-47	03/24/2014	23:35	Providence-Zone 1-College Hill	Installed Barriers	357	Angell St	Ives St	41.82919	-71.39323	9.42	2.6	19.3	Streetlight	19	Company	Ground Rod	90000128961	0	NA	No	Below 4.5 Volts	3.6	Internal	04/09/2014	Repaired Neutral	Thursday, May 08, 2014	0.00	0.00	Repair Complete	1-4.4 Volts						
14-48	03/24/2014	2:01	Providence-Zone 7-Smith Hill	Guarded	201	Charles St	Randall St	41.83642	-71.41214	107	17.2	0.2	Streetlight	21	Company	Ground Rod	90000128968	0	NA	No	At or Above 4.5 Volts	98	Internal	03/31/2014	Repaired Neutral	Thursday, May 08, 2014	0.10	58.10	Repair Complete	4.5 - 24.9 Volts						
14-49	03/25/2014	23:52	Newport	Installed Barriers	27	Roversky St	Bellvue Ave	41.45947	-71.30888	56.4	1.08	3.8	Streetlight	1-7	Company	Ground Rod	90000128959	0	NA	No	Below 4.5 Volts	55	Internal	04/10/2014	Repaired Neutral	Friday, May 09, 2014	0.00	0.30	Repair Complete	1-4.4 Volts						
14-50	03/25/2014	4:09	Providence-Zone 4-Federal Hill	Installed Barriers	280	Kinsley St	Dean St	41.82867	-71.42683	26.8	4.2	7.9	Streetlight	Unknown	Company	Ground Rod	90000128965	0	NA	No	Below 4.5 Volts	1.6	Internal	04/17/2014	Repaired Neutral	Friday, May 09, 2014	0.20	0.00	Repair Complete	1-4.4 Volts						
14-51	03/25/2014	3:05	Providence-Zone 4-Federal Hill	Below Threshold	263	Atewils Ave	DePasquale Ave	41.82385	-71.42683	3.6	0.41	N/A	Traffic Control Box		Customer	Ground Rod	90000128965	0	NA	No	Below 4.5 Volts											1-4.4 Volts				
14-52	03/25/2014	3:07	Providence-Zone 4-Federal Hill	Below Threshold	263	Atewils Ave	DePasquale Ave	41.82364	-71.42685	4	0.14	N/A	Streetlight			Ground Rod	90000128965	0	NA	No	Below 4.5 Volts												1-4.4 Volts			
14-53	03/25/2014	3:14	Providence-Zone 4-Federal Hill	Below Threshold	148	Atewils Ave	Dean St	41.82327	-71.42291	4.6	0.24	N/A	Streetlight			Ground Rod	90000128965	0	NA	No	At or Above 4.5 Volts													1-4.4 Volts		
14-54	03/25/2014	3:16	Providence-Zone 4-Federal Hill	Below Threshold	138	Atewils Ave	Dean St	41.82323	-71.42277	10.6	0.034	N/A	Private Signs		Customer	Ground Rod	90000128965	0	NA	No	At or Above 4.5 Volts													1-4.4 Volts		
14-55	03/25/2014	1:56	Providence-Zone 6-Olneyville	Below Threshold	29	Manton Ave	San Souci Dr	41.81729	-71.44364	4.8	0.1	N/A	Streetlight			Ground Rod	90000128967	0	NA	No	At or Above 4.5 Volts													1-4.4 Volts		
14-56	03/25/2014	1:59	Providence-Zone 6-Olneyville	Below Threshold	26	Manton Ave	San Souci Dr	41.81735	-71.44394	1.7	0.74	N/A	Streetlight			Ground Rod	90000128967	0	NA	No	Below 4.5 Volts													1-4.4 Volts		
14-57	03/25/2014	2:25	Providence-Zone 6-Olneyville	Below Threshold	1820	Westminster St	SR 10	41.816	-71.43983	3.2	0.88	N/A	Streetlight			Ground Rod	90000128967	0	NA	No	Below 4.5 Volts													1-4.4 Volts		
14-58	03/25/2014	2:31	Providence-Zone 6-Olneyville	Below Threshold	1801	Westminster St	SR 10	41.81624	-71.44007	2.2	0.46	N/A	Streetlight			Ground Rod	90000128967	0	NA	No	Below 4.5 Volts													1-4.4 Volts		
14-59	03/26/2014	1:04	Newport	Installed Barriers	77	Narragansett St	Clay St	41.47545	-71.30605	3.94	2.24	16.9	Streetlight	1-72	Company	Ground Rod	90000128959	0	NA	No	Below 4.5 Volts	1.8	Internal	04/10/2014	Remade Splices	Saturday, May 10, 2014	0.07	23.10	Repair Complete	1-4.4 Volts						
14-60	03/26/2014	0:58	Newport	Below Threshold	140	Narragansett Ave	Annadale Rd	41.47561	-71.30276	1.8	0.15	N/A	Streetlight			Ground Rod	90000128959	0	NA	No	Below 4.5 Volts													1-4.4 Volts		
14-61	03/26/2014	1:04	Newport	Below Threshold	138	Narragansett Ave	Annadale Rd	41.47556	-71.3038	2.1	0.29	N/A	Streetlight			Ground Rod	90000128959	0	NA	No	Below 4.5 Volts														1-4.4 Volts	
14-62	03/26/2014	1:10	Newport	Below Threshold	138	Narragansett Ave	Clay St	41.47472	-71.30542	3.8	0.16	N/A	Streetlight			Ground Rod	90000128959	0	NA	No	Below 4.5 Volts														1-4.4 Volts	
14-63	03/26/2014	1:16	Newport	Below Threshold	138	Narragansett Ave	Clay St	41.47543	-71.30602	1.3	0.43	N/A	Streetlight			Ground Rod	90000128959	0	NA	No	Below 4.5 Volts														1-4.4 Volts	
14-64	03/27/2014	0:41	Newport	Below Threshold	46	Washington Square	Meeting St	41.49035	-71.31351	2.6	0.6	N/A	Streetlight			Ground Rod	90000128959	0	NA	No	Below 4.5 Volts														1-4.4 Volts	
14-65	03/27/2014	0:43	Newport	Below Threshold	42	Washington Square	Meeting St	41.49032	-71.3167	4.9	0.56	N/A	Streetlight			Ground Rod	90000128959	0	NA	No	At or Above 4.5 Volts														1-4.4 Volts	
14-66	03/27/2014	0:47	Newport	Below Threshold	38	Washington Square	Meeting St	41.49031	-71.31378	3.7	0.56	N/A	Streetlight			Ground Rod	90000128959	0	NA	No	Below 4.5 Volts														1-4.4 Volts	
14-67	03/27/2014	0:50	Newport	Below Threshold	36	Washington Square	Colonial St	41.49029	-71.31391	1.9	0.19	N/A	Streetlight			Ground Rod	90000128959	0	NA	No	Below 4.5 Volts														1-4.4 Volts	
14-68	03/27/2014	0:52	Newport	Below Threshold	28	Washington Square	Colonial St	41.49026	-71.31408	2	0.31	N/A	Streetlight			Ground Rod	90000128959	0	NA	No	Below 4.5 Volts														1-4.4 Volts	
14-69	03/27/2014	0:55	Newport	Below Threshold	24	Washington Square	Colonial St	41.49023	-71.31422	2.6	0.63	N/A	Streetlight			Ground Rod	90000128959	0	NA	No	Below 4.5 Volts														1-4.4 Volts	
14-70	03/27/2014	0:57	Newport	Below Threshold	22	Washington Square	Charles St	41.49022	-71.31433	5.3	0.83	N/A	Streetlight			Ground Rod	90000128959	0	NA	No	At or Above 4.5 Volts														1-4.4 Volts	
14-71	03/27/2014	0:59	Newport	Below Threshold	10	Washington Square	Charles St	41.4902	-71.3145	3.2	0.73	N/A	Streetlight			Ground Rod	90000128959	0	NA	No	Below 4.5 Volts														1-4.4 Volts	
14-72	03/27/2014	1:03	Newport	Below Threshold	10	Washington Square	Charles St	41.49018	-71.31464	3.3	0.15	N/A	Streetlight			Ground Rod	90000128959	0	NA	No	Below 4.5 Volts														1-4.4 Volts	
14-73	03/27/2014	1:06	Newport	Below Threshold	10	Washington Square	Duke St	41.49017	-71.31472	4.3	0.54	N/A	Streetlight			Ground Rod	90000128959	0	NA	No	Below 4.5 Volts														1-4.4 Volts	
14-74	03/27/2014	1:08	Newport	Below Threshold	15	Washington Square	Touro Ct	41.48999	-71.31469	1.5	0.13	N/A	Streetlight			Ground Rod	90000128959	0	NA	No	Below 4.5 Volts														1-4.4 Volts	
14-75	03/27/2014	1:11	Newport	Below Threshold	15	Washington Square	Charles St	41.49006	-71.31439	3	0.32	N/A	Streetlight			Ground Rod	90000128959	0	NA	No	Below 4.5 Volts														1-4.4 Volts	
14-76	03/27/2014	1:13	Newport	Below Threshold	23	Washington Square	Charles St	41.49009	-71.31419	4.3	0.31	N/A	Streetlight			Ground Rod	90000128959	0	NA	No	Below 4.5 Volts														1-4.4 Volts	
14-77	03/27/2014	1:14	Newport	Below Threshold	33	Washington Square	Colonial St	41.49013	-71.31393	3.1	0.82	N/A	Streetlight			Ground Rod	90000128959	0	NA	No	Below 4.5 Volts														1-4.4 Volts	
14-78	03/27/2014	1:17	Newport	Below Threshold	37	Washington Square	Meeting St	41.49016	-71.3137	2.7	0.52	N/A	Streetlight			Ground Rod	90000128959	0	NA	No	Below 4.5 Volts														1-4.4 Volts	
14-79	03/27/2014	1:21	Newport	Below Threshold	43	Washington Square	Meeting St	41.49019	-71.31352	2.7	0.93	N/A	Streetlight			Ground Rod	90000128959	0	NA	No	Below 4.5 Volts														1-4.4 Volts	
14-80	03/27/2014	1:24	Newport	Below Threshold	47	Touro St	Clarke St	41.48976	-71.31364	3.3	0.68	N/A	Streetlight		Customer	Ground Rod	90000128959	0	NA	No	Below 4.5 Volts														1-4.4 Volts	
14-81	03/27/2014	1:28	Newport	Below Threshold	45	Touro St	Clarke St	41.48977	-71.31388																											

Exhibit 2
2014 Post-Mitigation Audits of Elevated Voltages Found in 2013 Mobile Elevated Voltage Survey (Greater than 1 Volt)
Columns (a) through (ae) from Exhibit 1 filed August 29, 2013;
Columns (af) through (aj) from post-mitigation audits performed February - March 2014.

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)	(s)	(t)	(u)	(v)	(w)	(x)	(y)	(z)	(aa)	(ab)	(ac)	(ad)	(ae)	(af)	(ag)	(ah)	(ai)	(aj)
Event ID	Date Found	Time Found	Zone Name	Action Taken	Address Number	Street	Cross Street	Latitude	Longitude	Voltage	Shunt Voltage	3rd Harmonic	Asset Type	Asset number	Asset Owner?	Ground Source	Work Order #	# of Customers Interrupted	Duration of Interruption	Prior EV Hit?	>= 4.5 Volts	Repair Crew	Repair Date	Type of Repair	Repair Due Date	Mitigated Repair Voltage	Repair Status	Shunt Voltage Category	Contacted 3rd Party (City, State, Owner)	Post Mobile EV Mitigation Audit	Audit Date	Audit Voltage	Audit Shunt Voltage	Audit THD	Audit Comments
6	03/18/2013	23:15	Providence-Zone 2-Downtown	Disconnected	UNK	Dyer St	319 Eddy St	41.81938	-71.40778	94.2	8.09	0	Streetlight	10	Company	Ground Rod	90000128963	0	N/A	No	At or Above 4.5 Volts	Internal	03/21/2013	Repaired/capped cable at adjacent hot pole (mm).	Thursday, May 02, 2013	0.20	Repair Complete	4.5 - 24.9 Volts		Y	03/04/2014	0.22	0.006	0	
10	03/19/2013	1:50	Providence-Zone 2-Downtown	Disconnected	100	South St	Parsonage St	41.81666	-71.40964	26	18.2	7.10%	Streetlight	3	Company	Ground Rod	90000128963	0	N/A	No	At or Above 4.5 Volts	Internal	04/25/2013	Replaced pole, head, wire, & service.	Friday, May 03, 2013	0.01	Repair Complete	4.5 - 24.9 Volts		Y	03/03/2014	11.7	0.042	0.84	
26	03/21/2013	2:05	Providence-Zone 2-Downtown	Installed Barriers	22	Fourtain St	Dorrance St	41.82485	-71.41453	2.6	1.8	27.8	Traffic Standard	N/A	Customer	Ground Rod	90000128963	0	N/A	No	Below 4.5 Volts				Customer Owned				City DPW notified on 3/21/13. Left message with directors office. Traffic engineering has been notified.	Y	02/26/2014	0.025	0.001	0	
45	03/22/2013	4:30	Providence-Zone 2-Downtown	Installed Barriers	55	College St	Benefit St	41.82614	-71.40655	2.65	1.64	11.4	Streetlight	2	Company	Ground Rod	90000128963	0	N/A	No	Below 4.5 Volts	Internal	04/23/2013	Replaced Head and Wire.	Monday, May 06, 2013	0.20	Repair Complete	1-4.4 Volts		Y	02/26/2014	2.73	0.489	11.1	
46	03/24/2013	23:50	Providence-Zone 1-College Hill	Disconnected	420	Taber Ave	Angell St	41.82968	-71.39083	30.7	12.7	12.4	Streetlight	38	Company	Ground Rod	90000128961	0	N/A	No	At or Above 4.5 Volts	Internal	04/15/2013	Replaced pole, head, wire, & service.	Wednesday, May 08, 2013	0.20	Repair Complete	4.5 - 24.9 Volts		Y	02/26/2014	1.44	0.174	0	
53	03/25/2013	23:15	Providence-Zone 7-Smith Hill	Disconnected	145	Charles St	Randall St	41.836	-71.41232	1.33	1.28	8.4	Streetlight	16	Company	Ground Rod	90000128968	0	N/A	No	Below 4.5 Volts	Internal	04/15/2013	Remade All Connections	Thursday, May 09, 2013	0.06	Repair Complete	1-4.4 Volts		Y	03/04/2014	0.46	0.039	0	
57	03/27/2013	2:34	Providence-Zone 10-West End	Disconnected	621	Broadway St	Barton St	41.81753	-71.43883	74	71.2	3.5	Streetlight	61	Company	Fence	90000128974	0	N/A	No	At or Above 4.5 Volts	Internal	04/15/2013	Replaced head, wire, & service.	Saturday, May 11, 2013	1.40	Repair Complete	>25 Volts		Y	02/26/2014	0.946	0.007	17.4	
58	03/27/2013	5:01	Providence-Zone 10-West End	Installed Barriers	870	Westminster St	Cranston St	41.81679	-71.42321	109	81.2	0	Streetlight	N/A	Customer	Fence	90000128974	0	N/A	No	At or Above 4.5 Volts	Customer	03/28/2013	Customer Owned		0.20		>25 Volts	Customer - Citizen Bank, notified by NGrid, Bus. Service. And UG Supervisor (VS) visited site and spoke to the manager. Customer to make repairs today 3/27/13 per UG supervisor. Aladdin Electric on Site 3/28/13 making repairs.	Y	03/04/2014	0.003	0.001	0	
59	03/27/2013	5:01	Providence-Zone 10-West End	Installed Barriers	870	Westminster St	Cranston St	41.81658	-71.42328	114	78	0	Streetlight	N/A	Customer	Fence	90000128974	0	N/A	No	At or Above 4.5 Volts	Customer	03/28/2013	Customer Owned		0.20		>25 Volts	Customer - Citizen Bank, notified by NGrid, Bus. Service. And UG Supervisor (VS) visited site and spoke to the manager. Customer to make repairs today 3/27/13 per UG supervisor. Aladdin Electric on Site 3/28/13 making repairs.	Y	03/04/2014	0.003	0.001	0	
60	03/27/2013	22:41	Providence-Zone 10-West End	Disconnected	325	Washington St	W Franklin St	41.81973	-71.41997	54	6.38	10.2	Streetlight	4041	Company	Ground Rod	90000128974	0	N/A	No	At or Above 4.5 Volts	Internal	04/22/2013	Replaced Damaged neutral in HH off MH 2429, Wash. ST.	Saturday, May 11, 2013	0.00	Repair Complete	4.5 - 24.9 Volts		Y	02/26/2014	0.468	0.069	14.2	
61	03/27/2013	22:41	Providence-Zone 10-West End	Disconnected	325	Washington St	W Franklin St	41.8196	-71.42	55.9	7.45	10.2	Streetlight	23 1/2	Company	Ground Rod	90000128974	0	N/A	No	At or Above 4.5 Volts	Internal	04/22/2013	Replaced Damaged neutral in HH off MH 2429, Wash. ST.	Saturday, May 11, 2013	0.00	Repair Complete	4.5 - 24.9 Volts		Y	02/26/2014	0.441	0.054	0	
63	03/27/2013	23:51	Pawtucket	Disconnected	67	Roosevelt Ave	Main St	41.87766	-71.38341	120	120	0	Streetlight	N/A	Customer	Fence	90000128960	0	N/A	No	At or Above 4.5 Volts				Customer Owned			>25 Volts	NGrid Crews worked to disconnect and stayed at location. Pawtucket Public Works out on Roosevelt Ave. NGrid energized the circuit to demonstrate to Public Works person the elevated voltage on two poles. He assured NGrid that these poles would be removed from the circuit so when the lights come on tonight there will be no elevated voltage present. (Per VS)	Y	03/04/2014	0.006	0.008	0	
64	03/28/2013	1:56	Pawtucket	Disconnected	67	Roosevelt Ave	Main St	41.87713	-71.38357	54	25	0	Streetlight	N/A	Customer	Ground Rod	90000128960	0	N/A	No	At or Above 4.5 Volts				Customer Owned			4.5 - 24.9 Volts	NGrid Crews worked to disconnect and stayed at location. Pawtucket Public Works out on Roosevelt Ave. NGrid energized the circuit to demonstrate to Public Works person the elevated voltage on two poles. He assured NGrid that these poles would be removed from the circuit so when the lights come on tonight there will be no elevated voltage present. (Per VS)	Y	03/04/2014	0.002	0.001	0	
66	03/28/2013	22:39	Newport	Installed Barriers	138	Narragansett Ave	Anndale Rd	41.47559	-71.03084	3.1	2.56	8.5	Streetlight	5 1	Company	Ground Rod	90000128959	0	N/A	No	Below 4.5 Volts	Internal	04/18/2013	Remade All Connections	Sunday, May 12, 2013	1.00	Repair Complete	1-4.4 Volts		Y	03/03/2014	2.489	0.004	0	
67	03/28/2013	22:46	Newport	Installed Barriers	102	Narragansett Ave	Anndale Rd	41.4754	-71.30506	3.66	2.89	8.5	Streetlight	6 1	Company	Ground Rod	90000128959	0	N/A	No	Below 4.5 Volts	Internal	04/18/2013	Remade All Connections	Sunday, May 12, 2013	1.00	Repair Complete	1-4.4 Volts		Y	02/26/2014	2.58	0.076	16.5	
68	03/28/2013	22:55	Newport	Installed Barriers	88	Narragansett Ave	Clay St	41.47541	-71.306	4.65	3.7	5.7	Streetlight	7 1	Company	Ground Rod	90000128959	0	N/A	No	Below 4.5 Volts	Internal	04/18/2013	Replaced Head and Wire (sweep/drop)	Sunday, May 12, 2013	1.70	Repair Complete	1-4.4 Volts		Y	02/26/2014	3.2	0.61	15.7	
69	03/28/2013	23:04	Newport	Installed Barriers	74	Narragansett Ave	Clay St	41.4753	-71.30727	4.89	4.27	7	Streetlight	8 1	Company	Ground Rod	90000128959	0	N/A	No	Below 4.5 Volts	Internal	04/18/2013	Replaced Head and Wire (sweep/drop)	Sunday, May 12, 2013	1.60	Repair Complete	1-4.4 Volts		Y	03/03/2014	3.9	0.012	0.95	
73	03/29/2013	22:57	Woonsocket	Disconnected	N/A	Worrall St, behind post office	Federal St	42.00662	-71.51097	60	52.8	7.6	Streetlight	4 dash 310	Company	Ground Rod	90000128976	0	N/A	No	At or Above 4.5 Volts	Internal	05/07/2013	Replaced head, wire, & service.	Monday, May 13, 2013	0	Repair Complete	>25 Volts		Y	02/26/2014	1.25	0.143	0	
74	03/29/2013	23:10	Woonsocket	Disconnected	245	Clinton St	Veterans Pkwy	42.00647	-71.50732	53	13.6	5.4	Streetlight	25 dash 1	Company	Ground Rod	90000128976	0	N/A	No	At or Above 4.5 Volts	Internal	04/15/2013	Replaced head, wire, & service.	Monday, May 13, 2013	0.2	Repair Complete	4.5 - 24.9 Volts		Y	02/26/2014	2.56	0.353	0	
75	03/30/2013	0:08	Woonsocket	Disconnected	36	N Main St	Blackstone St	42.00642	-71.51291	62	20.1	3.2	Streetlight	2 dash 1	Company	Ground Rod	90000128976	0	N/A	No	At or Above 4.5 Volts	Internal	04/15/2013	Fell Overhead, repaired neutral connection	Tuesday, May 14, 2013	0	Repair Complete	4.5 - 24.9 Volts		Y	03/04/2014	0.12	0.066	0	

Exhibit 3
2014 Quality Assurance Manual Testing Results

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)	(s)	(t)
Event ID	Asset ID	Mobile Inspection Area	Structure Type	Tax District Name	Street Name	Street Suffix	Structure Number	GIS X Coord	GIS Y Coord	GPS X Coord	GPS Y Coord	QA/QC Date	Asset Accessible Yes/No	Elevated Voltage Found Yes/No	Elevated Voltage Measured Without Shunt Resistor	Elevated Voltage Measured With Shunt Resistor	Elevated Voltage Measured THD %	Immediate Action Taken	Comments
14-89	214907039	Newport	STREET_LIGHT_SUPPORT	NEWPORT	PARKING		2	-71.308974	41.482712	-71.308922	41.482708	04/21/2014	Y	Y	34.58	N/A	N/A	Disconnected	CALLED DISPATCH, TMAN DISCONNECTED LIGHT, MITIGATED VOLTAGE - 0 VOLTS TOTAL STANDBY TIME: 1.5 HOURS
14-90	NA -- Asset added in field	Newport	STREET_LIGHT_SUPPORT	NEWPORT	PARKING		5					04/21/2014	Y	Y	38.68	N/A	N/A	Disconnected	CALLED DISPATCH, TMAN DISCONNECTED LIGHT, MITIGATED VOLTAGE - 0 VOLTS. THIS STREETLIGHT WAS NOT PART OF THE ORIGINAL SAMPLE. STANDBY TIME 1.5 HOURS
14-91	214906906	Newport	STREET_LIGHT_SUPPORT	NEWPORT	AMERICA'S CUP	AVE	2	-71.315082	41.485104	-71.315048	41.485092	05/01/2014	Y	Y	3.2	0.18	9.80%	Below Threshold	NO ACTION REQUIRED, BT (BELOW THRESHOLD .1V)



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INTRODUCTION

The purpose of this procedure is to outline the requirements for the annual equipment elevated voltage testing on National Grid Facilities in New York as required by the New York Public Service Commission’s “Electric Safety Standards” issued on January 5, 2005, the New York Public Service Commission’s “Order Adopting Changes to Electric Safety Standards issued and effective on December 15, 2008, the New York Public Service Commission’s “Order Requiring Additional Mobile Stray Voltage Testing” issued and effective on July 21, 2010 and the New York’s Public Service Commission “Order Granting Petition In Part and Modifying Electric Safety Standards” issued and effective on March 22, 2013.

This procedure also outlines requirements for equipment elevated voltage testing in Rhode Island and requirements by the Rhode Island Public Utilities Commission in Docket 4237 “Order to Establish a Contact Voltage Detection, Repair and Reporting Program” issued on November 9, 2012, and the subsequent order issued on February 1, 2013.

Additionally the Massachusetts Department of Telecommunications and Energy provided a series of recommendations on December 9, 2005, that have been included in this procedure.

While there are variances in requirements between New York, Massachusetts, and Rhode Island driven by particular regulatory requirements in each State, the minimum requirements are based on sound utility practice.

PURPOSE

This procedure applies to all personnel involved with or responsible for the testing, repair and reporting of facilities designated by this EOP for equipment elevated voltage. It should be noted that the term “Contact Voltage” has been adopted and is used in the EOP (refer to definitions section).

ACCOUNTABILITY

1. Standards, Policies and Codes
 - A. Update program as necessary.
 - B. Provide personnel guidance and assistance as requested.
2. Inspections & Maintenance
 - A. Ensure the equipment elevated voltage program as outlined in this EOP is implemented properly and timely.
 - B. Ensure that the program as outlined in the EOP is completed each year.
 - C. Provide qualified personnel to complete equipment elevated voltage testing.
 - D. Ensure all equipment elevated voltage inspectors have been trained.

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File: NG-EOP G016 Equipment Elevated Voltage Testing MGA	Originating Department: Standards, Policies & Codes	Sponsor: Susan Fleck

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3. Equipment Elevated Voltage Inspector

- A. Demonstrate the ability and proficiency to perform equipment elevated voltage testing per this EOP.
- B. Demonstrate the ability to become proficient in the use of the appropriate database.
- C. Possess the ability to do walking patrols, collect information, edit data, and guard unsafe facilities.
- D. Attend equipment elevated voltage training program.

4. Learning & Development

- A. Provide training upon request.

5. Distribution Network Strategy

- A. Provide input into program revisions.
- B. Ensure the equipment elevated voltage program as outlined in this EOP is implemented properly and timely.
- C. Ensure the program as outlined in the EOP is completed each year.
- D. Provide qualified personnel to complete equipment elevated voltage testing.
- E. Ensure all equipment elevated voltage inspectors have been trained.
- F. Provide program management.

REFERENCES

NYPSC Order 04-M-0159
NYPSC Order Adopting Changes to Electric Safety Standards
NYPSC Order Requiring Additional Mobile Stray Voltage Testing
RIPUC Docket 4237 Order 20871 (November 9, 2012) and Order 20950 (February 1, 2013)
Proposed Rhode Island Electric Contact Voltage Program, Revised October 2, 2012 (Docket 4237)
NYPSC Order Granting Petition in Part and Modifying Electric Safety Standards
Applicable National Grid Safety Rules & Procedures
Testing Equipment Operation Instructions

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DEFINITIONS

Contact Voltage (Draft definition as defined by the Working Group of the Institute of Electrical and Electronic Engineers (IEEE)): Voltage resulting from abnormal power system conditions that may be present between two conductive surfaces that can come into contact by members of the general public and/or animals. Contact voltage is caused by power system fault current as it flows through the impedance of available fault current pathways. Contact voltage is not related to normal system operation and can exist at levels that may be hazardous.

Contact Voltage Area (CVA): Designated underground distribution areas within the cities of Providence, Pawtucket, Newport and Woonsocket established in the “proposed Rhode Island Electric Contact Voltage Program”, Revised October 2, 2012 (Docket 4237).

Equipment Elevated Voltage: An A.C. rms voltage difference between utility equipment and the earth, or to nearby grounded facilities that exceeds the lowest perceptible voltage levels for humans.

Equipment Elevated Voltage Inspector: The individual performing the equipment elevated voltage inspection.

Finding: Any confirmed voltage reading on an electric facility or streetlight greater than or equal to 1V measured using a volt meter and a 500 ohm shunt resistor.

Handheld Computer: An electronic data recording device that is used in the field to create a record of conditions found.

Mitigation: Corrective actions performed by the utility to address the stray voltage finding.

Proximity Detection Unit: A low voltage hand held detector used to test exposed metallic surfaces and conductors for the presence of low voltage from 6V to 600V.

Shall: The word shall is to be understood as mandatory.

Should: The word should is to be understood as advisory.

Stray Voltage: As defined by NYPSC the term “Stray Voltage” means voltage conditions on electric facilities that should not ordinarily exist.

Stray Voltage Testing: The process of checking an electric facility for stray voltage using a device capable of reliably detecting and audibly and/or visually signaling voltages in the range of 6 to 600 volts.

Total Harmonic Distortion (THD): This term has come into common usage to define either voltage or current “distortion factor.”

Distortion Factor (harmonic factor): The ratio of the root-mean-squared of the harmonic content to the root-mean-squared value of the fundamental quantity, expressed as a percent of the fundamental.

$$DF = \sqrt{\frac{\text{sum of squares of amplitudes of all harmonics}}{\text{square of amplitude of fundamental}}} * 100\%$$

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1.0 FACILITIES WHERE EQUIPMENT ELEVATE VOLTAGE TESTING/DOCUMENTATION IS REQUIRED – NEW YORK

- 1.1 Street Lights and Municipally Owned Facilities
 - 1.1.1 Company owned metallic street lighting standards are required to be tested for equipment elevated voltage annually. This test is to be performed while the light is operating.
 - 1.1.2 Municipally owned street light systems that National Grid directly provides energy to shall be tested for equipment elevated voltage annually. National Grid will complete this testing unless assurances of the completion of required testing and transfer of such test data are made by the appropriate municipality. This test is to be performed while the light is operating.
 - 1.1.3 Municipal owned metallic traffic signal standards and accessible devices are to be tested annually for equipment elevated voltage by National Grid.
 - 1.1.4 All street lights identified on public thoroughfares regardless of ownership are to be tested annually.
 - 1.1.5 All street lights under a maintenance contract are to be tested annually. Exceptions not requiring equipment elevated voltage testing: private lighting, park associations, parking lots, fiberglass (or other non-conductive) street light standards, and locations where street light standards are not publicly accessible, such as facilities located in the center of highways that cannot be accessed without stopping traffic or creating potentially hazardous situations for the worker and/or public.
- 1.2 National Grid Substation Fences
 - 1.2.1 Metallic fencing surrounding substations with National Grid Facilities shall be tested for equipment elevated voltage annually. This fencing can be customer owned for customer stations, if a National Grid facility is part of the station.
- 1.3 Overhead Distribution Facilities
 - 1.3.1 Towers and/or metallic poles with distribution facilities shall be tested for equipment elevated voltage at an annual rate of twenty percent (20%) in conjunction with field inspections on a five-year cycle. 
 - 1.3.2 The following equipment on wood distribution poles requires equipment elevated voltage testing at an annual rate of twenty percent (20%) in conjunction with field inspections on a five-year cycle: 
 - 1. Metallic riser guard or conduit (company or non-company).
 - 2. Uncovered or uninsulated down ground (company or non-company).
 - 3. Down guy (company or non-company).
 - 4. Any other publicly accessible conductive piece of equipment (company or non-company) on the pole within reach from the ground.

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1.3.3 Exceptions: Customer meters and customer meter poles are excluded.

1.4 Overhead Transmission Facilities

1.4.1 Towers and/or metallic poles with transmission facilities shall be tested for equipment elevated voltage at an annual rate of twenty-percent (20%) in conjunction with field inspections on a five-year cycle.

1.4.2 The following equipment on wood transmission poles or structures require equipment elevated voltage testing at an annual rate of twenty-percent (20%) in conjunction with field inspections on a five-year cycle:

- a. Metallic riser guard or conduit (company or non-company).
- b. Uncovered or uninsulated down ground (company or non-company).
- c. Down guy (company or non-company).
- d. Any other publicly accessible conductive piece of equipment (company or non-company) on the pole or structure within reach from the ground.

1.5 Underground Facilities

1.5.1 Annual equipment elevated voltage testing is required on all of the following equipment where accessible to the public.

- a. All metallic manhole covers, vault covers and grates, junction box covers, and handhole covers.

1.5.2 Pad-mounted transformers and switchgear are tested at an annual rate of twenty percent (20%) in conjunction with field inspections on a five-year cycle.

1.5.3 Starting in 2010 and continuing thereafter, unless changed by subsequent order of the NY Public Service Commission, two mobile stray voltage surveys shall be conducted annually in Buffalo and one mobile stray voltage survey is required to be conducted annually in Albany and Niagara Falls.

1.5.4 Exceptions: Non-metallic concrete or fiberglass pads or handholes or pull/splice boxes are not required to be tested.

1.6 Daily Job Site Test Requirements

1.6.1 Each job site where National Grid personnel or its contractors complete a work assignment shall be tested for equipment elevated voltage at the start and at the end of the work day or at the start or at the completion of the assignment. This testing requirement is considered good utility practice and does not require specific documentation.

1.6.2 Exceptions:

- a. Substation fencing will not require equipment elevated voltage testing unless scheduled as part of the inspection program or if work was done on the fencing.
- b. In a storm situation, where mutual aid is required, testing by other than National Grid personnel will not be required.

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1.7 Exemptions

- 1.7.1 A completely fenced in area where access is denied to the general public and where access is only achieved by climbing a fence. Good judgment is required by the tester in these scenarios.

2.0 FACILITIES WHERE EQUIPMENT ELEVATED VOLTAGE TESTING/DOCUMENTATION IS REQUIRED – RHODE ISLAND

2.1 Company Owned Street Lights

- 2.1.1 Company owned metallic street lighting standards are required to be tested for equipment elevated voltage on a three-year cycle.
- 2.1.2 Exceptions: Testing shall not be completed at locations where street light standards are not publicly accessible, such as facilities located in the center of highways that cannot be accessed without stopping traffic or creating potentially hazardous situations for the worker and/or the public.

2.2 Overhead Distribution Facilities

- 2.2.1 Towers and/or metallic poles with transmission facilities shall be tested for equipment elevated voltage at an annual rate of twenty-percent (20%) in conjunction with field inspections on a five-year cycle..
- 2.2.2 The following equipment on wood transmission poles or structures require equipment elevated voltage testing at an annual rate of twenty-percent (20%) in conjunction with field inspections on a five-year cycle:
 - a. Metallic riser guard or conduit (company or non-company).
 - b. Uncovered or uninsulated down ground (company or non-company).
 - c. Down guy (company or non-company).
 - d. Any other publicly accessible conductive piece of equipment (company or non-company) on the pole or structure within reach from the ground.

2.3 Underground Facilities

- 2.3.1 Testing for equipment elevated voltage shall be done while completing scheduled inspections of underground equipment covered by NG-EOP UG006, Underground Inspection and Maintenance. The following items are to be tested on a five year cycle, pad-mounted transformers, pad-mounted switchgears, and metallic handhole covers.
- 2.3.2 Testing for equipment elevated voltage shall be completed on underground facilities while completing working inspections covered by NG-EOP UG006. The metallic items to be tested are manholes covers, vault covers and grates, handhole covers, splice box covers, junction box covers, pad-mounted transformers, pad-mounted switchgears, and submersible equipment covers.

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2.3.3 Starting in Fiscal Year 2013 and continuing thereafter, unless changed by subsequent order of the Rhode Island Public Utilities Commission, mobile contact voltage surveys will be performed in designated Contact Voltage Areas (CVA) The mobile surveys will be performed on a five-year cycle. A survey of 100 percent of the CVA will be performed the first year of the program followed by 20 percent of the CVA in successive years.

2.4 Daily Job Site Test Requirements

2.4.1 Each job site where National Grid personnel or its contractors complete a work assignment shall be tested for equipment elevated voltage at the start and at the end of the work day or at start and at the completion of the assignment. This testing requirement is considered good utility practice and does not require specific documentation.

- a. In a storm situation, where mutual aid is required, testing by other than National Grid personnel will not be required.

2.5 Exemptions

2.5.1 A completely fenced in area where access is denied to the general public and where access is only achieved by climbing a fence. Good judgment is required by the tester in these scenarios.

3.0 FACILITIES WHERE EQUIPMENT ELEVATED VOLTAGE TESTING/DOCUMENTATION IS REQUIRED – MASSACHUSETTS

3.1 Company Owned Street Lights

3.1.1 Company owned metallic street lighting standards are required to be tested for equipment elevated voltage on a five year cycle.

3.1.2 Exceptions: Testing shall not be completed at locations where street light standards are not publicly accessible, such as facilities located in the center of highways that cannot be accessed without stopping traffic or creating potentially hazardous situations for the worker and/or public.

3.2 Overhead Distribution Facilities

3.2.1 Towers and/or metallic poles with transmission facilities shall be tested for equipment elevated voltage at an annual rate of twenty-percent (20%) in conjunction with field inspections on a five-year cycle.

3.2.2 The following equipment on wood transmission poles or structures require equipment elevated voltage testing at an annual rate of twenty-percent (20%) in conjunction with field inspections on a five-year cycle:

- a. Metallic riser guard or conduit (company or non-company).
- b. Uncovered or uninsulated down ground (company or non-company).
- c. Down guy (company or non-company).

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- d. Any other publicly accessible conductive piece of equipment (company or non-company) on the pole within reach from the ground.

3.3 Underground Facilities

3.3.1 Equipment elevated voltage testing is required on all of the following equipment where accessible to the public on a five year cycle.

- a. All metallic manhole covers, vault covers and grates, junction box covers, handhole covers, pad-mounted transformers, secondary pedestals, and pad-mounted switchgears.

Exceptions: Non-metallic concrete or fiberglass pads or handholes or pull/splice boxes are not required to be tested.

3.4 Daily Job Site Test Requirements

3.4.1 Each job site where National Grid personnel or its contractors complete a work assignment shall be tested for equipment elevated voltage at the start and at the end of the work day or at the start or at the completion of the assignment. This testing requirement is considered good utility practice and does not require specific documentation.

- a. In a storm situation, where mutual aid is required, testing by other than National Grid personnel will not be required.

3.5 Exemptions

3.5.1 A completely fenced in area where access is denied to the general public and where access is only achieved by climbing a fence. Good judgment is required by the tester in these scenarios.

4.0 TEST EQUIPMENT

4.1 A hand held device (proximity detection unit) that is capable of detecting voltage from 6 volts to 600 volts.

4.2 A portable AC digital high impedance volt meter must have the ability to take readings with and without an input load impedance of 500 ohms.

4.3 The handheld devices utilized shall be certified by an independent test laboratory as being able to reliably detect voltages of 6 – 600 volts. The following units have been certified:

4.3.1 HD Electric model LV-S-5 (5-600 volts).

- Fluke 85
- Fluke 87
- Fluke 170 series or equivalent
- Fluke 175
- Fluke 177
- Fluke 179
- Fluke 187
- Fluke 189

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- 4.4 Mobile Voltage Detection Equipment:
Narda 8950/10 Stray Voltage System
SVD2000 Stray Voltage Mobile Detector

5.0 TEST PROCEDURE

5.1 Job Briefing

- 5.1.1 At minimum, the following information shall be communicated to all personnel at the beginning of each shift for equipment elevated voltage testing:
- Structures are never to be touched with a bare hand while performing the tests, only the voltage detector or meter probe is to be used to make contact with the facilities.
 - Appropriate PPE shall be worn.
 - Each individual needs to be aware of his/her surroundings at all times.
 - Make sure to observe all traffic before entering a street, either at intersections or any other point.
 - Traffic safety vest (DOT Compliant Class II) is to be worn at all times when exposed to traffic. Be aware that when bending down, the visibility benefits of the traffic safety vest are diminished.
 - Obey all traffic control devices.
 - When working in the street, face oncoming traffic whenever possible.

5.2 Measurements for voltages will be performed in accordance with the following:

- 5.2.1 Initial measurements for the presence of voltage shall be made using a certified proximity detection unit as noted in the testing equipment certified equipment list in Section 4.0, 4.3.
- To verify the proper operation of the proximity detector, follow operating instructions for the particular certified unit being utilized, this is to be done daily.
 - After verification that the detection unit is working, approach the area/equipment to be tested. The proximity detector will illuminate prior to touching the area/equipment being tested if voltage is present. If the proximity detector does not illuminate in close proximity to the area/equipment touch the area/equipment to be tested with the probe of the unit.
- 5.2.2 If this test detects voltage, repeat the test with the portable AC voltmeter (The 500 ohm resistor is NOT used in this initial test):
- Measurements with a portable AC voltmeter shall be taken on clean bare metallic surface (structure, ground wire, etc.)
 - When using a portable AC voltmeter, connection shall be made to suitable neutral or ground source with the common (black) lead.

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1. In locations where the neutral or ground point is at a distance in excess of the voltmeter lead length, the connection to the neutral/ground shall be made with up to 25' of # 16 stranded copper lead wire (covered), the other end of which shall be securely connected to the negative (black) probe of the meter. When using such "extension leads" appropriate care shall be taken in the placement of such leads so as to not create a physical hazard to workers, pedestrian or vehicular traffic.
 2. In locations where a system ground is not available, or the existing ground registered voltage upon the proximity test, a metal rod shall be firmly embedded into the earth to a depth of no less than 6" to create a ground reference point for the measurement to be taken. An alternate method is available for obtaining a ground reference point utilizing an aluminum plate in lieu of driving a ground rod. The reference point should be as close as practicable to the facility being tested to simulate an equipment elevated voltage situation (3' to 4'.) On occasion longer leads may be necessary to find undisturbed earth (up to 25'.)
- c. The "live" meter probe lead shall then be placed into contact with the structure under inspection to determine the voltage.
1. Voltages readings greater than 30 volts shall be recorded in the database for the site.
 2. For voltage readings less than 30 volts, install a 500 ohm input load impedance resistor on the volt meter. Take another voltage measurement and record this voltage in the database for the site.
- 5.2.3 Measurements for elevated voltages/contact voltage using mobile technology will be performed in accordance with the following:
- a. Mobile testing is performed by contract crews driving pre-determined routes in Contact Voltage Areas searching for elevated voltage levels. The equipment used is mounted to vehicles and detects voltage levels greater than 1 volt while driving at speeds of up to 25 mph near underground facilities. Once elevated voltages are detected the crew stops and performs a thorough check with certified manual testing equipment to determine if there is contact voltage present.
- 5.2.4 Any positive indications by either mobile testing or hand held tools shall be followed up with multi-meter measurements on the target structures. Voltage measurements shall be taken in accordance with Section 5.2.2 above. The investigators shall verify that a suitable ground (i.e. a ground that is not energized) is used as a reference. Ground source location shall be marked with tape, paint or flag for future testing of repair work.
- 5.2.5 A Total Harmonic Distortion (THD) test method will be implemented as a pilot for Rhode Island mobile elevated voltage testing. THD will be determined by the

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use of a Fluke Power Quality clamp meter or a Fluke scope meter both of which have the ability to measure THD.

6.0 CORRECTIVE ACTION REQUIREMENTS FOR ELEVATED VOLTAGE FINDINGS

6.1 State Specific Requirements

6.1.1 New York

If equipment elevated voltage condition is found and verified by the Test Procedure in Section 5.0, the site is to be guarded until made safe by Company personnel or if municipally owned, made safe by the owner or company. Guarded for the purpose of this EOP is defined as guarded by a person or a protective barrier that prevents public contact if the equipment elevated voltage found is greater than 1 volt. **If the voltage measures less than 1 volt and is found to be consistent with system operation design (no visual evidence of a problem upon review) no further action is required.** If the voltage measures greater than or equal to 1 volts and less than 4.5 volts it can either be guarded in person or by a protective barrier that prevents public contact, contact your supervisor for required action. Sound judgment shall be utilized in this application. If the voltage measurement is greater than or equal to 4.5 volts it shall be guarded by an equipment elevated voltage inspector or a Company employee that has been trained to stand by on energized facilities, and immediate response is required using the notification in Section 6.3 below.

6.1.2 Massachusetts and Rhode Island

If equipment elevated voltage condition is found and verified by the Test Procedure in Section 5.0, the site is to be guarded until made safe by Company personnel or if municipally owned, made safe by the owner or company. Guarded for the purpose of this EOP is defined as guarded by a person or a protective barrier that prevents public contact if the equipment elevated voltage found is greater than 4.5 volts. **If the voltage measures less than 4.5 volts and is found to be consistent with system operation design (no visual evidence of a problem upon review) no further action is required.** If the voltage measures greater than 4.5 volts and less than 8 volts it can either be guarded in person or by a protective barrier that prevents public contact, contact your supervisor for required action. Sound judgment shall be utilized in this application. If the voltage measurement is greater than 8 volts it shall be guarded by an equipment elevated voltage inspector or a Company employee who has been trained to stand by on energized facilities; an immediate response is required using the notification in section 6.3 below

6.1.3 Rhode Island Total Harmonic Distortion Pilot

Under the Total Harmonic Distortion (THD) pilot in Section 5.2.5, if during mobile testing of the Contact Voltage Area the voltage measures greater than 1 volt and less than 4.5 volts and has a total harmonic distortion of less than 10% the voltage will be considered contact voltage. These areas will then be safeguarded from the public and permanent repairs will be made. If the total harmonic

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distortion is greater than 10% and no visual defects are found, no further action will be required.

6.1.4 New York and Rhode Island

In the event of an elevated voltage finding on an electric facility or street light during the stray voltage test procedure, all publicly accessible structures and sidewalks within a minimum 30 foot radius of the electric facility or street light must be tested for stray voltage.

6.2 The following notification process for personnel to respond shall be utilized.

6.2.1 Notification by location:

a. New York: contact Systems Operations Dispatch 1-877-716-4996

b. New England North, Northborough Distribution Control Center:

1. North Shore (MA) 1-877-247-3606
2. Merrimack Valley (MA) 1-877-247-3607
3. Central (MA) 1-877-247- 3608
4. Western (MA) 1-877-247-3609

c. New England South, Northborough Distribution Control Center

1. Capital (RI) 1-877-247-3610
2. Coastal (RI) 1-877-247-3599
3. Southeast (MA) 1-877-411-3812
4. South Shore (MA) 1-877-411-5599

6.2.2 Inform the operator that this is an equipment elevated voltage call, giving inspector name, company (if not National Grid), unique ID, address where problem is identified, facility number, circuit number , ownership, type of equipment, voltage found and whether they are physically guarding or leaving the site after flagging and installing a protective barrier. National Grid personnel or designee will be assigned to respond.

6.3 Temporary repairs may be used to correct the equipment elevated voltage thereby removing the need to guard the site.

6.4 Except as noted in Section 6, 6.6, permanent repairs to the equipment shall be made within 45 days of the occurrence.

6.5 If permanent repairs can not be made within 45 days due to extraordinary circumstances, the company shall periodically perform site visits to monitor the condition of the temporary repair. For New York, all exceptions shall be identified and justified in the annual reporting of the program to the NYPSC.

6.6 The Stray Voltage Tester/Equipment elevated Voltage Inspector may detect a minimal voltage level that is attributable to the design of the facility and not the result of an improper condition, no corrective action is required in this instance.

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- 6.7 The individuals conducting the equipment elevated voltage tests on street light standards shall have a supply of “Angel guards” available for installation if the cover is missing or wires are found to be exposed to the public at the time of testing. Angel guards shall only be installed after the testing of the street light standard is complete and 1) there is no indication of equipment elevated voltage above 1 volt, or 2) repairs have been completed to correct the equipment elevated voltage.
- 6.8 The equipment elevated voltage inspector shall report any potentially hazardous conditions found on National Grid facilities seen visually during the survey process.
- 6.9 Customer Owned Equipment
- 6.9.1 Where the Company finds equipment elevated voltage above 1 volt and identifies its source as customer-owned equipment, the Company shall guard the site and notify the customer or a responsible person, as appropriate, that a potentially hazardous situation exists. The Company shall advise the customer or responsible person that the cause of the equipment elevated voltage shall be immediately remedied.
- 6.9.2 Company personnel are encouraged to work with the customer to determine and rectify the problem. If the customer agrees to accept the Company’s assistance, the Company may charge a reasonable cost for this effort.
- a. The Company may temporarily remove a customer’s meter or take such other actions as are appropriate and necessary to protect the public.

7.0 DATABASE REQUIREMENTS

- 7.1 The database in use shall be easily searchable for information and reporting.
- 7.2 Information fields required to be completed for facilities:
- Survey Date
 - Region
 - District
 - Contractor
 - GIS ID/Asset # (Unique ID)
 - Facility Type
 - Owner
 - Feeder/Circuit
 - Line #
 - Tax District
 - Pole/Structure/Equipment ID
 - Street Name
 - Inspectors Name
 - GPS Taken
 - Pre-load Match
 - Equipment elevated Voltage Test Required
 - Voltage Found Y/N
 - Voltage Measurement

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- Type of Equipment (See Appendix A)
- Immediate Action Taken
- Person Notified
- Permanent Repair Date
- Type of Repair
- Person Responsible for repair (Employee ID)
- 7.3 Information fields required to be completed for facilities in mobile testing
 - Survey Date
 - Region
 - District
 - Contractor
 - Facility Type
 - Owner
 - Pole/Structure/Equipment ID
 - Street Name
 - GPS taken
 - Voltage Measurements
 - Type of Equipment (see Appendix A)
 - Immediate Action Taken
 - Person Notified
 - Permanent Repair Date
 - Type of Repair

8.0 NEW YORK ANNUAL REPORTING AND CERTIFICATION REQUIREMENTS

- 8.1 Each Regional program supervisor shall provide certification to the program manager that the Region they supervise has complied with the equipment elevated voltage testing and inspection program as ordered by the PSC.
- 8.2 The program manager shall provide certification to the Vice President Distribution Network Strategy and the Senior Vice President of Customer Operations & Maintenance that the organization has complied with the equipment elevated voltage testing and inspection program as ordered by the PSC.
- 8.3 Written certification of the completion and results of every equipment elevated voltage test and inspection shall be completed, as well as a certification that all unsafe conditions identified have been remediated by appropriate company personnel.
- 8.4 The President or officer with direct responsibility for overseeing the equipment elevated voltage testing and inspection shall provide an annual certification to the NYSPSC that the Company has tested all of its publicly accessible conductive surface electric facilities and all street lights, as well as completed all required inspections.
- 8.5 The President or officer with direct responsibility for overseeing facility inspections shall provide an annual certification to the Commission that the utility is in compliance with its inspection program and has inspected the requisite number of electric facilities. Additionally, at the end of the five-year inspection cycle, the officer shall certify that all of the utility's electric facilities have been inspected at least once.

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- 8.6 The annual reporting and certification is required by February 15 of each year. In addition to certifications, it shall address the following:
- 8.6.1 Details the results of stray voltage test results and inspections conducted over the 12-month period ending December 31 of the prior calendar year. (A separate report will be required for inspections from November 1 – December 31, 2008 to account for transition to calendar year reporting.)
 - 8.6.2 Addresses the performance mechanism contained in Section 10 of the PSC Order Adopting Changes to Electric Safety Standard effective December 15, 2008 (December 15, 2008 Order).
 - 8.6.3 Contain certification describe in 8.3, 8.4 and 8.5 of this section.
 - 8.6.4 Contain a breakdown of the voltage findings in a tabular format as detailed in Attachment 1 of the December 15, 2008 Order; for all findings that result in a reading of 1 V or more after completion of mitigation efforts, a detail report of company efforts shall be provided.
 - 8.6.5 Contain a breakdown of the shock reports received from the public as detailed in Attachment 2 of the December 15, 2008 Order.
 - 8.6.6 Discussion of the analysis undertaken on the causes of the stray voltage within the Company’s electric system, the conclusions drawn there from, the preventative and remedial measures identified, and the Company’s plan to implement those measures.
 - 8.6.7 Description of the priority levels used to gauge the severity of a deficiency, including repair timeframes, and details the requirements for training personnel to properly identify and categorize the deficiencies.
 - 8.6.8 Contain a breakdown of facilities to be inspected, unique inspection conducted per year, and the cumulative number of unique inspections conducted to meet the five year requirement.
 - 8.6.9 Contain a breakdown of the deficiencies found, permanent repair actions taken by year, whether a repair was completed within the required timeframe, and the number of deficiencies awaiting repair. This information should be provided on a yearly basis by priority level and by equipment groupings as detailed in Attachment 3 of the December 15, 2008 Order.
 - 8.6.10 Contain a review and analysis of the inspection results. Identifying areas of concern along with remedial actions or future plans to alleviate inadequacies in current program assets.
 - 8.6.11 Description of the quality assurance program along with the results from quality assurance activities conducted during the year.
 - 8.6.12 Any additional information that is pertinent to the issues addressed by the safety standards should also be included.

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- 8.7 The Company shall file reports on their mobile stray voltage testing with the Secretary of the New York PSC within 45 days after completion of the mobile testing or February 15, 2011, whichever is earliest, and in each subsequent year. The filing shall include the historic results and costs associated with the manual test program in each area listed in Section 1.5 of this procedure.
- 8.8 The Company is required by the December 15, 2008 Order to have independence in the quality assurance program required by the order. The management and personnel performing the quality assurance activities shall be separate from those performing the required stray voltage testing and inspection activities.
- 8.9 The Company shall maintain its written certification and other documentary proof of its testing at its' Albany, Buffalo, and Syracuse office facilities. These documents shall be made available to the public for review upon request.

9.0 MASSACHUSETTS REPORTING REQUIREMENTS

- 9.1 National Grid shall submit an annual report that includes the following:
 - 9.1.1 Annual reports that list inspection and testing data, including number of inspections conducted by equipment type.
 - 9.1.2 Number of equipment elevated voltage events detected by inspection personnel versus call-ins or notification by third parties.
 - 9.1.3 Variance reports on current year inspection targets.
 - 9.1.4 Equipment elevated voltage events detected on equipment that is not included in equipment elevated voltage equipment inspection schedules (which will enable the DTE to determine if the company is inspecting and testing the correct equipment).
 - 9.1.5 Number of exceptional or non-routine events that required reporting to OSHA or other government organizations due to injuries or other substantive impacts

10.0 Rhode Island Reporting Requirements

- 10.1 National Grid shall submit an annual report that includes the following in a searchable form:
 - 10.1.1 Event record number
 - 10.1.2 Location of testing
 - 10.1.3 Date and time of testing
 - 10.1.4 Company or customer asset
 - 10.1.5 Failed equipment type
 - 10.1.6 Voltage recorded
 - 10.1.7 Personal injuries to members of the public, pets or property damage

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- 10.1.8 Any other equipment involved and age
- 10.1.9 Prior incidents at this location in the past five years
- 10.1.10 Corrective actions taken at the location and date taken
- 10.1.11 Number of customers if service is interrupted while making repairs
- 10.1.12 Duration of interruption
- 10.1.13 Summary of investigation into cause of the incident
- 10.1.14 Number of calls to the company “shock” line
- 10.1.15 Total repair costs by Contact Voltage Area
- 10.1.16 All information as provided for in Section 7.3

The Company will provide a summary of the above information as part of the report. In addition, the Company will include a recommendation for which specific CVAs will be tested the following year, whether there are any recommended changes to the CVAs and whether there are any advances in technology for detection of elevated voltages.

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11.0 TYPE OF EQUIPMENT - APPENDIX A

TYPE	CODE	EQUIPMENT DESCRIPTION
Distribution	910	Pole
	911	Regulator
	912	Sectionalizer
	913	Recloser
	914	Ground
	915	Guy
	916	Riser
	917	Switch Handle Mechanical Operated
	929	Distribution – Other (use comments)
Transmission	930	Pole
	931	Tower
	932	Guy
	933	Ground
	934	Riser
	935	Switch Hand Mechanical Operator
	949	Transmission – Other (use comments)
Underground	950	Handhole
	951	Manhole
	952	Switchgear
	953	Transformer
	954	Vault – Cover/Door
	969	Underground – Other (use comments)
Street Light	970	Handhole
	971	Standard
	979	Street light – Other (use comments)
Customer Street Light/Other	980	Handhole
	981	Standard
	989	Customer SL/Other – Other (use comments)
Traffic Control	990	Handhole
	991	Standard
	992	Control Box
	993	Pedestrian Crossing Pole
	999	Traffic control – Other (use comments)

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12.0 REVISION HISTORY

<u>Version</u>	<u>Date</u>	<u>Description of Revision</u>
1.0	04/01/11	This document supersedes document dated 08/17/09.
2.0	09/30/13	This document supersedes document dated 04/01/11.

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