New York State Electric & Gas Corporation

Steuben-Chemung Area Transmission Enhancement

Exhibit E-4

Engineering Justification

Critical Energy/Electric Infrastructure Information (CEII) Has Been Redacted From This Document

This page intentionally left blank.

TABLE OF CONTENTS

* * * * *

LIST OF TABLES

* * * * *

LIST OF FIGURES

* * * * *

LIST OF ATTACHMENTS

* * * * *

This page intentionally left blank.

EXHIBIT E-4: ENGINEERING JUSTIFICATION

E-4.1 Summary of the Proposed Plan and Its Benefits

The Commission's May 14, 2020 Order on Transmission Planning issued in Case 20-E-0197, directed the Applicant and other New York State electric utilities to evaluate available capacity on the local transmission and distribution systems, identify constraints caused by proposed electric generation penetration, and propose mitigating upgrades to relieve these constraints and increase system capacity. The utilities filed the resulting study, the Utility Transmission & Distribution Investment Working Group Report, with the Commission on November 2, 2020. It identified preliminary system upgrades for consistency with New York State's energy policy goals.

On September 9, 2021, following the above Phase 1 analysis, the Commission issued a new order (the "Phase 2 Order") in which it highlighted that certain regions of the state have been identified by the utilities, DPS Staff, NYSERDA, and stakeholders as being in critical need of local transmission investment. These regions, called "Areas of Concern," are characterized by their respective transmission systems lacking sufficient capacity to avoid curtailment of existing and/or proposed electric generation projects. As a result, this deficiency was identified as a "Near-Term Need".

The Commission in the Phase 2 Order directed the utilities within these Areas of Concern to present, by March 8, 2022, a minimum of two proposals for each area of concern that identify the most cost-effective upgrades to satisfy the "Near-Term Need". In response, NYSEG performed a needs analysis and proposed projects within its Area of Concern – Z1. The Commission, in its *Order Approving Phase 2 Areas of Concern Transmission Upgrades* dated February 16, 2023, approved the Area of Concern projects and designated them Phase 2. The Project[1] is a Phase 2 project.

E-4.2 System Description

The "Z1" Area of Concern that was assessed by the Applicant and resulted in the Project (among other projects) consists of the Hornell and Elmira Divisions of NYSEG's service area as well as parts

[1] For clarity and consistency, the Application includes a Master Glossary of Terms that defines terms and acronyms used throughout the Application.

of RG&E's southern service region. This Area of Concern includes approximately 880 MW of existing utility-scale generation interconnected on the 230 kV, 115 kV, and 34.5 kV systems. [redacted]

Figure E-4-1 depicts the region making up the Z1 Area of Concern (shaded in yellow) as well as the locations of the existing 230 kV lines that make up the Project.

[redacted]

Figure E-4-1: NYSEG Lines 68,72, & 69

E-4.3 Need for the Project

Deliverability Needs

NYSEG's deliverability assessment of the transmission system in the Z1 Area of Concern determined that there are

[redacted]

Figure E-4-2 and Figure E-4-3 illustrate the deliverability constraints on the 230 kV corridor that will be addressed by the Project. (The system topologies in these figures are highly simplified and are not intended to be representative of actual system topology; rather, they are useful for demonstrating the nature of the limiting constraints in the Area of Concern.)

Critical Energy/Electric Infrastructure Information (CEII) Has Been Redacted From This Document

Figure E-4-2: Illustrative Depiction of N-0 Constraints

Figure E-4-3: Illustrative Depiction of N-1 Constraints

Table E-4-1 summarizes the specific transmission deliverability needs identified on Lines 68, 72, and 69.

Table E-4-1: SCATE Lines Thermal Violations

Asset Condition

Both the conductor and structures for the 230 kV transmission lines in the corridor from Canandaigua to Watercure are nearing or beyond 60 years of age. There are a total of 18 Transmission Line Deficiencies (TLDs) on these three lines that require structure replacement.

- Line 68 is a 230 kV transmission line that is 24.0 miles long and runs from Canandaigua Substation to Avoca Switching Station to Stoney Ridge Substation. The existing conductor type is 1033 Ortolan ACSR. Currently, the conductor is approximately 62 years old and the

average pole age is approximately 56 years. There is currently a total of six TLDs on this transmission line that require structure replacement.

- Line 72 is a 230 kV transmission line that is 26.9 miles long and runs from Hillside Substation to Stoney Ridge Substation. Line 72 is on double circuit lattice towers with 230 kV Line 69 for 0.8 miles near Hillside Substation. The existing conductor type is 1033 Ortolan ACSR. Currently, the conductor is approximately 63 years old and the average pole age is approximately 63 years. There is currently a total of 10 TLDs on this transmission line that require structure replacement.
- Line 69 is a 230 kV transmission line that is 1.3 miles long and runs from Hillside Substation to Watercure Substation. Line 69 is on double circuit lattice towers with 230 kV Line 72 for 0.8 miles near Hillside Substation. The existing conductor type is 1033 Ortolan ACSR. Currently, the conductor is approximately 58 years old and the average pole age is approximately 53 years. There is currently a total of two TLDs on this transmission line that require structure replacement.

E-4.4 Proposed Plan and Its Benefits

To address the known asset condition needs and the deliverability overloads requiring larger capacity conductors on the Lines 68, 72, and 69, the Project includes the following:

1. Replacement of Conductors and Hardware: Upgrade the conductors and associated hardware along the entire length of each circuit.
2. Replacement of Structures:
    - For Line 68 and the portion of Line 72 not sharing a corridor with Line 69, replace structures with steel H-frames (majority of locations) and monopoles (at certain locations).
    - For Line 69 and the portion of Line 72 on the shared corridor, reuse most of the existing lattice structures with necessary modifications and replace certain lattice structures with steel monopoles.

Additional details for the Project's scope of work for each line are as follows:

- Line 68 - Rebuild on an offset with bundled 1192 Bunting ACSR for both curtailment conditions. No new ROW is anticipated for this solution.
- Line 72 – For both curtailment options:
    - Rebuild on an offset with 2156 Bluebird ACSR for the portion not on the shared corridor with Line 69; and
    - Replace the conductor with 2156 Bluebird ACSR on existing lattice structures and replace select structures with offset steel monopoles for the portion of Line 72 sharing the corridor with Line 69.
- Line 69 - Replace conductor with 2156 Bluebird ACSR on existing lattice structures and replace select structures with offset steel monopoles for the portion of Line 72 sharing the corridor with Line 69.

Figure E-4-1 is a geographic one-line that depicts the Project lines and conductor as proposed to be modified in the Project.

Figure E-4-4: Post Project One-Line

The Project, along with the other Area of Concern projects proposed by NYSEG, [redacted] It is difficult to calculate each line's individual contribution to headroom as all are interconnected; however, NYSEG performed an analysis of the potential headroom reduction if the individual components were removed, and the results of this analysis can be found in Table E-4-2.

Table E-4-2: Project Component Headroom Reduction Potential

[redacted]

The sum of the headroom reductions in the table above exceeds the combined headroom reduction because the components are interconnected and will "share" headroom contributions.

The Applicant anticipates that the Project will serve the interests of electric system economy and reliability. The Applicant anticipates that the Project will reduce congestion and curtailments, thereby resulting in delivered cost savings and capacity market benefits.

In consultation with the NYISO, the Applicant performed all the necessary analyses for a System Impact Study (SIS) screening and determined that a SIS is not necessary for the Project. The NYISO agreed. This is documented in the correspondence, dated October 25, 2023, provided as Attachment E-4-A.

E-4.5 Construction Schedule

The proposed date for completion of the Project is November 30, 2032. A delay in the construction of the Project will impact customers in the local area should the contingencies identified occur. This will also have an impact upon NYSEG's compliance with NERC, NPCC, and NYSRC standards.

* * * * *

This page intentionally left blank.

New York State Electric & Gas Corporation

Steuben-Chemung Area Transmission Enhancement Project

Exhibit E-4

Engineering Justification

Attachments

This page intentionally left blank.

New York State Electric & Gas Corporation

Steuben-Chemung Area Transmission Enhancement

Exhibit E-4

Engineering Justification

Attachment E-4-A

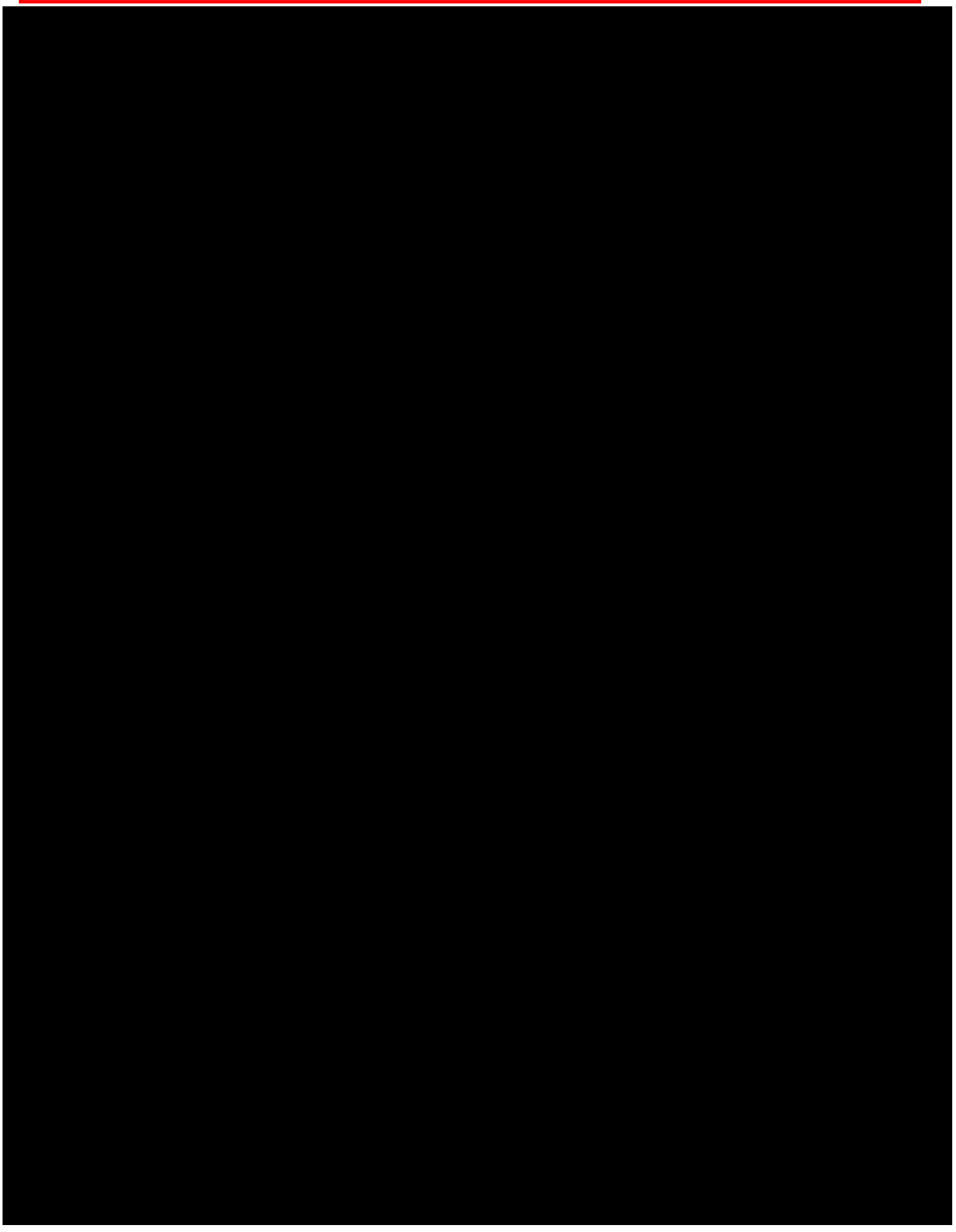
SIS Correspondence

New York State Electric & Gas Corporation

Southern Tier Area Reliability East Project

Attachment E-4-A: SIS Correspondence

Critical Energy/Electric Infrastructure Information (CEII) Has Been Redacted From This Document



Critical Energy/Electric Infrastructure Information (CEII) Has Been Redacted From This Document

[redacted]

Critical Energy/Electric Infrastructure Information (CEII) Has Been Redacted From This Document

[redacted]

Critical Energy/Electric Infrastructure Information (CEII) Has Been Redacted From This Document

[redacted]

Critical Energy/Electric Infrastructure Information (CEII) Has Been Redacted From This Document

[redacted]

of RG&E's southern service region. This Area of Concern includes approximately 880 MW of existing utility-scale generation interconnected on the 230 kV, 115 kV, and 34.5 kV systems. [redacted]

Figure E-4-1 depicts the region making up the Z1 Area of Concern (shaded in yellow) as well as the locations of the existing 230 kV lines that make up the Project.

[redacted]