

July 28, 2017

BY HAND DELIVERY AND ELECTRONIC MAIL

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

RE: Docket 4237 - National Grid 2017 Contact Voltage Annual Report

Dear Ms. Massaro:

Pursuant to R.I. Gen. Laws § 39-2-25 and the Rhode Island Public Utilities Commission's (PUC) Order No. 20950 in Docket 4237, I have enclosed The Narragansett Electric Company's¹ 2017 Contact Voltage Annual Report.

The Annual Report includes the following nine sections:

- Section 1: Background and summary;
- Section 2: Summary of the Company's surveying and testing results of the fourteen designated contact voltage risk areas (DCVRAs) for the period of August 7, 2016 to August 19 2016;
- Section 3: Contact Voltage Program costs;
- Section 4: Details regarding calls to the Company's Shock Line;
- Section 5: Copy of the Company's current emergency operating procedure (EOP)-G016;
- Section 6: Additional information on the Company's total harmonic distortion (THD) pilot program results;
- Section 7: The Company's recommendation for the percentage of DCVRAs to be completed in the sixth year of the program;
- Section 8: Summary of the Company's latest understanding of the current state of electrical standards and mobile equipment technology; and

¹ The Narragansett Electric Company d/b/a National Grid.

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- Section 9: Summary of the Company's Recommendations for the FY 2018 Contact Voltage Program.

As noted in the enclosed Annual Report, in January 2013, the Company awarded its first three-year contract to Premier for the FY 2013, FY 2014, and FY 2015 mobile surveys. In October 2015, the Company awarded a new four-year contract to Willbros, now TRC, for the FY 2016, FY 2017, FY 2018, and FY 2019 mobile surveys. The next request for proposals for the contract will be for the FY 2020 mobile survey.

Thank you for your attention to this filing. If you have any questions, please contact me at 781-907-2121.

Very truly yours,



Raquel J. Webster

Enclosure

cc: Docket 4237 Service List
Steve Scialabba
Leo Wold, Esq.

Certificate of Service

I hereby certify that a copy of the cover letter and any materials accompanying this certificate was electronically transmitted to the individuals listed below.

The paper copies of this filing are being hand delivered to the Rhode Island Public Utilities Commission and to the Rhode Island Division of Public Utilities and Carriers.



Joanne M. Scanlon

July 28, 2017

Date

**Docket No. 4237 – Commission’s Proceeding Relating to Stray
and Contact Voltage Pursuant to Enacted Legislation
Service List updated 7/27/17**

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The Narragansett Electric Company
d/b/a National Grid

**Rhode Island
2017 Contact Voltage Annual
Report**

Submitted to:
Rhode Island Public Utilities Commission
RIPUC 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.
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.

Section 1

Background and Summary

Background and Summary

On June 6, 2012, the Rhode Island Contact Voltage statute, R.I. Gen. Laws § 39-2-25, was signed into law. That statute directed the Rhode Island Public Utilities Commission (PUC) to establish a contact voltage detection, repair, and reporting program, which would be applicable to National Grid.¹ On November 9, 2012, the PUC issued an order (Program Order)² approving the Company's amended contact voltage program (Contact Voltage Program). The Program Order established thirteen (13) 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 right-of-ways identified within these DCVRAs.

On February 1, 2013, the PUC issued a subsequent order (Compliance Order)⁴ that directed the Company to complete its initial testing and surveying of all thirteen (13) 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 (Contact Voltage Annual Report) by no later than September 1, 2013. The Contact Voltage 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. The Compliance Order also required the Company, after the findings and results of its survey and testing were reviewed, to provide the

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

² Written Order No. 20871 (issued on November 9, 2012 in Docket No. 4237).

³ The initial 13 DCVRAs include Newport, Pawtucket, Woonsocket, and 10 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 DCVRA.

⁴ Written Order No. 20950 (issued on February 1, 2013 in Docket No. 4237).

PUC with a recommendation of the specific DCVRAs to be surveyed and tested in the next year of the program. Finally, the Compliance Order further directed the Company to keep the PUC apprised of any advances in elevated voltage mobile technology as part of its Contact Voltage Annual Report.

The PUC directed that the Contact Voltage Annual Report must be provided in Excel or searchable PDF format and must include the information below by DCVRA.⁵ Exhibit 1 provides a searchable Excel 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)*)
14. The date when corrective action was taken and the date on which 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

⁵ Program Order at 28-29.

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

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 percent to be tested in the next year (*Section 7*); and
20. Any updates the Company discovered concerning the standards (IEEE) and advances in equipment technology (*Section 8*)

On March 31, 2014, the PUC approved the Company's FY 2013 Contact Voltage Annual Report in Docket No. 4237-A and subsequently issued an order (First Annual Report Order)⁹ that amended the Company's Annual Contact Voltage Report to include:¹⁰

21. The addition of a section of Westerly as a fourteenth DCVRA (*Section 2*)
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*)

On December 16, 2014, the PUC approved the Company's FY 2014 Contact Voltage Annual Report in Docket No. 4237 and subsequently issued an order (Second Annual Report Order)¹¹ that directed the Company's Contact Voltage Annual Report to address the following:¹²

⁷ Program Order at 28-29, Compliance Order at 8-9.

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 4) to include section 7.3, which includes the back-up information applicable for mobile elevated voltage testing to be included in the Annual Report.

⁹ Written Order No. 21414 (issued on March 31, 2013 in Docket No. 4237-A).

¹⁰ First Annual Report Order at 8-9.

¹¹ Written Order No. 21780 (issued on December 16, 2014 in Docket No. 4237).

¹² Second Annual Report Order at 6.

26. Implement follow-up scans in DCVRAs where remediation work was completed before the next annual mobile survey to verify that the objects found and repaired were 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*)

Similar to last year's Contact Voltage Annual Report, the Company has incorporated these modifications into the charts and exhibits within this filing.

Additionally, on March 14, 2016, the PUC approved the Company's FY 2015 Contact Voltage Annual Report in Docket No. 4237, and subsequently issued an order (Third Annual Report Order)¹³ that approved a modified mobile testing schedule proposed by the Company, where mobile surveying and testing will now occur in the April-June timeframe.

Section 2 of the Contact Voltage Annual Report provides a summary of the Company's surveying and testing results of the fourteen (14) DCVRAs for the period of April 1, 2016 to March 31, 2017. Section 3 provides a preliminary summary of the aggregate costs of the Contact Voltage Program (#15 above). Section 4 provides a fiscal year list 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 4). Section 6 provides additional information on the results of the Company's total harmonic distortion (THD) pilot program, which the PUC approved in the First Annual Report Order. Section 7 includes the percentage of DCVRAs to be completed in the fifth year of the program (#18 and #19 above). Section 8 provides the current state of electrical standards and elevated voltage mobile

¹³ Written Order No. 22357 (issued on March 14, 2016 in Docket No. 4237).

equipment technology (#20 above). Finally, Section 9 provides the Company's recommendations for the FY 2018 Contact Voltage Program.

Section 2

Survey and Testing Results

1. Mobile Survey and Testing Results

In compliance with the First Annual Report Order, TRC (Formerly Willbros Engineers (U.S.), LLC. (Willbros), which previously performed mobile contact voltage testing under its subsidiary, Premier Utility Services, LLC (Premier), conducted the surveying and testing of all fourteen (14) DCVRAs over the period of August 7, 2016 to August 19, 2016. TRC conducted all surveying and testing at nighttime to include the testing of street lights. In total, the surveying and testing of all fourteen (14) DCVRAs covered approximately 134.2 miles.¹⁴ The Company had underground crews and inspectors available to guard any elevated voltage findings discovered during the surveying and testing until such areas could be made safe. When an elevated voltage condition of 4.5 volts or greater was found and verified, the Company followed proper Guarded – Made Safe actions. 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 three (3) 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

¹⁴ The 134.2 miles includes all mileage driven to survey. This includes both sides of a street, not simply linear mileage.

6, although not considered hazardous to the public, as part of the testing, the Company also remediated four (4) events where the total harmonic distortion was greater than 10 percent.

Eight (8) mobile events were recorded during the mobile scanning survey having 1 volt or greater. These findings were down from the twenty-six (26) mobile events recorded during the FY 2016 mobile survey, and the nineteen (19) mobile events recorded during the FY 2015 mobile survey.

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 FY 2017 mobile survey. Of the eight (8) mobile events that were recorded during the mobile survey having 1 volt or greater, one (1) was found and documented as having elevated voltage at or above 4.5 volts, and seven (7) were found and documented as having elevated voltage below 4.5 volts. In each of these events, the Company took immediate remedial action by disconnecting the asset, placing protective barriers, and/or repairing the asset. All of the Company's assets that registered greater than 1 volt were permanently repaired between August 23 2016 and August 24, 2016.

Table 1
Mobile Events by DCVRA

DCVRA	Dates Tested	Estimated Investigatory Mobile Survey Stops	Mobile Events	Readings < 1 Volt	Readings > 1 Volt but < 4.5 Volts		Readings >= 4.5 Volts	
				Customer and Company Asset	Customer Asset	Company Asset	Customer Asset	Company Asset
PROVIDENCE								
College Hill	8/14/16-8/15/16	18	1	0	1	0	0	0
Downtown	8/11/16-8/19/16	48	6	3	2	0	1	0
Elmwood	8/8/16-8/9/16	12		0	0	0	0	0
Federal Hill	8/9/16-8/10/16	10	7	6	1	0	0	0
Lower So. Prov.	8/7/16-8/8/16	19	3	3	0	0	0	0
Olnyville	8/9/16-8/10/16	8		0	0	0	0	0
Smith Hill	8/15/16-8/16/16	15		0	0	0	0	0
Upper So. Prov.	8/8/16-8/9/16	13		0	0	0	0	0
Washington Park	8/7/16-8/8/16	10		0	0	0	0	0
West End	8/9/16-8/10/16	11	0	0	0	0	0	0
NEWPORT	8/18/16-8/19/16	32	9	8	0	1	0	0
PAWTUCKET	8/17/16-8/18/16	17	5	3	0	2	0	0
WESTERLY	8/18/16-8/19/16	6	1	1	0	0	0	0
WOONSOCKET	8/17/16-8/18/16	11		0	0	0	0	0
Total		230	32	24	4	3	1	0

As shown in Table 1 above, during the mobile survey, two hundred thirty (230) 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 a vast majority of these mobile events resulting in a finding of no actionable voltage on a conductive object or surface. Overall, many additional manual checks were made on objects and assets over the 13-day scanning period.

Table 2 below provides the same detail on mobile events as in Table 1, but by Asset Type. As shown in Table 2, streetlights are responsible for the majority of elevated voltage readings. This is consistent with the results from the FY 2013, FY 2014, FY 2015, and FY 2016 mobile surveys.

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 and Company Asset	Customer Asset	Company Asset	Customer Asset	Company Asset
Streetlight	32	24	4	3	1	0
Traffic Control Box		0	0	0	0	0
Private Lighting		0	0	0	0	0
Traffic Standard		0	0	0	0	0
No Parking Sign		0	0	0	0	0
Store Fronts		0	0	0	0	0
Other		0	0	0	0	0
Total	32	24	4	3	1	0

Table 3 below provides a comparison of the number of mobile events by voltage level, found in the FY 2016 and FY 2017 mobile surveys.

Table 3
Comparison of Number of Mobile Events FY 2016 to FY 2017

Number of Mobile Events	FY 2016	FY 2017
Readings less than 1 Volt	33	24
Readings Greater than 1 Volt but less than 4.5 Volts	14	7
Readings Greater than 4.5 Volts	12	1
Total	59	32

2. Manual Surveying and Testing Results

As previously noted, in the Second Annual Report Order, the PUC directed the Company to conduct additional testing as part of the Contact Voltage Program and to provide the results in the Contact Voltage Annual Report. This included (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.

On December 6, 2016, the Company conducted its post-mitigation manual testing of eight (8) company and customer mobile events from the FY 2016 mobile survey where repairs were completed. Five (5) of the mitigated repair shunt voltage readings¹⁵ for this post-mitigation

¹⁵ Exhibit 2, column (ah).

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. In Exhibit 2, columns (a) through (ac) were taken from Exhibit 1 in the FY 2015 Annual Contact Voltage Report filed with the PUC on June 30, 2015, and Columns (ad) through (aj) were from the testing performed on these same assets in the post-mitigation manual testing done on May 7, 2015.

Regarding the manual testing of random assets and objects, to perform its quality assurance audit, the Company selected a random sample of 981 Company and customer assets spread throughout the fourteen (14) DCVRAs. This sample size was based on a total population of approximately 5,000 Company-owned assets in the fourteen (14) DCVRAs, using a confidence level of 95% and a confidence interval of 0.004. These included Company assets such as manholes, handholes, street lights, and underground vaults. The quality assurance audit for FY 2017 found no instances of elevated voltage. Therefore, Exhibit 3 is not included in this report. Between December 7, 2016 and December 9, 2016, these 981 assets were audited by Company personnel, and the results revealed that no elevated voltage was found on 972 of these assets. Nine (9) of the 981 assets were found to be inaccessible to the Company and the public or not located in the field, and, as such, were not tested.

Section 3

Contact Voltage Program Costs

Contact Voltage Program Costs

The cost to perform the mobile survey, post-mitigation manual testing, and quality assurance manual testing in the fourteen (14) DCVRAs was \$221,720. In addition, the cost to repair Company locations identified during the FY 2016 contact voltage surveying and testing was \$6,495. These are shown by DCVRA in Table 4 below. The total costs for the FY 2016 contact voltage testing and repair were \$228,215. The Company will reconcile these costs as part of its FY 2016 Electric Infrastructure, Safety, and Reliability Plan Reconciliation Filing, which the Company will submit to the PUC on or before August 1, 2016.

**Table 4
Aggregate Contact Voltage Testing and Repair Costs**

DCVRA	Repair Costs (Company Locations)	Mobile Survey, Post-Mitigation Manual Testing, QA of Manual Testing
Newport	\$1,417	
Pawtucket	\$4,858	
College Hill		
Downtown		
Federal Hill		
Lower South Providence		
Smith Hill	\$220	
Woonsocket		
Total	\$6,495	\$221,720
Grand Total		\$228,215

Section 4

Shock Line Calls

Shock Line Calls

As previously noted, the Compliance Order directed the Company to report annual calls to its Shock Line. Shock Line calls to the Company record an event of elevated voltage reported by either the public or other entities such as another utility. For the period April 1, 2016 to March 31, 2017, the Company received two calls of elevated voltage to its Shock Line. The Company responded to these calls by testing for elevated voltage, mitigating conditions where necessary, and repairing facilities as needed. In addition, if the asset was customer-owned, the Company notified the customer and informed them of any actions the Company planned to take to remedy the issues. There were no reported personal injuries or damages to property from any of these incidents.

**Table 5
Shock Line Calls**

Date	Town	Street	Asset	Voltage Found	Owner	Injury
5/18/2016	West Warwick	Nolan St	Wood Pole	4 Volts	Company	No
10/13/2016	West Warwick	Carrie Ann Dr	Street Light	3 Volts	Company	No

In one call, a Verizon technician reported elevated voltage at 298 Washington Street in West Warwick. The Company found voltage of 4 volts on messenger at P1 Nolan St, West Warwick. Lineman bonded and repaired and measured 0 volts after repairs. In one call, the Company found elevated voltage in the ground behind a metal light post at 14 Carrie Ann Drive in West Warwick. Troubleman tested 3V in the ground behind the pole and zero volts on the pole. Any voltage under 5V is safe; however, this reading was still referred to engineering for review.

Section 5

Company EOP-G016

Company EOP-G016

There have been no additional updates or modifications to EOP-G016 since the FY 2015 Contact Voltage Annual Report that was filed with the PUC on June 30, 2015. Exhibit 4 of this filing includes the 2.0 version of EOP-G016, which was last updated and published on September 30, 2013.

Section 6

THD Pilot Program

THD Pilot Program

In the First Contact Voltage Annual Report Order, the PUC approved the continuation of the Total Harmonic Distortion (THD) pilot program, noting 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 to the Contact Voltage Program in future years. The THD pilot testing was performed as part of the fourth year of testing from October 26, 2015 to November 10, 2015. Under the THD pilot testing, during contact voltage testing, any voltage measures greater than 1 volt and less than 4.5 volts that had a THD of less than 10% would be considered contact voltage and treated accordingly. Specifically, these areas would be safeguarded from the public and permanent repairs would be made as needed. However, if the THD was greater than 10% and no visual defects were found, then no further action would be 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 are 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%
7	3	4

As shown above, the results of the THD pilot program indicate a total of seven (7) readings between 1 volt and 4.5 volts (Exhibit 1, Column l). Of that total, three (3) readings were below the 10% distortion level and, therefore, considered as contact voltage. Four (4) readings were greater than the 10% distortion level and, therefore, not considered as contact voltage. Three (3) of these readings occurred on Company-owned streetlights, where the Company took the appropriate Guarded – Make Safe actions.

Table 7 below provides the THD readings with distortion levels below 10% by Event ID (Exhibit 1, Columns (a)), DCVRA (Exhibit 1, Columns (d)), street/cross street location (Exhibit 1, Columns (g),(h)), the associated shunt voltage reading (Exhibit 1, Columns (l), initial THD reading (Exhibit 1, Columns (m)), and subsequent THD reading after the Company’s repairs (Exhibit 1, Columns (ac)).

Table 7*
THD Readings Below 10%

Event ID	DCVRA	Street	Shunt Voltage	THD Before	THD After
1	Providence-Zone 5-Lower South Providence	Broad St & Saratoga St	2.57	6.2	0
2	Providence-Zone 4-Federal Hill	Broadway & Pallas St	1.9	6.4	0
5	Providence-Zone 2-Downtown	Chestnut St & Elbow St	3.9	3.4	0.22
6	Providence-Zone 2-Downtown	Chestnut St & Bassett St	2.9	4.8	0.11
9	Providence-Zone 2-Downtown	Ship St & Richmond St	2.5	5.6	0
16	Providence-Zone 4-Federal Hill	Atwells St & Dean St	1.5	7.2	N/A
17	Providence-Zone 4-Federal Hill	Atwells St & Weeden St	1.2	7.5	N/A
20	Woonsocket	Truman Dr & Clinton St	1.6	2.4	0
22	Woonsocket	Clinton St & Cumming St	2.4	8.2	0
24	Westerly	Main St & Broad St	2.2	2.9	0

* Repairs for these events are described in Section 2.

Table 8 is the same as Table 7, but provides the THD readings with distortion levels greater than 10%.

Table 8*
THD Readings Above 10%

Event ID	DCVRA	Street	Shunt Voltage	THD Before	THD After
15	Providence-Zone 2-Downtown	College St & Benefit St	1.03	10.3	8.3
18	Pawtucket	Park St & Harris Ave	1.1	35.3	0.69
19	Pawtucket	Park St & S Union St	1.4	35.4	0
23	Woonsocket	Clinton St & Cumming St	2.3	11.6	0

* Repairs for these events are described in Section 2.

After reviewing the THD pilot program information and the overall mobile survey testing results for the past four years, the Company plans to continue using THD testing during the FY 2017 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 four years (nine (9) in 2014, twelve (12) in 2015, and fourteen (14) in 2016), the Company believes that the costs of THD testing are minimal and that THD testing will continue to 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

DCVRA Recommendation

In the Compliance Order, the PUC directed the Company to include in its Contact Voltage 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 Program.¹⁶ In preparing its recommendation, as discussed below, the Company relied on the results of its first four 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 does not recommend any changes to the current list of fourteen (14) DCVRAs.

Regarding surveying and testing for the sixth year, the Company proposes that it survey and test 20 percent of the DCVRAs in FY 2018 and 20 percent thereafter for FY 2019, FY 2020, FY 2021 and FY 2022 to complete 100% of the testing in a five-year period. If approved by the PUC, the Company will negotiate with the vendor as allowed for in the contract.

¹⁶ Compliance Order at 9.

Section 8

Standards and Equipment Update

Standards and Equipment Update

In its Compliance Order, the PUC directed the Company to continue monitoring advances in elevated voltage mobile technology and keep the PUC apprised of these efforts.¹⁷ On January 29, 2016, the Institute of Electrical and Electronics Engineers (IEEE) Standards Boards approved standard P1695, *Guide to Understanding, Diagnosing and Mitigating Stray and Contact Voltage*. A copy of this guide is currently with the Standards Publications Department pending editorial revisions and approval. As such, the IEEE has not officially published any final documentation or final recommendations on elevated voltage. In addition, the Company is not aware of any additional changes to mobile testing technology. In FY 2017, the Company plans to continue using its existing manual technology and chosen vendor mobile technology for the fifth year of the Contact Voltage Program.

In January of 2013, the Company awarded its first three-year contract to Premier for the FY 2013, FY 2014, and FY 2015 mobile surveys. In October of 2015, the Company awarded a new four-year contract to Willbros, now TRC, for the FY 2016, FY 2017, FY 2018, and FY 2019 mobile surveys. The next request for proposals for the contract will be for the FY 2020 mobile survey.

¹⁷ Compliance Order at 8.

Section 9

Company Recommendations

Company Recommendations

The Company makes the following recommendations for the FY 2018 Contact Voltage Program:

1. There has been a recent and ongoing shift in street light ownership from the Company to the Municipalities in the DCVRAs, which was not considered when the original Contact Voltage Order was written. Currently, the Company costs associated with executing the annual Contact Voltage program fall under the Electric ISR Plan, which is how the Company recovers the costs for this program. Due to shift in asset ownership, the Company would like to propose a new Contact Voltage Testing program that addresses completion of the required survey and test work as well as the reallocation of some of the program costs from the Company to the Municipalities.
2. As noted in Section 7, the Company is recommending that 20 percent of the DCVRAs be surveyed and tested for the FY 2018 mobile survey.

As noted in Section 6, the Company plans to continue using THD testing during the FY 2018 mobile survey. The Company/TRC would continue to perform the Contact Voltage Survey and Testing annually in the same 14 designated contact voltage risk areas (DCVRAs). To achieve 100% compliance, the Company/TRC will perform Contact Voltage Survey and Testing on 20% of assets annually in the DCVRAs over a five-year period. This is a change from 100% performed annually. This would result in the reduction of the time commitment to perform the work from two weeks annually to three days annually over a five year period.

In compliance with the March 3, 2017 PUC Open Meeting directive that the Company in this docket propose a new contact voltage testing program that allocates the appropriate costs of

the mobile testing to those municipalities that now own the majority of streetlight assets in their community, in mid-July of 2017, the Company coordinated a discussion with the City of Providence and reached agreement on the following proposal:

The Company and Municipalities will work together to determine mutually agreed upon Contact Voltage Survey and Testing dates. The Company/TRC will perform the contact voltage survey and testing. Contractor(s) hired by Municipalities to perform repair/mitigation work will shadow the Company/TRC performing the survey and testing so they are available to immediately mitigate any elevated voltage findings discovered during the surveying and testing. Municipality-hired Contractor(s) will then directly invoice the Municipalities for any and all costs associated with mitigation efforts.

The Company also reviewed this proposal with the Rhode Island Division of Public Utilities and Carriers.

The Company will perform post-mitigation manual testing, manually testing the areas where previous remediation work was completed on the prior year's mobile survey to ensure that the repairs were addressed on assets that are company owned. Currently, the Company is performing post-mitigation manual testing on both company and customer owned assets.

The Company will no longer perform post-mobile survey audit testing to spot verify the accuracy of the mobile technology. Historical quality assurance audits for this program have found no instances of elevated voltage.