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September 5, 2024

VIA ELECTRONIC MAIL AND HAND DELIVERY

Stephanie De La Rosa, Commission Clerk
Rhode Island Public Utilities Commission
89 Jefferson Boulevard
Warwick, RI 02888

RE: Docket No. 4237 – Rhode Island Energy’s 2024 Contact Voltage Annual Report

Dear Ms. De La Rosa:

On behalf of The Narragansett Electric Company d/b/a Rhode Island Energy (the “Company”), attached please find the Company’s 2024 Contact Voltage Annual Report (the “Report”). This Report is being filed in accordance with R.I. Gen. Laws § 39-2-25 and relevant contact voltage orders issued by the Public Utilities Commission (“PUC”) including the most recent order, Order No. 25121. The Company respectfully requests that the PUC find that the Report satisfies the requirements of R.I. Gen. Laws § 39-2-25 and all relevant PUC orders.

Thank you for your attention to this transmittal. If you have any questions or concerns, please do not hesitate to contact me at 401-784-4263.

Sincerely,

A handwritten signature in blue ink, appearing to read "Andrew S. Marcaccio".

Andrew S. Marcaccio

Enclosure

cc: Docket No. 4237 Service List

The Narragansett Electric Company
d/b/a Rhode Island Energy

Rhode Island Energy 2024 Contact Voltage Annual Report

Submitted to:

Rhode Island Public Utilities Commission
RIPUC Docket No. 4237

Submitted by:



Rhode Island Energy™

a PPL company

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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 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.

Term	Definition
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

Section 1 - 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 Rhode Island Energy.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

¹ The Narragansett Electric Company d/b/a Rhode Island Energy (Rhode Island Energy or Company).

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

³ The initial thirteen DCVRAs 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 DCVRA.

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

Company, after the findings and results of its survey and testing were reviewed, to provide the 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 following information for each mobile event recorded during testing:

1. A record number for each contact voltage event (*Exhibit 1, Column (a)*)
2. The date and time of the testing (*Exhibit 1, Columns (c)*)
3. The specific location of the testing (*Exhibit 1, Columns (f),(g),(h)*)
4. An identification of whether it was a Company or customer asset (*Exhibit 1, Column (l)*)
5. The type of the equipment that failed (*Exhibit 1, Columns (s)*)
6. The voltage recorded (*Exhibit 1, Columns (i),(j),(k)*)
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 (m)*)
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 (s)*)
11. The number of customers if service is interrupted (*Exhibit 1, Column (t)*)
12. The duration of the interruption (*Exhibit 1, Column (u)*)
13. A summary of the investigation into the cause of the incident (*Exhibit 1, Column (v)*); and
14. The date when corrective action was taken and the date on which repairs were made (i.e., temporary and final) (*Exhibit 1, Columns (d),(r)*)

⁵ Program Order at 28-29.

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

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

1. The aggregated costs of repair for each contact voltage event by DCVRA (*Section 3*)
2. The number of calls to the Shock Line (*Section 4*)
3. Any additional back-up information currently included in Section 5.3⁸ of the Company's current EOP-G016 (*Section 5 and Exhibit 3*)
4. A recommendation on whether any DCVRA should be added or modified with a specific rationale supporting the recommendation (*Section 7*)
5. A recommendation of which DCVRAs should comprise the 20 percent to be tested in the next year (*Section 7*); and
6. 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

1. The addition of a section of Westerly as a fourteenth DCVRA (*Section 2*)
2. The estimated number of mobile survey stops (*Section 2*)
3. A glossary and listing of terminology in the report (*Glossary of Terms*)
4. A summary of mobile survey events and readings (*Section 2, Table 1 and Table 2*); and
5. The inclusion of before and after readings for the Company's Total Harmonic Distortion (THD) pilot program (*Exhibit 1, Column (k) and Section 6, Table 7 and Table 8*)

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. The revised EOP (Version 3, attached as Exhibit 3) to include section 5.3, which includes the back-up information applicable for mobile elevated voltage testing to be include 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.

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

1. 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*)
2. 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*)¹³

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)¹⁴ 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, 2023, to March 31, 2024. Section 3 provides a preliminary summary of the aggregate costs of the Contact Voltage Program (#1 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 (#2 and #7 above). Section 5

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

¹² Second Annual Report Order at 6.

¹³ As noted in the Company's 2017 Contact Voltage Annual Report, which the Company filed with the PUC on July 28, 2017, the Company will no longer perform post-mobile survey audit testing to spot verify the accuracy of the mobile technology.

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

includes a copy of the Company's current EOP-G016 (#3 above and Exhibit 3).¹⁵ 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 FY25. (#4 and #5 above). Section 8 provides the current state of electrical standards and elevated voltage mobile equipment technology (#6 above).

¹⁵ In Section 5 of Exhibit 3, item 5.4.1 has changed from Narda 8950/10 Stray Voltage system to Electric Field Solutions Voltage Detection System.

Section 2

Mobile Survey and Testing Results

Section 2 - Mobile Survey and Testing Results

In compliance with the First Annual Report Order, Osmose Utilities Services, Inc. conducted the surveying and testing of 20% of previously established DCVRAs over the period of February 4, 2024, to February 8, 2024. Osmose conducted all surveying and testing at nighttime to include the testing of streetlights. In total, the surveying and testing covered approximately 95 miles. Rhode Island Energy was available to mitigate any elevated voltage findings discovered during the surveying and testing. If the site were customer-owned, the owner would be 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 measures 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. THD was determined by the use of a Fluke power quality clamp meter or a Fluke scope meter.

There were sixty- three (63) mobile events recorded during the mobile scanning survey having 1 volt or greater. Of the 63, five (5) were determined to have voltage less than 4.5 with a THD greater than 10. This finding is a decrease from the seventy-three (73) mobile events recorded during the FY 2023 mobile survey.

The chart below illustrates the mobile events recorded, since program inception, during the mobile scanning survey having 1 volt or greater.

Fiscal Year	# Mobile Events Recorded ≥ 1 Volt
2024	63
2023	73
2022	16
2021	21
2020	1
2019	0
2018	4
2017	8
2016	26
2015	19

Table 1 below summarizes the FY 2024 mobile survey and provides the dates of testing, number of estimated investigatory mobile survey stops, and number of mobile events by shunt voltage readings.

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
College Hill	2/5/2024	5	9	0	5	1	3	0
Elmwood	2/4/2024 - 2/5/2024	2	4	0	2	0	2	0
Downtown Providence	2/5/2024-2/8/2024	15	50	0	34	1	13	2
Total		22	63	0	41	2	18	2

As shown in Table 1, during the mobile survey, twenty-two (22) 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, and all these mobile events resulted in voltage readings that led to barricading the area, guarding the area, or immediate repair by Rhode Island Energy. Overall, many additional manual checks were made on objects and assets over the five-day scanning period.

Table 2 provides the same detail on mobile events as in Table 1, but by Asset Type. As shown in Table 2, there was a high volume of manhole and streetlight findings. However, these results are similar to the FY 2023 contact voltage results where streetlight and manholes were the most prevalent assets found to have contact voltage.

Table 2
Mobile Events by Asset Type

Asset Type	Mobile Events	Readings less than 1 Volt Customer and Company Asset	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	18	0	8	0	10	0
Fence	3	0	2	0	1	0
Sign Post	5	0	3	0	2	0
Manhole Cover	15	0	9	2	2	2
Handhole	2	0	1	0	1	0
Other	20	0	18	0	2	0
Total	63	0	41	2	18	2

Table 3 provides a comparison of the number of mobile events by voltage level, found in the FY 2023 and FY 2024 mobile surveys.

Table 3
Comparison of Number of Mobile Events FY 2023 to FY 2024

Number of Mobile Events	FY 2023	FY 2024
Readings less than 1 Volt	0	0
Readings Greater than 1 Volt but less than 4.5 Volts	24	43
Readings Greater than 4.5 Volts	49	20
Total	73	63

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 manually performing post mitigation testing in the areas where previous remediation work was completed before the 2024 mobile survey to ensure that the repairs were addressed. For FY 2023 the Company performed post mitigation testing and recorded the results. Table 4237 –Exhibit 2 FY 2024 provides those results. Eleven (11) company events were documented. The table provides the data of Asset Ownership, Investigation Summary of Cause, RIE Verification on Voltage, Repair Date, Type of Repair, Repair status, and shunt voltage results.

Section 3

Contact Voltage Program Costs

Section 3 - Contact Voltage Program Costs

The cost to perform the mobile survey, post-mitigation manual testing, and quality assurance manual testing in 20% of previously established DCVRAs was \$54,500. There were 3 repairs required during the FY 2024 contact voltage surveying and testing. However, the costs were included under the blanket emergency work order and cannot be sorted to summarize the costs of these repairs alone. The aggregate contact voltage testing and repair costs for each DCVRA are included in Table 4 below. The total cost for the FY 2024 contact voltage testing and repair was \$54,500. The Company will reconcile this cost as part of its FY 2024 Electric Infrastructure, Safety, and Reliability Plan Reconciliation Filing.

Table 4
Aggregate Contact Voltage Testing and Repair Costs

DCVRA	Repair Costs (Company Locations)	Mobile Survey, Post-Mitigation Manual Testing
Newport	0	
Pawtucket	0	
College Hill	0	x
Downtown Providence	0	x
Federal Hill	0	
Lower South Providence	0	
Smith Hill	0	
Woonsocket	0	
Westerly	0	
Elmwood	0	x
Total	\$0	\$54,500
Grand Total		\$54,500

Section 4

Shock Line Calls

Section 4 - 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 the either the public or other entities such as another utility. For the period October 27, 2023 to August 16, 2024 the Company received no calls of elevated voltage to its Shock Line.

Section 5

Company EOP-G016

Section 5 - Company EOP-G016

Exhibit 3 of this filing includes the 4.0 EOP-G016. There have been no updates to the guide since it was last updated on October 17, 2023.

Section 6

THD Pilot Program

Section 6 - 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 FY24 year of testing from February 4, 2024, to February 8, 2024.

**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%
43	38	5

After reviewing the THD pilot program information and the overall mobile survey testing results, the Company plans to continue using THD testing during the FY 2025 mobile survey cycle. 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

Section 7 - 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 previous 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.

¹⁶ Compliance Order at 9.

Section 8

Standards and Equipment Update

Section 8 - 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 P1695, *Guide to Understanding, Diagnosing and Mitigating Stray and Contact Voltage*. The 1695 guide revision has passed balloting, and the guide is now with the IEEE editors. The editing should be complete by 2024 and then the guide will go to publication. The recent changes include adding case studies, and information on troubleshooting swimming pool shocks. Efforts were made to eliminate redundancies and improve the flow of the document. No changes impacted the current test methods or process.

The Company is not aware of any additional changes to mobile testing technology. In FY 2024, the Company plans to continue using its existing manual technology and chosen vendor mobile technology for 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 five-year contract to Willbros, now TRC, for the FY 2016, FY 2017, FY 2018, FY 2019, and FY20 mobile surveys. In August of 2020, the Company awarded a new three-year contract to Osmose Utilities for the FY21, FY22, and FY23 mobile surveys. The Company awarded the FY24 contract to Osmose Utilities and will evaluate the results and make recommendations to continue using Osmose Utilities or another vendor for future mobile surveys.

¹⁷ Compliance Order at 8.

Section 9

Company Recommendations

Section 9 - Company Recommendations

Rhode Island Energy awarded the contract to Osmose Utilities. The annual cost of mobile scanning is expected to increase slightly in future years. The FY2024 mobile scans showed a decrease in mobile events compared to the FY 2023 Mobile events. The recommendation is to continue with testing 20 percent of the DCVRAs each year.

Over the past 5-years, there has been a fluctuation in the number of contact voltage findings. What remains consistent is that most of the findings are on streetlights. Per the RI PUC Order 24263, the Company was directed to notify municipalities that own streetlights of the increasing trend in mobile events. Providence was notified May 23, 2024, by email. An email was also sent August 21, 2024, following up on Providence repairs. Although the overall percentage of streetlights with contact voltage has decreased when compared to historical figures, streetlights remain one of the most common assets where contact voltage is measured. Rhode Island Energy will notify municipalities that own streetlights of this trend when the contact voltage scans are scheduled to be performed in those DCVRAs.

Fiscal Year	# Findings >1 volt	# Street Light Findings	% Street Light Findings >1 volt
2024	63	18	29%
2023	73	19	26%
2022	16	15	94%
2021	21	17	81%
2020	1	1	100%
2019	0	0	0%
2018	4	3	75%

Exhibit 1

Docket No. 4237 Exhibit 1 Elevated Voltage Mobil Survey Results

February 4, 2024, through February 8, 2024

Please see Excel version of Exhibit 1.


Exhibit 2

Post-Mitigation Manual Testing

Event ID	Parent Id	Work Order Date	Event Closed Time Stamp	Scan Type	Address	Cross Street	City	Voltage	Shunt Voltage	Third Harmonic	Structure	Structure Id	Ground	Latitude	Longitude	Asset Owner	Work Order #	# of Customers Interrupted	Duration of Interruption	Investigation Summary of Cause	>= 4.5 Volts	RIE Verification Voltage	Repair Crew	Repair Date	Type of Repair	Mitigated Repair Voltage	Repair Status	Shunt Voltage Category
00009		12/13/2022 3:18	12/13/2022 4:17	122	120 ATWELLS AVE	BRADFORD ST	FEDERAL HILL	79.3	75.3	1	MANHOLE COVER	ELECTRICAL	GUIDE WIRE	41.8233	-71.422	Company	90000150871			Lead Cable burned in duct from HH in-front-of 126 Atwells Ave to MH 1509		18V		13-Dec	De-energize and remove lead cable.	0	Complete	>25 Volts
00016	00009	12/13/2022 3:18	12/13/2022 4:17	122	120 ATWELLS AVE	BRADFORD ST	FEDERAL HILL	3.7	1.4	2.5	MANHOLE COVER		GUIDE WIRE	41.8233	-71.422	Company	90000150871			Lead Cable burned in duct from HH in-front-of 126 Atwells Ave to MH 1509		18V		13-Dec	De-energize and remove lead cable.	0	Complete	1-4.4 Volts
00023	00009	12/13/2022 3:18	12/13/2022 4:17	122	120 ATWELLS AVE	BRADFORD ST	FEDERAL HILL	22.7	21	1.6	MANHOLE COVER		GUIDE WIRE	41.8233	-71.422	Company	90000150871			Lead Cable burned in duct from HH in-front-of 126 Atwells Ave to MH 1509		18V		13-Dec	De-energize and remove lead cable.	0	Complete	4.5 - 24.9 Volts
00032	00009	12/13/2022 3:18	12/13/2022 4:17	122	119 ATWELLS AVE	BRADFORD ST	FEDERAL HILL	32.1	27.2	1.5	MANHOLE COVER	ELECTRICAL	GUIDE WIRE	41.8233	-71.422	Company	90000150871			Lead Cable burned in duct from HH in-front-of 126 Atwells Ave to MH 1509		18V		13-Dec	De-energize and remove lead cable.	0	Complete	>25 Volts
00045	00009	12/13/2022 3:18	12/13/2022 4:17	122	119 ATWELLS AVE	BRADFORD ST	FEDERAL HILL	5.5	4.1	1	MANHOLE COVER		GUIDE WIRE	41.8233	-71.422	Company	90000150871			Lead Cable burned in duct from HH in-front-of 126 Atwells Ave to MH 1509		18V		13-Dec	De-energize and remove lead cable.	0	Complete	1-4.4 Volts
00058	00057	12/14/2022 0:15	12/14/2022 0:23	122	351 ATWELLS AVE	SUTTON ST	FEDERAL HILL	44.9	16.4	2.4	ACCESS HATCH		STORM DRAIN	41.8238	-71.4296	Company	90000150871			Abandoned lead service carrying voltage on the jacket.		44		12/14/2022	De-energized service.	0	Complete	4.5 - 24.9 Volts
00062	00057	12/14/2022 0:15	12/14/2022 0:23	122	351 ATWELLS AVE	SUTTON ST	FEDERAL HILL	2.1	2	2.6	MANHOLE COVER	ELECTRICAL	STORM DRAIN	41.8238	-71.4296	Company	90000150871			Abandoned lead service carrying voltage on the jacket.		44		12/14/2022	De-energized service.	0	Complete	1-4.4 Volts
00068	00067	12/14/2022 2:25	12/14/2022 2:27	122	621 EDDY ST	DUDLEY ST	SOUTH PROVIDENCE	1.7	1.6	8.6	MANHOLE COVER		HYDRANT	41.8112	-71.4072	Company	90000150871			Seperated neutral connection		0		12/14/2022	Repaired neutral connection	0	Complete	1-4.4 Volts
00069	00067	12/14/2022 2:25	12/14/2022 2:27	122	621 EDDY ST	DUDLEY ST	SOUTH PROVIDENCE	1.2	1.1	8.9	MANHOLE COVER		HYDRANT	41.8112	-71.4072	Company	90000150871			Seperated neutral connection		0		12/14/2022	Repaired neutral connection	0	Complete	1-4.4 Volts
00071	00070	12/14/2022 2:57	12/14/2022 3:03	122	OPP 593 EDDY ST	BORDEN ST	SOUTH PROVIDENCE	1.2	1.1	62.8	MANHOLE COVER	ELECTRICAL	METAL POST	41.8121	-71.407	Company	90000150871			Seperated neutral connection		0		12/14/2022	Repaired neutral connection	0	Complete	1-4.4 Volts
00074		12/15/2022 21:48	12/15/2022 21:50	122	1920 WESTMINSTER ST	BOUGH ST	OLNEYVILLE	2.8	2.6	1.4	MANHOLE COVER	ELECTRICAL	MANHOLE	41.8167	-71.4422	Company	90000150871			Seperated neutral connection		0		12/15/2022	Repaired neutral connection	0	Complete	1-4.4 Volts

Exhibit 3

RIE-EOP G016

 Rhode Island Energy™ <small>a PPL company</small>	ELECTRIC OPERATING PROCEDURE	Doc. # RIE-EOP G016
	GENERAL	Page 1 of 16
	Equipment Elevated Voltage Testing	Version 4.0 – 10/17/2023

INTRODUCTION

The purpose of this procedure is to outline the requirements for the equipment elevated voltage testing on Rhode Island Energy Facilities in Rhode Island as required by:

1. 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.


PURPOSE

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

ACCOUNTABILITY

1. T&D Work Methods, Electrical Material & Design Standards
 - a. Update Procedure as Necessary
 - b. Provide personnel guidance and assistance as requested.
2. Operations – Inspection & Maintenance
 - a. Ensure the 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 qualified personal have been trained on performing equipment elevated voltage testing.
3. Quality Assurance Quality Control
 - a. QAQC Inspector shall randomly audit elevated voltage testing performed to ensure testing completeness and accuracy.
4. Equipment Elevated Voltage Inspector
 - a. Demonstrate the ability to perform equipment elevated voltage testing per this procedure
 - b. Demonstrate the ability to become proficient in the use of the appropriate database.
 - c. Perform walking patrols, collect information, edit data, and guard unsafe facilities.
 - d. Attend the equipment elevated voltage training program and demonstrate competency with the equipment.

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5. Learning & Development
 - a. Provide training upon request
6. Distribution Asset Management
 - a. Provide input into program revisions.
 - b. Ensure the equipment elevated voltage program as outlined in this EOP is implemented, budgeted, and sanctioned properly and timely.

REFERENCES

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)
Applicable Rhode Island Energy Safety Rules & Procedures
Testing Equipment Operation Instructions
NG EOP-DEF – EOP Definitions

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1.0 SAFETY REQUIREMENTS

- 1.1 All work shall be performed in accordance with:
 - 1.1.1 Rhode Island Energy Employee Safety Handbook
 - 1.1.2 Applicable Rhode Island Energy EOP's
- 1.2 All applicable and appropriate Personal Protective Equipment (PPE) shall be worn.
- 1.3 The employee in charge of the work shall conduct a written pre-job brief with the employees involved prior to the start of each job. Using the Job Brief Form as an aide, discussions for performing the work should include:
- 1.4 Minimum Approach Distances (MAD) to energized lines or exposed live parts shall be maintained.
- 1.5 Identify if a Process Hazard Assessment (PHA) is required. Refer to NG-EOP G037 "Process Hazard Analysis".
- 1.6 Identify if an ARC flash assessment is required. Refer to NG-EOP G035 "ARC Flash Awareness and Mitigation" and Work Methods Infonet site for Arc Flash Table to determine working distance and energy levels – see link below:
http://us3infonet/sites/eng_delivery_svcs/Pages/ArcFlashMitigation.aspx

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 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.
 - 2.2.2 The following equipment on wood distribution 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).

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- c. Down guy wire (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 Equipment elevated voltage testing at an annual rate of twenty-percent (20%), to be completed on a five-year cycle:

- a. Metallic manhole covers, vault covers and grates, junction box covers, handhole covers
- b. Pad-mounted transformers, secondary pedestals, and pad-mounted switchgears.

2.3.2 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).

2.3.3 The mobile surveys will be performed at an annual rate of twenty-percent (20%), to be completed on a five-year cycle

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

2.4 Daily Job Site Test Requirements

2.4.1 Each job site where Rhode Island Energy personnel or its contractors complete a work assignment:

- a. An equipment elevated voltage test shall be taken 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.


2.4.2 Exceptions

- a. Electric 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 Rhode Island Energy personnel will not be required.

2.5 Exemptions

2.5.1 See Section 2.7.1

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3.0 TEST EQUIPMENT

- 3.1 A hand held device (proximity detection unit) that is capable of detecting voltage from 5 to 600 VAC.
- 3.2 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.
- 3.3 The handheld devices utilized shall be certified by an independent test laboratory as being able to reliably detect voltages from 5-600 VAC. The following units have been certified:
 - 3.3.1 HD Electric Stray Voltage Detector model LV-5
 - 3.3.2 Fluke 85
 - 3.3.3 Fluke 87
 - 3.3.4 Fluke 170 series or equivalent
 - 3.3.5 Fluke 175
 - 3.3.6 Fluke 177
 - 3.3.7 Fluke 179
 - 3.3.8 Fluke 187
 - 3.3.9 Fluke 189
- 3.4 Mobile Contact Voltage Detection Equipment:
 - 3.4.1 Narda 8950/10 Stray Voltage System
 - 3.4.2 SVD2000 Stray Voltage Mobile Detector

4.0 TEST PROCEDURE

- 4.1 Job Safety Requirements
 - 4.1.1 At minimum, the following information shall be communicated to all personnel at the beginning of each shift for equipment elevated voltage testing:
 - a. Structures are never to be touched with a bare hand while performing the tests, only the proximity detector or meter probe is to be used to make contact with the facilities.
 - b. Appropriate PPE shall be worn.
 - c. Each individual needs to be aware of his/her surroundings at all times.
 - d. Make sure to observe all traffic before entering a street.
 - e. Traffic safety vest (DOT Compliant Class III) shall 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.
 - f. Obey all traffic control devices.

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g. When working in the street, face oncoming traffic whenever possible.

4.2 Measurements for detecting elevated voltages will be performed in accordance with the following:


4.2.1 Initial measurements for the presence of voltage shall be made using a certified proximity detection unit, refer to Section 3.3

- a. To verify the proper operation of the proximity detector, follow operating instructions for the particular unit being utilized, this is to be done daily.
- b. 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.

4.2.2 If voltage is detected, re-test using a portable AC voltmeter (The 500 ohm resistor is NOT used in this initial test):

- a. Measurements with a portable AC voltmeter shall be taken on clean bare metallic surface (structure, ground wire, etc.)
- b. When using a portable AC voltmeter, connection shall be made to suitable neutral or ground source with the common (black) lead.
 1. In locations where the neutral or ground point is at a distance in excess of the voltmeter lead length
 - i. The connection to the neutral/ground shall be made with up to 25' of # 16 stranded copper lead wire (covered).
 - ii. The other end of which shall be securely connected to the common (black) probe of the meter.
 - iii. 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
 - i. A metal rod shall be firmly embedded into the earth to a minimum depth of 6" to create a ground reference point for the measurement to be taken.
 - ii. 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 touch potential situation (3' to 4'.) On occasion

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longer leads may be necessary to find undisturbed earth (up to 25'.)

- c. The “live” meter (red) probe lead shall then be placed into contact with the structure under inspection to determine the voltage.
 1. Voltage readings greater than 30 volts AC 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.
- 4.2.3 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.
 - b. The equipment used is mounted to vehicles and detects contact voltage levels greater than 1 volt while driving at speeds of up to 25 mph near underground facilities.
 - c. 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.
- 4.2.4 Any positive indications by either mobile testing or hand held tools shall be followed up with voltage measurements on the target structures.
 - a. Voltage measurements shall be taken in accordance with Section 5.2.2 above.
 - b. 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.
- 4.2.5 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 use of a Fluke Power Quality clamp meter or a Fluke scope meter both of which have the ability to measure THD.


5.0 CORRECTIVE ACTION REQUIREMENTS FOR EQUIPMENT ELEVATED VOLTAGE FINDINGS

5.1 Manual Testing

5.1.1 Rhode Island


If equipment elevated voltage condition is found and verified by the Test Procedure in Section 4.0, the site is to be guarded by a person or a protective barrier until made safe by Company personnel or if municipally owned, made safe by the owner or company.

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- a. 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.**
- b. If the voltage measures greater than 4.5 volts and less than 8 volts:
 - i. The asset shall be guarded in person or by a protective barrier that prevents public contact.
 - ii. Contact your supervisor for required action. Sound judgment shall be utilized in this application.
- c. If the voltage measurement is greater than 8 volts:
 - i. It shall be guarded by an equipment elevated voltage inspector or a Company employee who has been trained to stand by on energized facilities.
 - ii. Immediate response is required using the notification in Section 5.3.

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5.2 Mobile Testing

5.2.1 Rhode Island Total Harmonic Distortion Pilot

Under the Total Harmonic Distortion (THD) pilot in Section 4.2.5, 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.

- a. These areas will be safeguarded from the public and permanent repairs will be made.
- b. If the total harmonic distortion is greater than 10% (no visual evidence of a problem upon review) **No further action is required.**

5.2.2 In the event of an elevated/contact voltage finding on an electric facility or a street light, 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.

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

5.3.1 Notification by location:

- a. New England Regional Control Center, South
 1. Ocean State (RI) 1-508-421-7885

5.3.2 Inform the System operator that this is an equipment elevated voltage call, and provide the following information:

- a. Inspector name, Company (if not Rhode Island Energy)
- b. Address where the problem is identified; include facility number, circuit number, ownership, type of equipment and unique ID.
- c. Voltage found and whether they are physically guarding or leaving the site after flagging and installing a protective barrier. Rhode Island Energy personnel or designee will be assigned to respond.


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

5.5 Permanent repairs to the equipment shall be made within 45 days of the occurrence, except as noted in Section 5.6

5.6 If permanent repairs cannot be made within 45 days due to extraordinary circumstances, the company shall periodically perform site visits to monitor the condition of the temporary repair.

5.7 The contractor and/or 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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5.8 Angel Guards

- 5.8.1 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.
- 5.8.2 Angel guards shall only be installed after the testing of the street light standard is complete and there is no indication of equipment elevated voltage above and 4.5 volts.
- 5.8.3 Repairs have been completed to correct the equipment elevated voltage.

5.9 The equipment elevated voltage inspector shall report any potentially hazardous conditions found on Rhode Island Energy facilities seen visually during the survey process.


5.10 Customer Owned Equipment

- 5.10.1 Where the Company finds equipment elevated voltage above the allowable thresholds and identifies its source as customer-owned equipment:
 - a. The Company shall guard the site and notify the customer or a responsible person, as appropriate, that a potentially hazardous situation exists.
 - b. The Company shall advise the customer or responsible person that the cause of the equipment elevated voltage shall be immediately remedied.
- 5.10.2 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.

6.0 EQUIPMENT ELEVATED VOLTAGE DATABASE

- 6.1 The equipment elevated voltage database will be populated with information that is collected by the inspector using a hand-held device. The database shall be easily searchable for information and reporting.

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- 6.2 The equipment elevated voltage inspector shall populate the following Information fields for manual testing:

Survey Date	Inspectors Name
Region	GPS Taken
District	Pre-load Match
Contractor	Equipment EV Test Required
GIS ID/Asset # (Unique ID)	Voltage Found Y/N
Facility Type	Voltage Measurement
Owner	Type of Equipment (Appendix A)
Feeder/Circuit	Immediate Action Taken
Line #	Person Notified
Tax District	Permanent Repair Date
Pole/Structure/Equipment ID	Type of Repair
Street Name	Person Responsible for repair (Employee ID)

- 6.3 Information fields required to be completed for facilities for mobile testing

Survey Date	Street Name
Region	GPS taken
District	Voltage Found Y/N
Contractor	Voltage Measurements
Facility Type	Type of Equipment (see Appendix A)
Owner	Immediate Action Taken
Pole/Structure/Equipment ID	Person Notified
Permanent Repair Date	Type of Repair

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7.0 Rhode Island Reporting Requirements

7.1 Rhode Island Energy shall submit an annual Contact Voltage Compliance report that includes the following in a searchable form:

- 7.1.1 Event record number
- 7.1.2 Location of testing
- 7.1.3 Date and time of testing
- 7.1.4 Company or customer asset
- 7.1.5 Failed equipment type
- 7.1.6 Voltage recorded
- 7.1.7 Personal injuries to members of the public, pets or property damage
- 7.1.8 Any other equipment involved and age
- 7.1.9 Prior incidents at this location in the past five years
- 7.1.10 Corrective actions taken at the location and date taken
- 7.1.11 Number of customers if service is interrupted while making repairs
- 7.1.12 Duration of interruption
- 7.1.13 Summary of investigation into cause of the incident
- 7.1.14 Number of calls to the company “shock” line
- 7.1.15 Total repair costs by Contact Voltage Area
- 7.1.16 All information as provided for in Section 6.3

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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8.0 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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9.0 EXCEPTION APPROVAL

- 9.1 It is recognized that situations may arise that are not covered by this procedure
- 9.2 When this occurs, an exception may be approved
- 9.3 The person in charge of the work shall
 - 9.3.1 Develop a work plan detailing
 - a. The need for an exception to the EOP
 - b. Additional safeguards to be employed
 - 9.3.2 Provide the work plan to and obtain approval from all of:
 - a. The manager in charge of the work
 - b. The manager of T&D Work Methods
 - c. A manager from Safety
 - 9.3.3 Alternatively approval may be obtained from a designee of any of the above
- 9.4 If agreement cannot be obtained at the manager level
 - 9.4.1 The request shall be forwarded to the Director levels
 - a. Director's may assign a designee
- 9.5 After approval is obtained.
 - 9.5.1 The work plan shall be reviewed with all workers who will participate in the job
 - a. All workers need to agree on the work plan
 - b. Document the exception on the job brief
- 9.6 T&D Work Methods shall publish a Memorandum documenting the approval
 - 9.6.1 A copy of the work plan shall be included
 - 9.6.2 Such memorandum shall be sent to all stakeholders and approvers
 - 9.6.3 The memo shall be stored for the record

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10.0 REVISION HISTORY

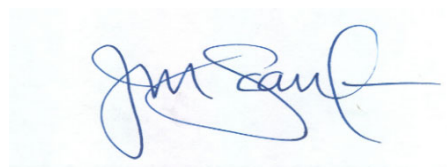
<u>Version</u>	<u>Date</u>	<u>Description of Revision</u>
1.0	04/01/11	This document supersedes document dated 08/17/09.
2.0	09/30/13	This document supersedes document date 04/01/11.
3.0	04/19/18	Revised the following: Formatting changes, broke paragraphs into subsections Accountability Section, Added "Quality Assurance Quality Control" group and removed "Network Strategy" and replaced with "Asset Management" Removed the Definitions Section Section 1 Added new "Safety Requirements" section 2.0 Renumbered section to revised listing 2.1.1 – 2.14 Revised language to include the percent rate of 100% 3.3.1 Added percent rate of 20% for underground testing in Rhode Island 4.11 Added percent rate of 20% for street light testing in Massachusetts 4.3.1 Added percent rate of 20% for underground testing in Massachusetts 7.3.1b.c Revised phone numbers for Northborough control center 7.8 Added "Angel Guard" Title and revised subsections 8.0 Database requirements, added language and formatted facilities list 13.0 7. Added new Exception Approval Section
4.0	10/17/2023	Updated document to remove NY and MA requirements. Updated document to replace National Grid with Rhode Island Energy.

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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

September 5, 2024
Date

**Docket No. 4237 –The Narragansett Electric Co. d/b/a Rhode Island Energy - Contact Voltage Compliance Report
Service List updated 7/24/2024**

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