



**CENTRAL HUDSON GAS & ELECTRIC
CORPORATION**

CONTACT (STRAY) VOLTAGE TESTING

And

FACILITY INSPECTIONS

Report

On the results of the

2022 Contact (Stray) Voltage Testing and Facility Inspections

February 15, 2023

Table of Contents

- I.** Background
- II.** Company Overview
- III.** Contact (Stray) Voltage Testing Program
- IV.** Facility Inspection Program
- V.** Company Facilities
- VI.** Annual Performance Targets
- VII.** Certifications
- VIII.** Analysis of Causes of Findings and Contact (Stray) Voltage
- IX.** Harmonics Analysis
- X.** Analysis of Inspection Results
- XI.** Inspection Driven Reliability and Efficiency Improvement Programs
- XII.** Quality Assurance
- XIII.** Other Pertinent Information

List of Appendices

Appendix 1: Summary of Energized Objects

Appendix 2: Summary of Shock Reports from the Public

Appendix 3: Summary of Deficiencies by Facility

Appendix 3A: Summary of Deficiencies and Repair Activity Resulting from the Inspection Process

Appendix 4: Temporary Repair Exceptions

Exhibit 1: Certifications

I. Background

The New York State Public Service Commission’s (“PSC” or “Commission”) Electric Safety Standards Order issued on January 5, 2005 (Case 04-M-0159), with subsequent revisions issued on July 21, 2005, December 15, 2008, March 22, 2013, January 13, 2015 and January 28, 2021 (collectively referred to herein as the “Safety Standards” or “Order”), requires electric utilities in New York State to test all of their publicly accessible overhead distribution facilities, underground residential distribution (URD) facilities, overhead and underground transmission facilities, and substation fences at least once every five years. The Order also requires all non-URD underground facilities, municipally owned traffic signals and streetlights to be tested for contact (stray) voltage annually. The Order requires utilities to inspect all utility-owned electric facilities every five years, except in the case of underground facilities, which a utility may opt to inspect as set forth in their asset management plan as per the revision to the Order issued on January 28, 2021. Central Hudson has opted to continue with its five-year inspection cycle for underground facilities.

This report describes Central Hudson Gas & Electric Corporation’s (“Central Hudson” or “Company”) contact (stray) voltage detection program and equipment inspection program conducted in 2022. Calendar year 2022 represents Year 3 of the five-year cycle for both contact (stray) voltage testing and equipment inspections for those assets requiring testing and inspection every five years.

II. Company Overview

Central Hudson is a regulated transmission and distribution utility that provides electric service to approximately 314,000 customers in a service area of approximately 2,600 square miles in eight counties of New York State’s Mid-Hudson River Valley. Central Hudson’s service territory extends north from the suburbs of metropolitan New York City to the Capital District of Albany.

Central Hudson owns substations having an aggregate transformer capacity of 6,918 MVA. Central Hudson’s electric transmission system consists of approximately 581 pole miles of line. The electric distribution system consists of approximately 7,149 pole miles of overhead lines and 1,678 trench miles of underground primary lines.

III. Contact (Stray) Voltage Testing Program

On March 22, 2013, the Commission issued a revision to the Order reducing the scope of contact (stray) voltage testing. As a result, poles (transmission and distribution), URD pads, and substation fences require a contact (stray) voltage test once every five years. Streetlights, traffic signals, and underground structures (manholes and pullboxes) must be tested annually. The target numbers in this report reflect the reduced scope of the testing requirements.

Pursuant to and in accordance with the Order, during the twelve-month period ending December 31, 2022, contact (stray) voltage testing was completed on:

- 1) Central Hudson's publicly accessible electric transmission and distribution facilities that are capable of conducting electricity;
- 2) All Company and non-Company owned metallic streetlights and traffic signals; and
- 3) All publicly accessible facilities within thirty feet of a component found to have an elevated voltage.

In addition, as required by the Order, Central Hudson:

- a. Immediately safeguarded and/or mitigated all contact (stray) voltages ≥ 1.0 V_{ac}. In instances where the contact (stray) voltage finding was determined to be caused by equipment not owned by Central Hudson, the area was immediately made safe and the municipalities, customers, or responsible parties associated with the premises were notified of the unsafe condition and the need for them to arrange for a permanent repair. Voltage findings that were caused by Central Hudson-owned facilities were immediately safeguarded and/or mitigated. Permanent repairs were completed within 45 days except under extraordinary circumstances such as storms or repairs having special requirements.
- b. Tested all publicly accessible structures and sidewalks within a 30-foot radius of the electric facility or streetlight where there was a voltage finding ≥ 1.0 V_{ac}.
- c. Responded to and investigated all shock incidents reported by the public and mitigated positive findings.

All facilities in Central Hudson's Contact (Stray) Voltage Testing Program that were targeted for testing in 2022 were visited. Of the 62,679 facilities visited, 493 locations did not have a contact (stray) voltage test performed because their electrically conductive appurtenances were deemed inaccessible. Inaccessible locations are defined in the Order as locations that have locked gates/fences, are located in dangerous terrain, or are located on limited access highways.

Contact (Stray) Voltage Mitigation Efforts

Central Hudson identified one (1) location with voltage readings greater than or equal to 1 V_{ac}. One (1) apparatus from one (1) source was found to have contact (stray) voltage and was mitigated:

- One (1) customer-owned streetlight in the Newburgh District had a voltage discovery of 44.05 V_{ac}. At the streetlight, Central Hudson located the splice box and isolated a hot leg that was touching the neutral wire. This mitigated the voltage to <1.0 V_{ac}.

IV. Facility Inspection Program

Central Hudson visually inspects 100% of its electric facilities within five years in compliance with the Order. This equates to inspecting approximately 20% of both overhead and underground facilities annually.

In accordance with the Order, Central Hudson uses the following severity levels to report deficiencies to the PSC and establish priority for repairs and scheduling:

Level I – Repair as soon as possible but not longer than one week. A Level I deficiency is an actual or imminent safety hazard to the public or poses a serious and immediate threat to the delivery of power. Critical safety hazards present at the time of the inspection shall be guarded until the hazard is mitigated.

Level II – Repair within one year. A Level II deficiency is likely to fail prior to the next inspection cycle and represents a threat to safety and/or reliability should a failure occur prior to repair.

Level III – Repair within three years. A Level III deficiency does not present immediate safety or operational concerns and would likely have minimum impact on the safe and reliable delivery of power if it does fail prior to repair.

Level IV – Condition found but repairs are not needed at this time. Level IV is used to track atypical conditions that do not require repair within a five-year time frame. This level should be used for future monitoring purposes and planning proactive maintenance activities.

In accordance with the PSC requirements, when a temporary repair is located during inspection or performed by the Company, best efforts are put forth to make a permanent repair of the facility within 90 days. Temporary repairs that remain on the system for more than 90 days are due to extraordinary circumstances such as storms, requiring extensive repair activity, or having special requirements. Central Hudson began tracking temporary repairs in the 2009 calendar year. Results from this tracking in 2022 have been compiled and described in Appendix 4 of this report.

V. Company Facilities

Based on the requirements of the Order, Central Hudson identified 62,679 individual electric facilities that required testing for the presence of contact (stray) voltage in 2022. These facilities were also inspected at the time of the contact (stray) voltage test. These facilities are broken down into four main categories as follows:

Distribution Overhead – Testing of distribution overhead with an operating voltage of 34.5 kV or less includes all utility-owned or joint use wooden poles with utility electrical facilities that are located on public thoroughfares or customer property, including backyards and alleys. There are approximately 209,725 distribution pole structures in Central Hudson’s service territory. Every five years, contact (stray) voltage tests are performed on all wooden poles with metallic attachments such as ground wires, ground

rods, anchor guy wires, riser pipes, or any electrical equipment within reach of the general public. Distribution overhead facilities are included in the facility inspection program.

Underground Facilities – Testing of underground facilities is comprised of both subsurface structures as well as above ground, pad-mounted structures. There are approximately 16,450 underground facilities that comprise Central Hudson’s system. Within this total are approximately 1,226 manholes and pullboxes and approximately 15,224 pad-mounted structures. Included in the underground facilities are padmount switchgear cases, padmount transformer cases, electric utility manhole covers, submersible transformer covers, electric utility handhole covers, network vaults and grates. Contact (stray) voltage tests are performed on all publicly accessible underground residential distribution facilities every five years. Contact (stray) voltage tests are performed on all publicly accessible non-URD underground facilities annually. These facilities are included in the facility inspection program.

Streetlights and Traffic Signals – Testing of streetlights and traffic signals includes all metal pole streetlights, traffic signals, and pedestrian crosswalk signals located on publicly accessible thoroughfares. There are approximately 6,113 metal pole streetlights and approximately 804 traffic signals within Central Hudson’s service territory. This total includes 187 metal pole streetlights owned by Central Hudson with the balance of the equipment owned by various municipalities. All contact (stray) voltage testing of streetlights is performed annually at night while the fixtures are energized. Pursuant to the Order, privately-owned area lights and streetlights are not included in the contact (stray) voltage testing program. All Company-owned streetlights are included in the facility inspection program.

Transmission Structures – Testing of transmission structures includes all structures, guys, and down grounds attached to the structures. There are approximately 9,070 individual structures that comprise Central Hudson’s transmission system. Transmission structures support circuit voltages of 69 kV and above. Transmission structures with distribution underbuild are included in this transmission category. Contact (stray) voltage tests are performed on all publicly accessible transmission structures every five years. Transmission structures are included in the facility inspection program.

Substation Fences – Testing of substation fences includes fencing on the outside of the substation. There are approximately 82 substation fences in Central Hudson’s territory. All substation fences are included in the contact (stray) voltage testing program.


VI. Annual Performance Targets

In compliance with the Order, Central Hudson met the annual performance target for contact (stray) voltage by testing approximately 20% of the publicly accessible electric facilities and 100% of streetlights, traffic signals, manholes, and pullboxes for the twelve-month period ending December 31, 2022.

In addition, Central Hudson met the performance target for facility inspections by inspecting approximately 20% of its electric facilities during the one-year period ending December 31, 2022 as defined in the Order.

The results are summarized in the tables as follows:

2022 Contact (Stray) Voltage Testing Results

	Total System Units Requiring Testing	Units Completed*	Percent Completed
Distribution Facilities	51,056	51,056	100%
Underground Facilities	3,301	3,301	100%
Non-URD	1,281	1,281	100%
Street Lights / Traffic Signals	6,917	6,917	100%
Substation Fences	11	11	100%
Transmission (69kV and Above)	1,394	1,394	100%
TOTAL	62,679	62,679	100%

*"Units Completed" includes a count of facilities tested plus those facilities deemed inaccessible (Please see Section III).

Facility Inspection Program Results

Category	Inspection Target Through 2022	Cumulative Total of Units Inspected 2020 - 2024 (Actual)
Overhead Distribution	N/A	61.82%
Overhead Transmission	N/A	50.98%
Underground (Non-URD)	N/A	59.87%
Pad-mounted Transformers	N/A	69.04%
Streetlights	100%	100%
System Total	54%	61.86%

5-Year Inspection Performance Summary

Overhead Distribution Facilities

Central Hudson performs inspections on overhead distribution facilities on a five-year cycle. In 2022, there were approximately 209,725 distribution poles in Central Hudson's system.

Inspection Year	Overhead Distribution Structures Inspected	% of Overall System Inspected (Yearly)	% of Overall System Inspected (Cumulative)
2020	37,190	17.73%	17.73%
2021	41,400	19.74%	37.47%
2022	51,056	24.34%	61.82%
2023	N/A	N/A	N/A
2024	N/A	N/A	N/A

Overhead Transmission Facilities

Central Hudson performs inspections on overhead transmission facilities on a five-year cycle. As of 2022, there were approximately 9,070 transmission poles in Central Hudson’s system.

Inspection Year	Overhead Transmission Facilities Inspected	% of Overall System Inspected (Yearly)	% of Overall System Inspected (Cumulative)
2020	1,781	19.64%	19.64%
2021	1,329	14.65%	34.29%
2022	1,514	16.69%	50.98%
2023	N/A	N/A	N/A
2024	N/A	N/A	N/A

Manholes and Pullboxes

Central Hudson performs inspections on manholes and pullboxes on a five-year cycle. As of 2022, there were approximately 1,226 manholes and pullboxes in Central Hudson’s system.

Inspection Year	Manholes and Pullboxes Facilities Inspected	% of Overall System Inspected (Yearly)	% of Overall System Inspected (Cumulative)
2020	227	18.52%	18.52%
2021	241	19.66%	38.17%
2022	266	21.70%	59.87%
2023	N/A	N/A	N/A
2024	N/A	N/A	N/A

Padmount Transformers

Central Hudson performs inspections on padmount transformers on a five-year cycle. As of 2022, there were approximately 15,224 padmounts in Central Hudson’s electric system.

Inspection Year	Padmount Transformers Inspected	% of Overall System Inspected (Yearly)	% of Overall System Inspected (Cumulative)
2020	4,252	27.93%	27.93%
2021	4,239	27.84%	55.77%
2022	2,020	13.27%	69.04%
2023	N/A	N/A	N/A
2024	N/A	N/A	N/A

Streetlights

Central Hudson performs inspections on Company-owned streetlights annually in conjunction with contact (stray) voltage testing. As technicians perform contact (stray) voltage testing, they also perform a visual inspection of the streetlights.

Inspection Year	Streetlights Inspected	% of Overall System Inspected (Yearly)	% of Overall System Inspected (Cumulative)
2020	187	100%	100%
2021	187	100%	100%
2022	187	100%	100%
2023	N/A	N/A	N/A
2024	N/A	N/A	N/A

VII. Certifications

Pursuant to Section 7 of Appendix A of the Order, the President or Officer of each utility with direct responsibility for overseeing contact (stray) voltage testing and facility inspections shall provide an annual certification to the Commission that the utility has, to the best of his or her knowledge, exercised due diligence in carrying out a plan, including quality assurance, that is designed to meet the contact (stray) voltage testing and inspection requirements, and that the utility has:

- Tested all of its publicly accessible electric facilities and streetlights/traffic signals, as referred to in the body of the February 15 Report, and
- Inspected the requisite number of electric facilities.

The certifications are attached as Exhibit 1 of this report.

VIII. Analysis of Causes of Findings and Contact (Stray) Voltage

All New York State utilities compile an inventory of all findings and report on the number of these findings each year. Section 1(f) of the January 13, 2015 Order defines a finding as “any confirmed voltage reading on an electric facility or streetlight \geq 1 volt measured using a voltmeter and 500-ohm shunt resistor.” Section 1(c) of the Order defines stray voltage as “voltage conditions on electric facilities that should not ordinarily exist. These conditions may be due to one or more factors, including, but not limited to, damaged cables, deteriorated, frayed, or missing insulation, improper maintenance, or improper installation.”

To distinguish between dangerous contact (stray) voltage and naturally occurring voltage, field forces use a handheld oscilloscope meter to classify these different types of voltages. By looking at the total harmonic distortion of a voltage waveform and the breakdown of the harmonics, in addition to the condition of the location, the proper actions can be taken.

If contact (stray) voltage is present, then the waveform will appear as a perfect 60 Hz sinusoidal wave with 10% or less total harmonic distortion. These voltages result from a variety of conditions including deterioration of conductors, age of equipment, exposure to the elements and various customer-related issues. These voltages should not exist on normally operating electric facilities and are considered to be contact (stray) voltages per Section 1(c) of the Order.

Section 3(h) of the Order requires “Mitigation shall be completed on any stray voltage findings.” Through the efforts of the contact (stray) voltage testing program, Central Hudson has been able to complete repairs to address these issues and mitigate the danger associated with these elevated voltages.

When examining a naturally-occurring voltage on a handheld oscilloscope, high harmonic content from different frequencies (generally 180 Hz and 300 Hz) will cause distortion in the voltage waveform. Causes of these voltages include but are not limited to naturally occurring neutral-to-earth voltages (as part of a multi-grounded wye power system), poor soil grounding conditions, imperfect load balancing between phases, single phase circuit spurs with high current loads, capacitive coupling, and proximity to transmission lines. Since all of these voltage sources are considered part of a normally operating electrical distribution system, they do not require mitigation per the Order.

Although not all findings are due to contact (stray) voltage, utilities are required to report on all findings, regardless of whether or not the voltage is within normal operating parameters. Inclusion of naturally occurring voltages in the findings gives the perception that there are more potentially hazardous voltage findings than actually exist. True hazardous voltages have been identified and mitigated through the contact (stray) voltage testing program.

In accordance with the PSC requirements, when a finding was discovered on an electric facility during contact (stray) voltage testing, the Company performed contact (stray) voltage testing on all publicly accessible structures and sidewalks within a minimum 30-foot radius of the electric facility or streetlight.

IX. Harmonics Analysis

Central Hudson has continued to apply the use of harmonics analysis to determine if voltages discovered in the field are dangerous contact (stray) voltage or naturally occurring/neutral to earth voltage (NEV) common in a normally functioning electric system. After analysis, the voltages can be classified into one of three categories. The following table (Table 1) depicts a breakdown of findings by asset class:

Table 1 - Category Classification Criteria

<u>Category One Voltage</u>	<u>Category Two Voltage</u>	<u>Category Three Voltage</u>
<ul style="list-style-type: none"> • Voltage is $\geq 1V_{ac}$ • Sinusoidal waveform • 60 Hz dominant • Total Harmonic Distortion is $<10\%$ THD 	<ul style="list-style-type: none"> • Voltage is $1V_{ac} - 4.5V_{ac}$ • Non-sinusoidal waveform • Is 180 Hz dominant • Total Harmonic Distortion is $>10\%$ THD 	<ul style="list-style-type: none"> • Voltage is $\geq 4.5V_{ac}$ • Non-sinusoidal waveform • Is 180 Hz dominant • Total Harmonic Distortion is $>10\%$ THD
<p>These voltages are considered contact (stray) voltage, which is hazardous and should not be present in a normally functioning electric system.</p>	<p>These voltages are considered non-hazardous Neutral to Earth Voltages and are considered part of a normally functioning electric system.</p>	<p>These voltages require additional field-testing and review to determine if the source is due to a system abnormality or if it is a result of a normally functioning electric system. Central Hudson attempts to mitigate these voltages at the time of discovery.</p>

Please note that Central Hudson mitigates all voltages in accordance with the Order.

Analysis of Findings

Since 2018, the documented accounts of dangerous contact (stray) voltage have been consistently less than 0.05% of the assets tested each year on Central Hudson’s electric system. The aggregate of the findings over the past five years shows that contact (stray) voltages comprise 31 of the 202 findings (15.35%), during this time period (see Table 3).

Contact (stray) voltage on Overhead Distribution accounts for 3.47% of the total voltage findings among all assets. Street and Traffic Light contact (stray) voltage accounts for 11.88% of the total findings over the past 5 years. There have been no findings of contact (stray) voltage in the Underground (Non-URD), URD, Transmission, and Substation Fence groups (see Tables 2 & 3).

Although there are fluctuations in the total number of category two voltage conditions, these naturally occurring conditions have accounted for 79.70% of the voltage findings from 2018-2022. Category two voltages fluctuate due to weather and load conditions. These voltages can be considered part of a properly functioning multi-grounded wye electric system and pose no threat to the public. There have been no findings of naturally occurring voltage in the Underground (Non-URD), Street and Traffic Light, and Substation Fence groups (see Tables 2 & 3).

In 2022, there were no instances of Category 3 voltage findings. Since 2011, Central Hudson has found only twelve (12) instances of Category 3 voltages on Central Hudson’s equipment.

By differentiating between dangerous contact (stray) voltage and naturally occurring voltages, field crews can be effectively dispatched to mitigate dangerous voltage conditions, ensuring the safety of the public while maintaining reliability of the system in a financially responsible manner.

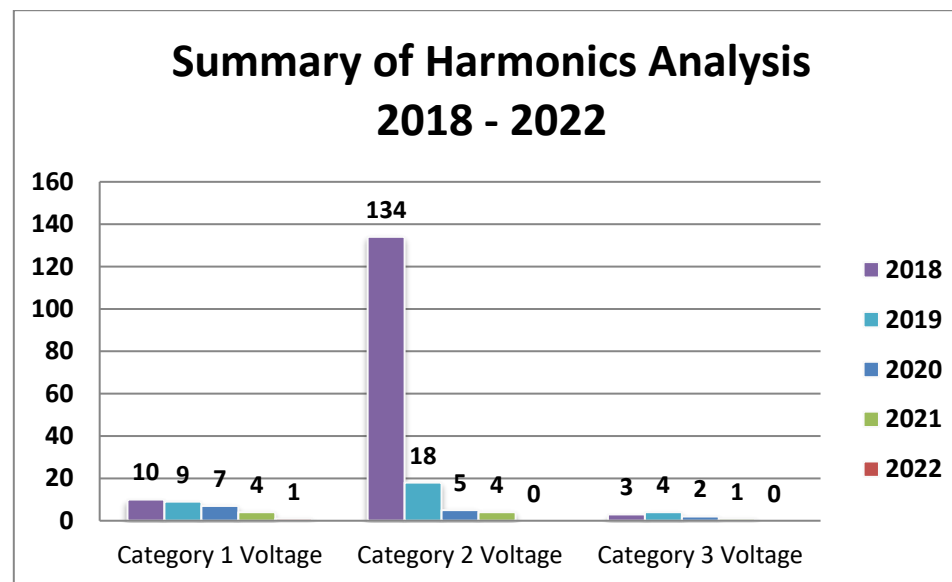
Table 2 - Summary of Findings by Asset Class

Asset Class	2018			2019			2020			2021			2022		
	Cat. 1	Cat. 2	Cat. 3	Cat. 1	Cat. 2	Cat. 3	Cat. 1	Cat. 2	Cat. 3	Cat. 1	Cat. 2	Cat. 3	Cat. 1	Cat. 2	Cat. 3
OH Poles	3	58	2	3	14	4	0	4	2	1	3	0	0	0	0
Non-URD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
URD (Pads)	0	0	0	0	3	0	0	1	0	0	0	0	0	0	0
SL & TS	7	0	0	6	0	0	7	0	0	3	0	0	1	0	0
Trans OH	0	76	1	0	1	0	0	0	0	0	1	1	0	0	0
Sub Fence	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	10	134	3	9	18	4	7	5	2	4	4	1	1	0	0

Table 3 - Summary of All Findings by Asset Class

Asset Class	Total Findings (2018 - 2022)		
	Cat. 1	Cat. 2	Cat. 3
Overhead Distribution	7	79	8
Underground (Non-URD)	0	0	0
URD (Pads)	0	4	0
Street and Traffic Lights	24	0	0
Transmission Overhead	0	78	2
Substation Fences	0	0	0
Total	31	161	10

Chart 1 - Summary of Harmonic Analysis



X. Analysis of Inspection Results

Discussion of Inspection Findings/Repairs

During the inspection process, two or more deficiencies can be reported at a single location during an inspection. Since there is no direct correlation between the number of deficiencies reported and the number of locations with deficiencies, this data has been tabulated separately.

As of January 1, 2022, Central Hudson fully transitioned off its previously-utilized 3rd-party managed inspection software (NextGrid) to a new internally-managed asset and inspection database System (CASCADE) for tracking deficiencies on transmission assets. The new system enhanced Central Hudson's asset management capabilities by allowing inspection findings to be associated to the specific assets they apply to rather than on a structure-level. This more detailed approach provides better visibility into the overall condition of a structure and offers enhanced capabilities related to asset analytics and tracking. As part of the implementation of the new CASCADE software system, adjustments were also made to enhance Central Hudson's Transmission Inspection Criteria, which has led to an increase in individual findings. Older outstanding conditions were evaluated against the new criteria and in some cases, updates were made to reflect an adjusted severity rating.

In 2022, the most common type of deficiencies found in Central Hudson's service territory were Level IV conditions, representing 5,013 out of the 8,760 total deficiencies found (57.22%). The three most common deficiencies at all severity levels involve the overhead distribution system. These deficiencies are: Broken Ground Molding (1,732; 34.55% of priority Level IV deficiencies), Rotten Poles (1,152; 32.31% of priority Level III deficiencies), and No Guy Guard (1,064; 21.22% of priority Level IV deficiencies).

Currently, Central Hudson is utilizing contract employees to help reduce the number of Level IV deficiencies. Targeted guy guard replacements are being completed by contract employees. To mitigate the findings of broken ground moldings, Central Hudson is utilizing contractor technicians to complete the repairs. Central Hudson also uses contractors to add pole tags where they are missing.

Trimming is performed over the entire service territory on a cyclical basis; however, the contract overhead inspectors also trim vines that are growing up into equipment that is not in contact with primary conductor or equipment at the time of the inspection. Contractor trimming crews or Company service crews are sent to assess and mitigate vine, trimming, and danger tree conditions that cannot be addressed by the contract overhead inspectors in areas not scheduled for routine trimming.

Overhead Distribution Structures

Table of Locations with Deficiencies for 2022

Locations Inspected	Locations w/ Deficiencies	% Locations w/ Deficiencies	% Locations w/ Deficiencies Requiring Repair in 1 year
51,056	5,377	10.53%	1.26%

Breakdown of Deficiencies for 2022

Priority Rating	Number of Deficiencies	% of Overhead Distribution Deficiencies Found
I	2	0.03%
II	99	1.54%
III	3,254	50.55%
IV	3,082	47.88%
Total:	6,437	100%

Overhead Transmission Facilities

Table of Locations with Deficiencies for 2022

Locations Inspected	Locations w/ Deficiencies	% Locations w/ Deficiencies	% Locations w/ Deficiencies Requiring Repair in 1 year
1,514	626	41.35%	2.72%

Breakdown of Deficiencies for 2022

Priority Rating	Number of Deficiencies	% of Overhead Transmission Deficiencies Found
I	0	0.00%
II	26	1.23%
III	224	10.62%
IV	1,860	88.15%
Total:	2,110	100%

Manholes and Pullboxes

Table of Locations with Deficiencies for 2022

Locations Inspected	Locations w/ Deficiencies	% Locations w/ Deficiencies	% Locations w/ Deficiencies Requiring Repair in 1 year
266	28	10.53%	3.57 %

Breakdown of Deficiencies for 2022

Priority Rating	Number of Deficiencies	% of Manhole and Pullbox Deficiencies Found
I	0	0.00%
II	1	2.70%
III	5	13.52%
IV	31	83.78%
Total:	37	100%

Padmount Transformers

Table of Locations with Deficiencies for 2022

Locations Inspected	Locations w/ Deficiencies	% Locations w/ Deficiencies	% Locations w/ Deficiencies Requiring Repair in 1 year
2020	84	4.16%	61.90%

Breakdown of Deficiencies for 2022

Priority Rating	Number of Deficiencies	% of Padmount Transformer Deficiencies Found
I	1	0.57%
II	52	29.55%
III	83	47.15%
IV	40	22.73%
Total:	176	100%

Streetlights

Table of Locations with Deficiencies for 2022

Locations Inspected	Locations w/ Deficiencies	% Locations w/ Deficiencies	% Locations w/ Deficiencies Requiring Repair in 1 year
187	0	0.00%	0.00%

Breakdown of Deficiencies for 2022

Priority Rating	Number of Deficiencies	% of Streetlight Deficiencies Found
I	0	N/A
II	0	N/A
III	0	N/A
IV	0	N/A
Total:	0	N/A

Over 98% of repairs are completed within their required timeframes. The exceptions are generally for Severity III findings where transmission rebuild projects are planned in the near future. Please see the footnotes to Appendix 3A for additional information.

XI. Inspection Driven Reliability and Efficiency Improvement Programs

Central Hudson has recognized the opportunity to use the inspection program as a means to help improve system reliability. Operations and Engineering have deployed “micro-surveys” to be completed by contracted technicians in line with contact (stray) voltage testing and inspection surveys. These micro-surveys were added to the existing inspection survey as a line item, and they are completed during the regular round of testing and inspections, eliminating the need for a second mobilization. The data that is collected during the survey is then aggregated and used to make a more efficient response plan based on what the goal is for each individual micro-survey. In the past, these surveys

have included inventories for cutouts and animal guards. Currently, surveys are performed for streetlights, pole rot, and third-party attachments.

Streetlights

While contractor technicians are on-site to perform inspections and testing on wooden poles with mounted streetlights, they also document the head type, body type, bulb type (when applicable), bulb wattage (when applicable), width (set back style only), and decorative arm (tear drop type only) associated with those streetlights. This information is stored and used to update the GIS system available to line crews when repairs are scheduled to ensure that the correct bulb/wattage is on the truck, thus saving a second mobilization.

Pole Rot

During the inspection survey, poles are probed with a screwdriver at grade by contractor technicians in order to check for rot around the base. Technicians will record the pole as “unsatisfactory” in the tablet if rot is suspected as a result of the probe test. A Central Hudson Field Supervisor will perform a site visit to confirm the preliminary assessment before recommending replacement. Central Hudson maintains a spending plan in the capital budget to replace any pole that is found to be rotten during the inspection process.

Third Party Attachments

During the inspection, contract inspectors also make note of non-Company attachments on the pole and count the number of through bolts, guy wires, and other attachments such as cameras and area lights. This information is compared to Company records and updated as needed.

XII. Quality Assurance

Central Hudson continues to utilize an external auditor to perform its QA/QC program to review the effectiveness and accuracy of the contact (stray) voltage testing and facility inspection programs and their associated activities. The external auditor reports directly to Central Hudson’s Internal Auditing Department and submits audit reports simultaneously to the Internal Auditing Department and the Program Manager for review. If there are any findings, an action plan is assembled to address the concerns identified by the external auditor. These audits have resulted in specific improvements to the various processes, which have contributed toward increasing program efficiency and accuracy as well as reducing potential for future errors. The QA/QC program calls for several types of audits and for constant feedback with respect to the data collection and processing. The various audits cover personnel training, field testing and inspection procedures and practices, testing and inspection records, and field trailing audits.

For 2022, four separate audits were completed: initial training (1), field-testing and inspection activities (2), and test data records (1). There is currently a comprehensive year-end audit for all 2022 records underway. The completed audits indicated that all


significant activities associated with the contact (stray) voltage testing and facilities inspection programs were conducted in accordance with established protocols.

XIII. Other Pertinent Information

Central Hudson participates with the other New York State Utilities and Department of Public Service Staff in discussions regarding both Contact (Stray) voltage Testing and Facility Inspections to ensure that the best operational, construction and maintenance practices are being utilized. Central Hudson attends the annual Jodie Lane National Conference for Contact (Stray) Voltage Detection, Mitigation and Prevention and participates in several other EPRI programs to improve the safety and reliability of its electric system.


Appendix 1: Summary of Contact (Stray) Voltage Findings – 2022

The table below shows Central Hudson’s Contact (Stray) voltage mitigation efforts. One (1) location had a finding of 1 Volt or greater which required mitigation to less than 1 volt due to having contact (stray) voltage caused by the deterioration of conductors or defective equipment.

	Initial Readings				Readings after Mitigation (where mitigation is required)		
	1V to 4.4V	4.5V to 24.9V	25V and Over	Totals	< 1 V	1V to 4.4V	4.5V and Over
Distribution Facilities	-	-	-	-	-	-	-
Pole	-	-	-	-	-	-	-
Ground	-	-	-	-	-	-	-
Guy	-	-	-	-	-	-	-
Riser	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-
Underground Facilities	-	-	-	-	-	-	-
Handhole / Pull box	-	-	-	-	-	-	-
Manhole	-	-	-	-	-	-	-
Padmount Switchgear	-	-	-	-	-	-	-
Padmount Transformer	-	-	-	-	-	-	-
Vault – Cover/Door	-	-	-	-	-	-	-
Pedestal	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-
Street Lights / Traffic Signals	-	-	1	1	1	-	-
Metal Street Light Pole	-	-	1	1	1	-	-
Traffic Signal Pole	-	-	-	-	-	-	-
Control Box	-	-	-	-	-	-	-
Pedestrian Crossing Pole	-	-	-	-	-	-	-
Other - NOT LISTED	-	-	-	-	-	-	-
Substation Fences	-	-	-	-	-	-	-
Fence	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-
Transmission (69kV and Above)	-	-	-	-	-	-	-
Lattice Tower	-	-	-	-	-	-	-
Pole	-	-	-	-	-	-	-
Ground	-	-	-	-	-	-	-
Guy	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-
Miscellaneous Facilities	-	-	-	-	-	-	-
Sidewalk	-	-	-	-	-	-	-
Gate/Fence/Awning	-	-	-	-	-	-	-
Control Box	-	-	-	-	-	-	-
Scaffolding	-	-	-	-	-	-	-
Bus Shelter	-	-	-	-	-	-	-
Fire Hydrant	-	-	-	-	-	-	-
Phone Booth	-	-	-	-	-	-	-
Water Pipe	-	-	-	-	-	-	-
Riser	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-

Note - Findings will include naturally and non-naturally occurring voltages. Naturally occurring voltages can include, but are not limited to, induction, capacitive coupling, and neutral-to-earth voltage. All of these are part of a normally functioning multi-grounded wye electric distribution system. Central Hudson only mitigates situations with non-naturally occurring voltages in compliance with PSC Order 04-M-0159.

Appendix 2: Summary of Shock Reports from the Public – 2022

	2022 Total
I. Total Shock Calls Received:	12
Unsubstantiated	2
Normally Energized Equipment	7
Contact (Stray) Voltage:	
Person	3
Animal	0
II. Injuries Sustained/Medical Attention Received	1
Person	1
Animal	0
III. Voltage Source:	12
Utility Responsibility	
Overhead Distribution System	2
Underground Distribution System	1
Transmission System	0
Other Utility / Gov't Agency Responsibility	
Streetlight	0
Other (Total)	0
Customer Responsibility(Total)	9
IV. Voltage Range:	12
Unrecorded/Below 1V	9
1.0V to 4.4V	1
4.5V to 24.9V	1
25V and above	1

Appendix 3: Summary of Deficiencies by Facility

Summary of Deficiencies and Repair Activity Resulting from the Inspection Process															
Priority Level	2018			2019			2020			2021			2022		
	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III
Repair Expected	Within 1 week	Within 1 year	Within 3 years	Within 1 week	Within 1 year	Within 3 years	Within 1 week	Within 1 year	Within 3 years	Within 1 week	Within 1 year	Within 3 years	Within 1 week	Within 1 year	Within 3 years
Overhead Facilities															
Repaired in Time Frame	15	100	8,126	3	53	5,635	1	60	4,124	-	74	1,411	2	21	301
Repaired - Overdue	1	16	65	-	2	136	-	1	-	-	-	-	-	-	-
Not Repaired - Not Due	-	-	-	-	-	-	-	-	777	-	-	940	-	78	2,953
Not Repaired - Overdue	-	-	5	-	-	19	-	-	-	-	-	-	-	-	-
Total Overhead Facilities	16	116	8,196	3	55	5,790	1	61	4,901	-	74	2,351	2	99	3,254
Underground Facilities															
Repaired in Time Frame	-	-	-	-	1	1	-	-	-	-	-	1	-	-	-
Repaired - Overdue	-	-	-	-	-	-	-	1	-	-	3	-	-	-	-
Not Repaired - Not Due	-	-	-	-	-	-	-	-	-	-	-	6	-	1	5
Not Repaired - Overdue	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
Total Overhead Facilities	-	-	-	-	1	1	-	1	-	-	5	7	-	1	5
Pad Mount Facilities															
Repaired in Time Frame	2	63	43	4	29	26	2	78	95	1	91	49	1	8	8
Repaired - Overdue	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Not Repaired - Not Due	-	-	-	-	-	-	-	-	5	-	-	31	-	44	75
Not Repaired - Overdue	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-
Total Overhead Facilities	2	65	44	4	29	27	2	78	100	1	91	80	1	52	83
Streetlight Facilities															
Repaired in Time Frame	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Repaired - Overdue	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Not Repaired - Not Due	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Not Repaired - Overdue	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Streetlight Facilities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transmission Facilities															
Repaired in Time Frame	-	16	41	-	30	30	-	7	36	-	105	203	-	1	11
Repaired - Overdue	-	49	54	-	20	11	-	5	-	-	1	-	-	-	-
Not Repaired - Not Due	-	-	-	-	-	-	-	-	111	-	-	146	-	25	213
Not Repaired - Overdue	-	16	58	-	57	162	-	18	-	-	50	-	-	-	-
Total Transmission Facilities	-	81	153	-	107	203	-	30	147	-	156	349	-	26	224

Appendix 3A: Summary of Deficiencies and Repair Activity Resulting from the Inspection Process

Summary of Deficiencies and Repair Activity Resulting from the Inspection Process							
Year	Priority Level / Repair Expected		Deficiencies Found (Total)	Repaired In Time Frame	Repaired -Overdue	Not Repaired - Not Due	Not Repaired – Overdue ^{1,2,3}
2018	I	Within 1 week	18	17	1	-	-
	II	Within 1 year	262	179	67	-	16 ⁴
	III	Within 3 years	8,393	8,210	119	-	64 ⁴
	IV	N/A	5,657	5,408	N/A	249	N/A
2019	I	Within 1 week	7	7	-	-	-
	II	Within 1 year	192	113	22	-	57 ⁵
	III	Within 3 years	6,021	5,692	147	-	182 ⁵
	IV	N/A	6,978	5,958	N/A	1,020	N/A
2020	I	Within 1 week	3	3	-	-	-
	II	Within 1 year	170	145	7	-	18 ⁶
	III	Within 3 years	5,148	4,255	-	893	-
	IV	N/A	7,310	6,095	N/A	1,215	N/A
2021	I	Within 1 week	1	1	-	-	-
	II	Within 1 year	326	270	4	-	52 ⁷
	III	Within 3 years	2,787	1,664	-	1,123	-
	IV	N/A	8,111	3,896	N/A	4,215	N/A
2022	I	Within 1 week	3	3	-	-	-
	II	Within 1 year	178	30	-	148	-
	III	Within 3 years	3,566	320	-	3,246	-
	IV	N/A	5,013	511	N/A	4,502	N/A

¹ 2015 – One (1) Level III deficiency on the FK Line is scheduled for repair in 2023*. One (1) Level III deficiency on the GK Line is scheduled for repair in 2023. Forty-six (46) Level III deficiencies on the H line are scheduled for repair in 2026†. Three (3) Level III deficiencies on the SB Line are scheduled for repair in 2023‡. Four (4) Level III deficiencies on the SB Line are scheduled for repair in 2024‡.

² 2016 – One (1) Level III deficiency on the WH Line is scheduled for repair in 2023.

³ 2017 – Three (3) Level III deficiencies on the 301 Line are scheduled for repair in 2023*. Eight (8) Level III deficiencies on the HG Line are scheduled for repair in 2023*.

⁴ 2018 – Five (5) Level II deficiencies on the TR Line will be addressed in 2026††. Ten (10) Level II deficiencies on the KM Line are scheduled for repair in 2023‡. One (1) Level II deficiency on the WM Line is scheduled for repair in 2024‡. Fourteen (14) Level III deficiencies on the FT Line are scheduled for repair in 2023*. One (1) Level III deficiency on the HP Line is scheduled for repair in 2023. Five (5) Level III deficiencies on the KM Line are scheduled for repair in 2023‡. Thirty-eight (38) Level III deficiencies on the WM Line are scheduled for repair in 2024‡. One (1) Level III padmount deficiency is scheduled for repair in 2023. Five (5) overdue distribution deficiencies are scheduled for repair in 2023.

⁵ 2019 – One (1) Level II deficiency on the FV Line is scheduled for repair in 2023‡. Fifty-six (56) Level II deficiencies on the Q Line are scheduled for repair in 2027†. Two (2) Level III deficiencies on the ER Line are scheduled for repair in 2023*. Two (2) Level III deficiencies on the E Line are scheduled for repair in 2023*. Thirty-two (32) Level III deficiencies on the GE Line are scheduled for repair in 2023*. One (1) Level III deficiency on the M Line is scheduled for repair in 2023*. Three (3) Level III deficiencies on the MR Line are scheduled for repair in 2023*. One (1) Level III deficiency on the S Line is scheduled for repair in 2023*. One hundred twenty-one (121) Level III deficiencies on the Q Line will be addressed in 2027†. Nineteen (19) Level III distribution deficiencies are scheduled for repair in 2023. One (1) Level III padmount deficiency is scheduled for repair in 2023.

⁶ 2020 – Four (4) Level II deficiencies on the GK Line are scheduled for repair in 2023‡. Six (6) Level II deficiencies on the H Line are scheduled for repair in 2026†. One (1) Level II deficiency on the OR Line is scheduled for repair in 2023*. Seven (7) Level II deficiencies on the SB Line are scheduled for repair in 2024‡.

⁷ 2021 – Eighteen (18) Level II deficiencies on the 5 Line are scheduled for repair in 2023*. Six (6) Level II deficiencies on the FW Line are scheduled for repair in 2023*. One (1) Level II deficiency on the GM Line is scheduled for repair in 2023*. Sixteen (16) Level II deficiencies on the HG Line are scheduled for repair in 2023*. One (1) Level II deficiency on the I Line will be addressed in 2023*. One (1) Level II deficiency on the RJ Line is scheduled for repair in 2023*. Six (6) Level II deficiencies on the SR Line are scheduled for repair in 2023*. One (1) Level II deficiency on the SC Line is scheduled for repair in 2023*. Two (2) Level II underground deficiencies are scheduled for repair in 2023.

*Scheduled as part of the HPR Program †Scheduled as part of a rebuild project †† Scheduled as part of the retirement of the line ‡ Scheduled as part of the WM Tap project § Scheduled as part of a joint project with Eversource

Appendix 4: Temporary Repair Exceptions

The process of tracking temporary repairs throughout all divisions in Central Hudson is a complex one requiring interfacing of multiple systems and coordination of several organizations. Central Hudson has developed an automated system to track temporary repairs and produce reports for line crews and supervisors to better manage the process. The system has automated most of the work associated with tracking temporary repairs, but manual intervention is still required. Central Hudson continues to utilize contact (stray) voltage technicians to update the inventory annually.

Central Hudson completed permanent repairs on 17 out of 24 locations (70.83%) identified in 2022. Of the repairs completed, thirteen (13) were completed within the 90-day time frame stated in the Order (76.47%). Of the seven (7) overdue repairs, two (2) were completed within 30 days following their respective due dates. Two (2) overdue repairs were completed within 90 days of their respective due dates. Two (2) overdue repairs are currently in construction. One (1) overdue repair is currently in estimating. The remaining four (4) open orders are not yet due.

Many factors can contribute to temporary repairs being completed outside of the 90-day window. For example, the process of getting a work order created, estimate generated, and highway permits obtained can cause the permanent repair to be completed outside of the 90-day timeframe. Other conditions outside of Central Hudson's control that can cause delays include weather, field conditions, equipment rentals, and available load capacity due to switching requirements. Similar to deficiencies identified during inspections, qualified personnel prioritize temporary repairs based on circuit reliability and public safety.

Once a temporary condition is identified, the Company re-evaluates the location and determines if additional safeguards are required to protect the interest of the public, and if so, puts them in place immediately.

Exhibit 1: Certifications

CERTIFICATION
[STRAY VOLTAGE TESTING]

STATE OF NEW YORK)
) ss.:
COUNTY OF DUTCHESS)

Ryan Hawthorne, on this 15th day of February 2023, certifies as follows:


1. I am the Vice President, Electric Engineering & Operations of Central Hudson Gas and Electric (the "Company"), and in that capacity I make this Certification for the annual period ending December 31st, 2022 based on my knowledge of the testing program adopted by the Company in accordance the Public Service Commission's Orders issued and effective January 5, 2005, July 21, 2005, December 15, 2008, March 22, 2013, January 13, 2015 and January 28, 2021 in Case 04-M-0159 (collectively the "Orders"), including the Quality Assurance Program filed by the Company with the Commission.

2. In accordance with the requirements of the Orders, the Company developed a program designed to test (i) all of the publicly accessible electric facilities owned by the Company ("Facilities") and (ii) all streetlights located in public thoroughfares in the Company's service territory ("Streetlights"), as identified through a good faith effort by the Company, for stray voltage (the "Stray Voltage Testing Program").

3. I am responsible for overseeing the Company's Stray Voltage Testing Program and in that capacity I have monitored the Company's Stray Voltage Testing Program during the twelve months ended December 31st, 2022 (the "Twelve-Month Period").

4. I hereby certify that, to the best of my knowledge, information and belief, the Company has implemented and completed its Contact (Stray) Voltage Testing program for the Twelve Month Period. Except for untested structures that are identified as temporarily inaccessible in the Company's Annual Report, submitted herewith, the Company is unaware of any Facilities or Streetlights that were not tested during the Twelve-Month Period.

5. I make this certification subject to the condition and acknowledgment that it is reasonably possible that, notwithstanding the Company's good faith implementation and completion of the Contact (Stray) Voltage Testing Program, there may be Facilities and Streetlights that, inadvertently, may not have been tested or were not discovered or known after reasonable review of Company records and reasonable visual inspection of the areas of the service territory where Facilities and Streetlights were known to exist or reasonably expected to be found.



Sworn to before me this 9th day of February, 2023

Notary Public: Donna M. Giametta

DONNA M. GIAMETTA
Notary Public, State of New York
No. 01GI5067398
Qualified in Ulster County
Commission Expires Oct. 15, 2026

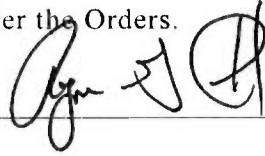
CERTIFICATION
[FACILITY INSPECTIONS]

STATE OF NEW YORK)
) ss.:
COUNTY OF DUTCHESS)

Ryan Hawthorne, on this 15th day of February 2023, certifies as follows:

1. I am the Vice President, Electric Engineering & Operations of Central Hudson Gas and Electric (the “Company”), and in that capacity I make this Certification for the annual period ending December 31st, 2022 based on my knowledge of the inspection program adopted by the Company in accordance with the Public Service Commission’s Orders issued and effective January 5, 2005, July 21, 2005, December 15, 2008, March 22, 2013, January 13, 2015 and January 28, 2021 in Case 04-M-0159 (collectively the “Orders”), including the Quality Assurance Program filed by the Company with the Commission.
2. The Company has an inspection program that is designed to inspect all of its electric facilities on a five-year inspection cycle, as identified through a good faith effort by the Company (“Facilities”), in accordance with the requirements of the Orders (the “Facility Inspection Program”).
3. I am responsible for overseeing the Company’s Facility Inspection Program and in that capacity I have monitored the program during the twelve months ended December 31st, 2022 (the “Twelve-Month Period”).
4. I hereby certify that, to the best of my knowledge, information and belief, the Company has implemented and completed its

Facility Inspection Program to inspect approximately 20 % of its
Facilities during calendar year 2022, in order to comply with the
five-year inspection cycle required under the Orders.



Sworn to before me this 9th day of February, 2023

Notary Public:

DONNA M. GIAMETTA
Notary Public, State of New York
No. 01G15067398
Qualified in Ulster County
Commission Expires Oct. 15, 2026