CENTRAL HUDSON GAS & ELECTRIC

CORPORATION

CONTACT (STRAY) VOLTAGE TESTING

And

FACILITY INSPECTIONS

Report

On the results of the

2021 Contact (Stray) Voltage Testing and Facility Inspections

February 15, 2022

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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's contact (stray) voltage detection program and equipment inspection program conducted in 2021. 2021 represents Year 2 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 Gas & Electric Corporation ("Central Hudson" or "Company") is a regulated transmission and distribution utility that provides electric service to approximately 309,000 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 6,826 MVA. Central Hudson's electric transmission system consists of approximately 593 pole miles of line. The electric distribution system consists of approximately 7,158 pole miles of overhead lines and 1,656 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. 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, 2021, 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. All 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 2021 were visited. Of the 55,316 facilities visited, 420 locations did not have a contact (stray) voltage test performed because their electrically conductive appurtenances were deemed inaccessible. Inaccessible locations were 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 nine (9) locations with voltage readings greater than or equal to 1 V_{ac}. Of the nine, four (4) apparatuses from four (4) different sources were found to have contact (stray) voltage and were mitigated:

- One (1) municipally-owned streetlight and one (1) traffic signal in the Poughkeepsie District fed from separate sources had voltage discoveries of 74.60 V_{ac} and 4.00 V_{ac}, respectively. At the streetlight, Central Hudson found and immediately repaired an energized secondary conductor that was touching ground. At the traffic signal, the DOT was notified of a bad neutral in their crosswalk button and made permanent repairs.

- One (1) municipally-owned traffic signal in the Kingston District had a voltage discovery of 59.25 V_{ac}. Central Hudson disconnected service to the control box feeding the blinking crosswalk warning light and notified the City's electrician to make repairs.

- One (1) distribution pole in the Newburgh District had a voltage discovery of 1.96 V_{ac}. This discovery was located on the secondary riser. Crews responded and made permanent repairs to the pole ground to mitigate the discovery.

There was one (1) additional finding that was 180 Hz dominant and exceeded 10% THD (total harmonic distortion) and so classified as naturally occurring, but was mitigated because the voltage measured over 4.5 $V_{ac.}$ This finding occurred on a transmission steel tower and was due to a grounding issue. Responding crews replaced the ground rod to mitigate.

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 2021 have been compiled and described in Appendix 4 of this report.

V. Company Facilities

Based on the requirements of the Order, Central Hudson identified 55,316 individual electric facilities that required testing for the presence of contact (stray) voltage in 2021. 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 6,037 metal pole streetlights and approximately 826 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, 2021.

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, 2021 as defined in the Order.

The results are summarized in the tables as follows:

2021 Contact (Stray) Voltage Testing Results

People. Power. Possibilities. Central Hudson A FORTIS COMPANY	Total System Units Requiring Testing	Units Completed*	Percent Completed
Distribution Facilities	41,400	41,400	100%
Underground Facilities	5,524	5,524	100%
Non-URD	1,285	1,285	100%
Street Lights / Traffic Signals	6,863	6,863	100%
Substation Fences	24	24	100%
Transmission (69kV and Above)	1,505	1,505	100%
TOTAL	55,316	55,316	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 2021	Cumulative Total of Units Inspected 2020 - 2024 (Actual)
Overhead Distribution	**N/A**	**37.47%**
Overhead Transmission	**N/A**	**34.29%**
Underground (Non-URD)	**N/A**	**38.17%**
Pad-mounted Transformers	**N/A**	**55.77%**
Streetlights	**100%**	**100%**
System Total	**35%**	**37.48%**

5-Year Inspection Performance Summary

Overhead Distribution Facilities

Central Hudson performs inspections on overhead distribution facilities on a five-year cycle. In 2021, 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	N/A	N/A	N/A
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 2021, 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	N/A	N/A	N/A
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 2021, 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	N/A	N/A	N/A
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 2021, 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	N/A	N/A	N/A
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	N/A	N/A	N/A
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 ≥ 1 volt measured using a volt meter 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. It was determined that five (5) of the findings identified in this year's testing effort were within normal operating parameters (55.56%), and not due to contact (stray) voltage. It should be noted that one (1) of these naturally occurring voltages was mitigated because it was in excess of 4.5 volts. 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

Category One Voltage	Category Two Voltage	Category Three Voltage
• Voltage is $\geq 1V_{ac}$ • Sinusoidal waveform • 60 Hz dominant • Total Harmonic Distortion is <10% THD	• Voltage is $1V_{ac} - 4.5V_{ac}$ • Non-sinusoidal waveform • Is 180 Hz dominant • Total Harmonic Distortion is >10% THD	• Voltage is $\geq 4.5V_{ac}$ • Non-sinusoidal waveform • Is 180 Hz dominant • Total Harmonic Distortion is >10% THD
These voltages are considered contact (stray) voltage, which is hazardous and should not be present in a normally functioning electric system.	These voltages are considered non-hazardous Neutral to Earth Voltages and are considered part of a normally functioning electric system.	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.

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

Analysis of Findings

Since 2017, 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 52 of the 252 findings (20.63%), during this time period (see Table 3).

Contact (stray) voltage on Overhead Distribution accounts for 8.73% of the total voltage findings among all assets. Street and Traffic Light contact (stray) voltage accounts for 11.90% 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 75.40% of the voltage findings from 2017-2021. 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 2021, there was one (1) instance of a Category 3 voltage finding. The finding did not have a sinusoidal waveform and was 180 Hz dominant but exceeded the voltage threshold of 4.5 volts. This finding occurred on a transmission steel tower and was mitigated by replacing the ground rod. 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.

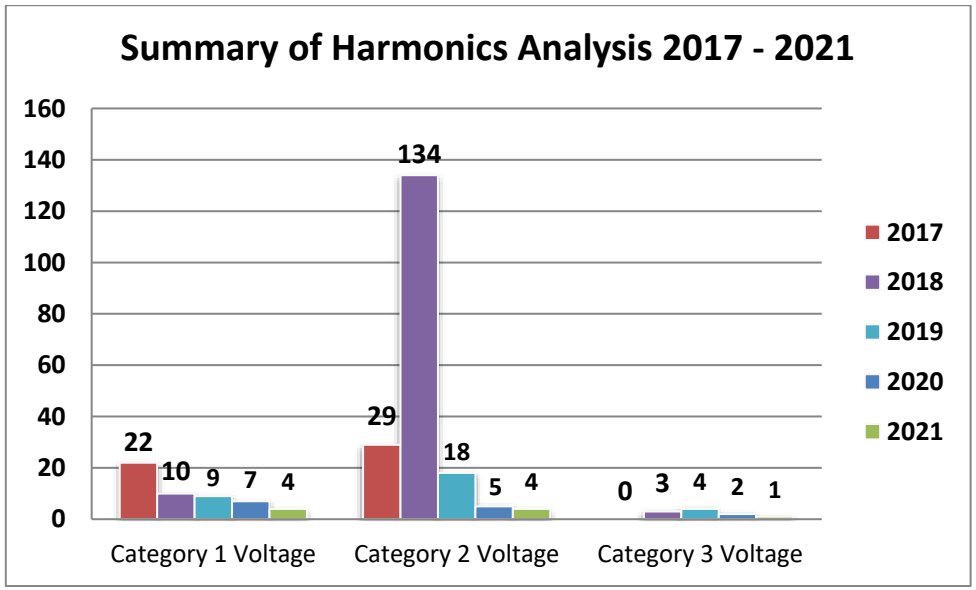
Table 2 - Summary of Findings by Asset Class

	2017			2018			2019			2020			2021		
Asset Class	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	15	27	0	3	58	2	3	14	4	0	4	2	1	3	0
Non-URD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
URD (Pads)	0	2	0	0	0	0	0	3	0	0	1	0	0	0	0
SL & TS	7	0	0	7	0	0	6	0	0	7	0	0	3	0	0
Trans OH	0	0	0	0	76	1	0	1	0	0	0	0	0	1	1
Sub Fence	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	22	29	0	10	134	3	9	18	4	7	5	2	4	4	1

Table 3 - Summary of All Findings by Asset Class

	Total Findings (2017 - 2021)		
Asset Class	Cat. 1	Cat. 2	Cat. 3
Overhead Distribution	22	106	8
Underground (Non-URD)	0	0	0
URD (Pads)	0	6	0
Street and Traffic Lights	30	0	0
Transmission Overhead	0	78	2
Substation Fences	0	0	0
Total	52	190	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 1st 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 will enhance 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 will provide better visibility into the overall condition of a structure and offer 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. Central Hudson will continue to review the new inspection data collected and enhanced criteria moving forward over the course of the next twelve months and make adjustments as needed.

In 2021, the most common type of deficiencies found in Central Hudson's service territory were Level IV conditions, representing 7,892 out of the 11,202 total deficiencies found (70.45%). The three most common deficiencies at all severity levels involve the overhead distribution system. These deficiencies are: Broken Ground Molding (4,588; 58.18% of priority Level IV deficiencies), No Guy Guard (1,603; 20.31% of priority Level IV deficiencies) and Rotten Poles (480; 16.05% of priority Level III 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 2021

Locations Inspected	Locations w/ Deficiencies	% Locations w/ Deficiencies	% Locations w/ Deficiencies Requiring Repair in 1 year
41,400	8,252	19.93%	0.27%

Breakdown of Deficiencies for 2021

Priority Rating	Number of Deficiencies	% of Overhead Distribution Deficiencies Found
I	0	0.00%
II	74	0.80%
III	2,351	25.49%
IV	6,798	73.71%
Total:	9,223	100%

Overhead Transmission Facilities

Table of Locations with Deficiencies for 2021

Locations Inspected	Locations w/ Deficiencies	% Locations w/ Deficiencies	% Locations w/ Deficiencies Requiring Repair in 1 year
1,329	609	45.82%	16.42%

Breakdown of Deficiencies for 2021

Priority Rating	Number of Deficiencies	% of Overhead Transmission Deficiencies Found
I	0	0.00%
II	148	8.84%
III	553	33.03%
IV	973	58.13%
Total:	1,674	100%

Manholes and Pullboxes

Table of Locations with Deficiencies for 2021

Locations Inspected	Locations w/ Deficiencies	% Locations w/ Deficiencies	% Locations w/ Deficiencies Requiring Repair in 1 year
241	51	21.16%	5.88%

Breakdown of Deficiencies for 2021

Priority Rating	Number of Deficiencies	% of Manhole and Pullbox Deficiencies Found
I	0	0.00%
II	5	6.02%
III	7	8.43%
IV	71	85.55%
Total:	83	100%

Padmount Transformers

Table of Locations with Deficiencies for 2021

Locations Inspected	Locations w/ Deficiencies	% Locations w/ Deficiencies	% Locations w/ Deficiencies Requiring Repair in 1 year
4,239	167	3.94%	50.90%

Breakdown of Deficiencies for 2021

Priority Rating	Number of Deficiencies	% of Padmount Transformer Deficiencies Found
I	1	0.45%
II	91	40.99%
III	80	36.04%
IV	50	22.52%
Total:	222	100%

Streetlights

Table of Locations with Deficiencies for 2021

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 2021

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 95% 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. These surveys have included inventories for cutouts, animal guards, and streetlights. In addition, third party attachment surveys are conducted along with this program.

Cutouts

Porcelain cutouts can fail when exposed to the elements for long periods. Porcelain cutouts can develop cracks in the insulators. When these cracks fill with water and become exposed to freezing conditions, the cracks can expand. Over time, the constant freezing and thawing can open the crack further. When water flows through the crack, it can create a path for the electricity to track, bypassing the fuse.

Prior to the 2010 inspection year, Central Hudson replaced porcelain cutouts with polymer cutouts located in the first zone of protection and/or protecting circuit segments of 500 customers or more. In 2010, a micro-survey was added to the contact (stray) voltage testing and inspection survey to confirm the cutouts were replaced and capture any that may have been missed. The data collected was aggregated and used to formulate a replacement plan in line with current operational plans and scheduled maintenance in order to avoid a second mobilization to the facility to replace the cutout(s).

Streetlights

In 2011, a micro-survey was added to inventory streetlights mounted on wooden poles in the electric distribution system. These streetlights are visually inspected from the ground when contractor technicians perform a voltage test. After the survey was completed, 30,000 pole mounted streetlights were inventoried.

The micro-survey documented 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). This information was stored and will be used to update the GIS system available to line crews when repairs are scheduled to ensure that the correct bulb/wattage was on the truck, thus saving a second mobilization.

Poles

During the inspection survey, poles are probed below grade by contractor technicians as they perform an inspection. Using a screwdriver, technicians probe the pole at grade to check around the base. While probing the pole, technicians test for low resistance to the probe. Technicians will record the pole as “unsatisfactory” in the PDA 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 2021, 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 2021 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 – 2021

The table below shows Central Hudson's Contact (Stray) voltage mitigation efforts. Of the 9 locations with findings of 1 Volt or greater, four (4) facilities required mitigation to less than 1 volt due to having contact (stray) voltage caused by the deterioration of conductors or defective equipment. One (1) location was deemed "naturally occurring" but exceeded the 4.5V threshold and was mitigated to less than 1V.

	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	**4**	**-**	**-**	**4**	**1**	**-**	**-**
Pole	-	-	-	-	-	-	-
Ground	2	-	-	2	-	-	-
Guy	-	-	-	-	-	-	-
Riser	1	-	-	1	1	-	-
Other	1	-	-	1	-	-	-
Underground Facilities	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Handhole / Pull box	-	-	-	-	-	-	-
Manhole	-	-	-	-	-	-	-
Padmount Switchgear	-	-	-	-	-	-	-
Padmount Transformer	-	-	-	-	-	-	-
Vault – Cover/Door	-	-	-	-	-	-	-
Pedestal	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-
Street Lights / Traffic Signals	**1**	**-**	**2**	**3**	**3**	**-**	**-**
Metal Street Light Pole	-	-	1	1	1	-	-
Traffic Signal Pole	-	-	-	-	-	-	-
Control Box	-	-	-	-	-	-	-
Pedestrian Crossing Pole	-	-	1	1	1	-	-
Other - NOT LISTED	1	-	-	1	1	-	-
Substation Fences	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Fence	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-
Transmission (69kV and Above)	**1**	**1**	**-**	**2**	**1**	**-**	**-**
Lattice Tower	-	1	-	1	1	-	-
Pole	-	-	-	-	-	-	-
Ground	-	-	-	-	-	-	-
Guy	1	-	-	1	-	-	-
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 – 2021

		2021 Total
I.	**Total Shock Calls Received:**	**8**
	Unsubstantiated	0
	Normally Energized Equipment	2
	Contact (Stray) Voltage:	
	Person	6
	Animal	0
II.	**Injuries Sustained/Medical Attention Received**	**0**
	Person	0
	Animal	0
III.	**Voltage Source:**	**8**
	Utility Responsibility	
	Overhead Distribution System	2
	Underground Distribution System	0
	Transmission Distribution System	0
	Other Utility / Gov't Agency Responsibility	
	Streetlight	0
	Other (Total)	0
	Customer Responsibility(Total)	6
IV.	**Voltage Range:**	**8**
	Unrecorded/Below 1V	7
	1.0V to 4.4V	1
	4.5V to 24.9V	0
	25V and above	0

Appendix 3: Summary of Deficiencies by Facility

Summary of Deficiencies and Repair Activity Resulting from the Inspection Process

	2017			2018			2019			2020			2021		
Priority Level	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	2	150	3,691	15	100	8,125	3	53	4,472	1	60	2,947	-	62	1,211
Repaired - Overdue	-	12	2	1	16	50	-	2	-	-	1	-	-	-	-
Not Repaired - Not Due	-	-	-	-	-	-	-	-	1,318	-	-	1,957	-	12	1,140
Not Repaired - Overdue	-	-	1	-	-	21	-	-	-	-	-	-	-	-	-
Total Overhead Facilities	2	162	3,694	16	116	8,196	3	55	5,790	1	61	4,904	-	74	2,351
Underground Facilities															
Repaired in Time Frame	-	14	19	-	-	-	-	1	1	-	-	-	-	-	-
Repaired - Overdue	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Not Repaired - Not Due	-	-	-	-	-	-	-	-	-	-	-	-	-	5	7
Not Repaired - Overdue	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Total Overhead Facilities	-	16	19	-	-	-	-	1	1	-	1	-	-	5	7
Pad Mount Facilities															
Repaired in Time Frame	4	29	63	2	63	43	4	29	26	2	78	91	1	55	43
Repaired - Overdue	1	-	-	-	2	-	-	-	-	-	-	-	-	-	-
Not Repaired - Not Due	-	-	-	-	-	-	-	-	2	-	-	9	-	36	37
Not Repaired - Overdue	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Total Overhead Facilities	5	29	63	2	65	44	4	29	28	2	78	100	1	91	80
Streetlight Facilities															
Repaired in Time Frame	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Repaired - Overdue	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Not Repaired - Not Due	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Not Repaired - Overdue	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Streetlight Facilities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transmission Facilities															
Repaired in Time Frame	-	6	66	-	16	41	-	30	23	-	6	11	-	3	4
Repaired - Overdue	-	49	54	-	38	6	-	18	-	-	-	-	-	-	-
Not Repaired - Not Due	-	-	-	-	-	-	-	-	244	-	-	255	-	145	549
Not Repaired - Overdue	-	-	43	-	27	146	-	59	-	-	25	-	-	-	-
Total Transmission Facilities	-	55	163	-	81	193	-	107	267	-	31	266	-	148	553

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[1,2,3,4,5]**
2017	I	Within 1 week	7	6	1	-	-
	II	Within 1 year	262	199	63	-	-
	III	Within 3 years	3,939	3,839	56	-	44[6]
	IV	N/A	5,019	4,694	N/A	325	N/A
2018	I	Within 1 week	18	17	1	-	-
	II	Within 1 year	262	179	56	-	27[7]
	III	Within 3 years	8,433	8,209	56	-	168[7]
	IV	N/A	5,621	5,201	N/A	420	N/A
2019	I	Within 1 week	7	7	-	-	-
	II	Within 1 year	192	113	20	-	59[8]
	III	Within 3 years	6,086	4,522	-	1,564	-
	IV	N/A	6,924	5,241	N/A	1,683	N/A
2020	I	Within 1 week	3	3	-	-	-
	II	Within 1 year	171	144	1	-	26[9]
	III	Within 3 years	5,270	3,049	-	2,221	-
	IV	N/A	7,212	4,962	N/A	2,250	N/A
2021	I	Within 1 week	1	1	-	-	-
	II	Within 1 year	318	120	-	198	-
	III	Within 3 years	2,991	1,258	-	1,733	-
	IV	N/A	7,892	1,879	N/A	6,013	N/A

[1] **2010** – One (1) Level III deficiency on the 301 line is scheduled for repair in 2022. One (1) Level III deficiency on the WP line is scheduled for repair in 2022.
[2] **2011** – One (1) Level III deficiency on the 303 line is scheduled for repair in 2022*.
[3] **2013** – One (1) Level II deficiency on the TR line is schedule for repair in 2022. Two (2) Level III deficiencies on the WM line are scheduled for repair in 2022*.
[4] **2015** - One (1) deficiency on the FK line is scheduled for repair in 2022*. Five (5) Level III deficiencies on the GK line are scheduled for repair in 2022. Forty-six (46) Level III deficiencies on the H line are scheduled for repair in 2025†. Three (3) Level III deficiencies on the SB line are scheduled for repair in 2022†. Two Level III (2) deficiencies on the MK line are scheduled for repair in 2022†. Six (6) Level III deficiencies on the SB Line are scheduled for repair in 2023†.
[5] **2016** – Sixteen (16) Level III deficiencies on the NW line are scheduled for repair in 2022*. Two (2) Level III deficiencies on the T7 line are scheduled for repair in 2022. Two (2) Level III deficiencies on the WH line are scheduled for repair in 2023.
[6] **2017** – Eleven (11) Level III deficiencies on the 301 line are scheduled for repair in 2022*. Two (2) Level III deficiencies on the 303 line are scheduled for repair in 2022*. Four (4) Level III deficiencies on the 311 line are scheduled for repair in 2022. Two (2) Level III deficiencies on the CW line are scheduled for repair in 2022. Twenty-four (24) Level III deficiencies on the HG line are scheduled for repair in 2022*. One (1) Level III distribution trimming-related defect will be addressed in 2022.
[7] **2018** – Five (5) Level III deficiencies on the CW line are scheduled for repair in 2022*. One (1) Level III deficiency on the DB line is scheduled for repair in 2022*. Ten (10) Level III deficiencies on the DR line are scheduled for repair in 2023*. Three (3) Level III deficiencies on the DW line are scheduled for repairs in 2023. One (1) Level III deficiency on the EM is scheduled for repair in 2022. One (1) Level III deficiency on the ER line is scheduled for repair in 2022*. Two (2) Level III deficiencies on the FO line are scheduled for repair in 2022. Fifteen (15) Level III deficiencies on the FT line are scheduled for repair in 2022*. One (1) Level III deficiency on the HP line is scheduled for repair in 2022. One (1) Level III deficiency on the KB line is scheduled for repair in 2022. Eleven (11) Level II deficiencies on the KM line are scheduled for repair in 2023††. Five (5) Level III deficiencies on the KM line are scheduled for repair in 2023††. Twenty-two (22) Level III deficiencies one the MW line are scheduled for repair in 2022*. One (1) Level III deficiency on the NF line is scheduled for repair in 2022. One (1) Level III deficiency on the RJ line is scheduled for repair in 2022. One (1) Level III deficiency on the SC line is scheduled for repair in 2022. Five (5) Level II deficiencies on the TR line are scheduled for repair in 2022*. Twelve (12) Level III deficiencies on the TR line are scheduled for repair in 2022*. Two (2) Level III deficiencies on the WF line are schedule for repair in 2022*. Eleven (11) Level II deficiencies on the WM line are scheduled for repair in 2024‡. Sixty-two (62) Level III deficiencies on the WM line are scheduled for repair in 2024‡. One (1) Level III Padmount defect is scheduled for repair in 2022. Thirteen (13) Level III Pole defects are scheduled for repair in 2022. Six (6) Level III Crossarm defects are scheduled for repair in 2022. Two (2) Level III Trimming-Related defects will be addressed in 2022.
[8] **2019** – One (1) Level II deficiency on the FV line is scheduled for repair in 2022*. Fifty-seven (57) Level II deficiencies on the Q line are scheduled for repair in 2026§. One (1) Level II deficiency on the S line is scheduled for repair in 2022*.
[9] **2020** – One (1) Level II deficiency on the FK line is scheduled for repair in 2022. Six (6) Level II deficiencies on the GK line are scheduled for repair in 2022. Six (6) Level II deficiencies on the H line are scheduled for repair in 2024†. Two (2) Level II deficiencies on the HS line are scheduled for repair in 2022. One (1) Level II deficiency on the MK line is scheduled for repair in 2023. One (1) Level II deficiency on the OR line is scheduled or repair in 2022*. Seven (7) Level II deficiencies on the SB line are scheduled for repair in 2023†. One (1) Level II deficiency on the WH line is scheduled for repair in 2023. One (1) Level II Underground defect is scheduled for repair in 2022.

* Scheduled as part of the HPR Program †Currently in permitting as part of Article VII submittal †† Scheduled as part of a rebuild project ‡ Scheduled as part of the WM Tap project §Scheduled as part of 2026 Rebuild Project

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. Currently, 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.

Overall, Central Hudson completed permanent repairs on 39 out of 41 locations (95.12%) identified in 2021. Of the repairs completed, 35 were completed within the 90 day time frame stated in the Order (89.74%). Of the six overdue repairs, four were completed within 30 days following their respective due dates. The remaining two (2) open orders are currently in construction.

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 2022, 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, 2021 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, 2021 (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 15th day of February, 2022

Notary Public:

NANCY M. BENINCASA
Notary Public, State of New York
No. 01BE4854721
Qualified in Ulster County
Commission Expires March 24, 2022

CERTIFICATION
[FACILITY INSPECTIONS]

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

Ryan Hawthorne, on this 15th day of February 2022, certifies as follows:

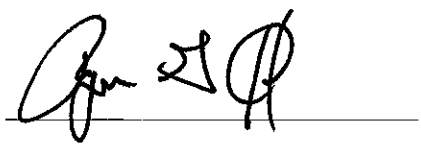
1. I am the Vice President, Electric Engineering & Operations of Central Hudson Gas and Electric (the "Company"), and in that capacity I make this Certification for the annual period ending December 31st, 2021 based on my knowledge of the inspection program adopted by the Company in accordance with the 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

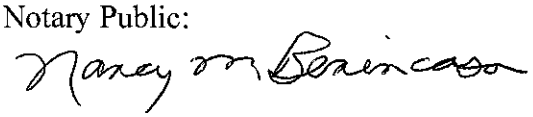
program during the twelve months ended December 31st, 2021 (the "Twelve-Month Period").

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 2021, in order to comply with the five-year inspection cycle required under the Orders.



Sworn to before me this 15th day of February, 2022

Notary Public:



NANCY M. BENINCASA
Notary Public, State of New York
No. 01BE4854721
Qualified in Ulster County
Commission Expires March 24, 2022