

NYSEG and RG&E Transmission and Distribution Facility Classification

Technical Guidance Document

Transmission Planning (NYSEG/RG&E)



Take care of the environment.
Printed in black and white and only if necessary.

Transmission & Distribution Facility Classification

Section 1 – Purpose

The purpose of this technical document is to provide general guidance¹ on how to classify Transmission (T) and Distribution (D) line facilities on both NYSEG and RG&E Electric Systems. The classification of these facilities is critical since it establishes factors such as T/D Planning responsibility, interconnection study requirements, and is used to inform project design standards / facility interconnection requirements.

Section 2 – Introduction

The NYSEG and RG&E electric systems include facilities which operate at various voltage levels and are mainly classified under the following designations:

- 1) Bulk Transmission (≥ 100 kV): Generally includes the NERC Bulk Electric System (BES), NPCC Bulk Power System (BPS), and NYISO Bulk Power Transmission Facilities (BPTF).
- 2) Medium-Voltage ² Transmission (< 100 kV and ≥ 34.5 kV): Generally includes networked and radial 34.5 kV, 46 kV, and 69 kV facilities. Also includes specified networked 11.5 kV facilities³.
- 3) Distribution (≤ 34.5 kV and ≥ 4.16 kV): Generally includes radial 4.16 kV, 4.8 kV, 7.2 kV, 11.5kV, 12.47 kV, 13.2 kV, 19.9 kV, and 34.5 kV facilities.

Historically, NYSEG and RG&E have utilized the 34.5 kV voltage level for both transmission and distribution applications. In some cases, it may not be immediately obvious whether a 34.5 kV line is part of the transmission or distribution system. This document is intended to provide specific guidance on how to properly determine whether a 34.5 kV facility shall be treated as a transmission or distribution asset. All other voltage facilities adhere to the general guidance above.

¹ NYSEG and RG&E systems have evolved over 100+ years, and in some cases, it's difficult to definitively conclude whether a facility should be classified as Transmission or Distribution. In these cases, this technical guidance document shall be used to inform discussions, and T/D facility classifications will be determined by considering the unique facility characteristics (under question) and evaluated against the general guidance outlined herein.

² Alternatively, it has been referred to as sub-transmission.

³ RG&E supplies a portion of the City of Rochester from networked transmission facilities that are operated at 11 kV. These facilities are operated in parallel with the 115 kV and 34.5 kV transmission systems and are part of the transmission system.



Section 3 – Transmission & Distribution Facility Characteristics

The following are some typical / unique characteristics associated with the identification of transmission line facilities:

- Transmission lines typically connect into two-or-more substations (*i.e., At minimum, the line will run “station-to-station” and terminate into at least two substations on either end of the line*).
- Transmission lines are typically constructed as a three-phase, three-wire configuration where no underbuilt neutral wire is present. A static / shield wire might be installed for the protection from lightning strikes. See **Figure 1** for a typical 34.5kV transmission line.
- Transmission lines will generally directly serve few customers. Customers served by transmission lines will typically be large spot loads with a balanced three-phase electrical configuration through a dedicated service.
- Transmission lines do not directly serve residential customers or other single-phase loads.
- Transmission lines are built to a more robust construction standard than distribution lines:
 - 34.5 kV transmission lines typically have larger phase spacing and taller insulators. See **Figure 1** for the insulators on a 34.5kV transmission line.
 - 34.5 kV transmission facilities are typically rated at 200 kV BIL or higher⁴ (*higher than distribution standard*).
 - 34.5 kV transmission facilities typically utilize surge arrestors rated for full line-to-line voltage.

The following are some typical /unique characteristics associated with the identification of distribution line facilities:

- Distribution lines typically emanate from a grounded source and serve radial distribution load.
- 34.5 kV distribution lines are typically constructed in a three-phase, four-wire configuration with an underbuilt neutral wire. It must have a continuous neutral back to the source of ground current, typically the grounded winding of a power transformer. See **Figure 2** for a typical 34.5kV distribution line.

⁴ IEEE C62.82.1 – IEEE Standard for Insulation Coordination – Definitions, Principles, and Rules



Transmission & Distribution Facility Classification

- 34.5kV distribution lines must use a grounded source and be capable of serving single-phase customers.
- 34.5kV distribution lines typically have smaller phase spacing, and shorter insulators as compared to a 34.5 kV transmission line. See **Figure 2** for the insulators on a 34.5kV distribution line.
- 34.5 kV distribution facilities are typically rated at 150 kV BIL⁵ (*lower than 34.5kV transmission*).
- 34.5 kV distribution facilities typically utilize surge arrestors that are not rated for full line-to-line voltage.

Figure 3 shows a one-line example illustrating the differences between the typical 34.5 kV transmission and 34.5 kV distribution line facilities.

Section 4 – Classification

NYSEG / RG&E Transmission and Distribution Planning follow the general guidelines to identify whether a 34.5 kV line facility should be considered a transmission or distribution asset.

1. Transmission – All 34.5 kV line facilities are assumed to be transmission unless it can be determined that all specific distribution characteristics (#2 below) are present.
2. Distribution – A 34.5 kV line facility shall be considered distribution if ALL of the following conditions are satisfied:
 - a) Utilizes three-phase four-wire configuration and has an underhung neutral wire.
 - b) Emanates from 34.5 kV grounded source to serve distribution load, including single-phase customers.

⁵ IEEE C62.82.1 – IEEE Standard for Insulation Coordination – Definitions, Principles, and Rules



Section 5 – Appendix

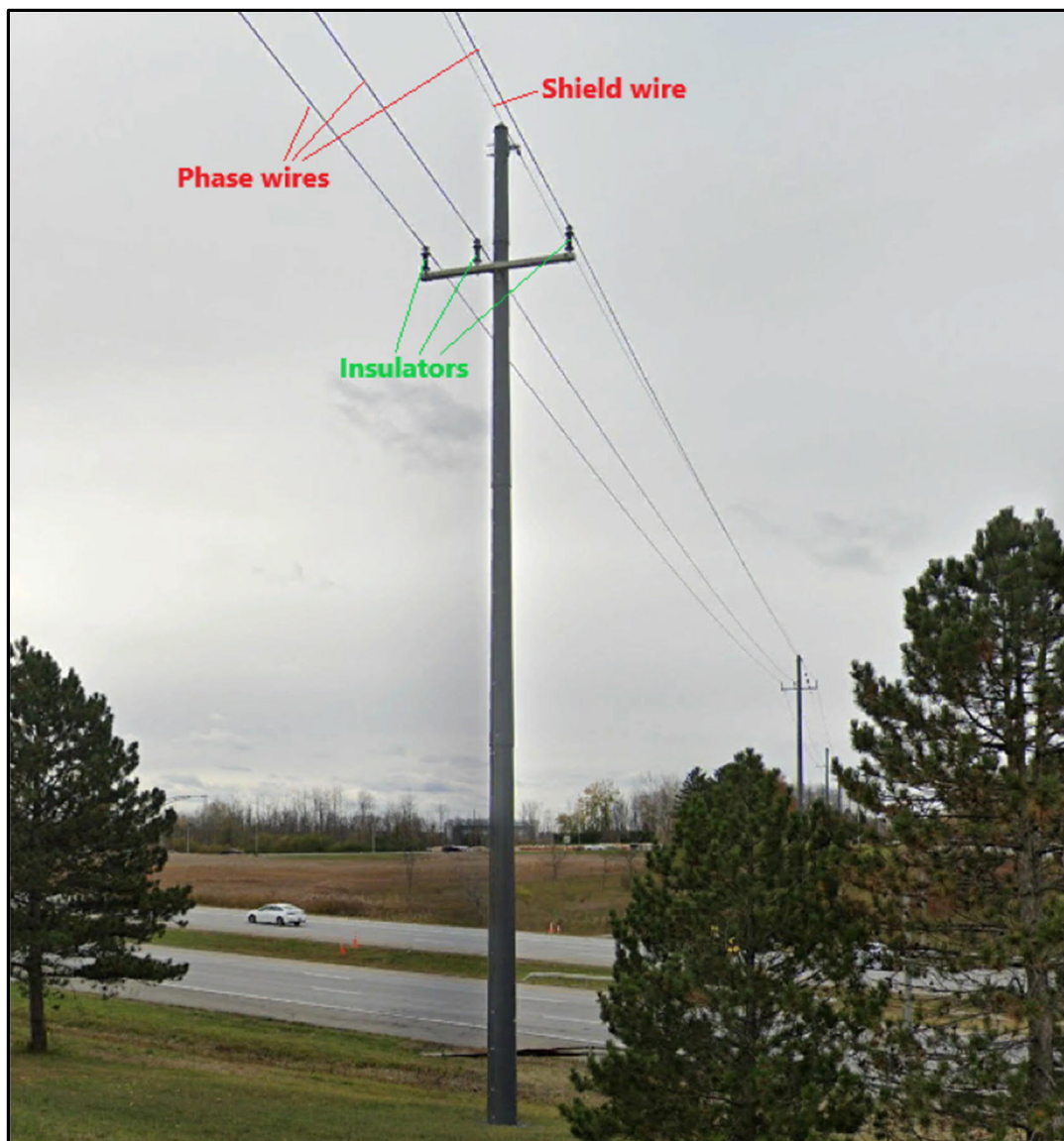


Figure 1 – A 34.5 kV Transmission Line (Three-phase three-wire and a shield wire; post insulators)



Take care of the environment.
Printed in black and white and only if necessary.

Transmission & Distribution Facility Classification

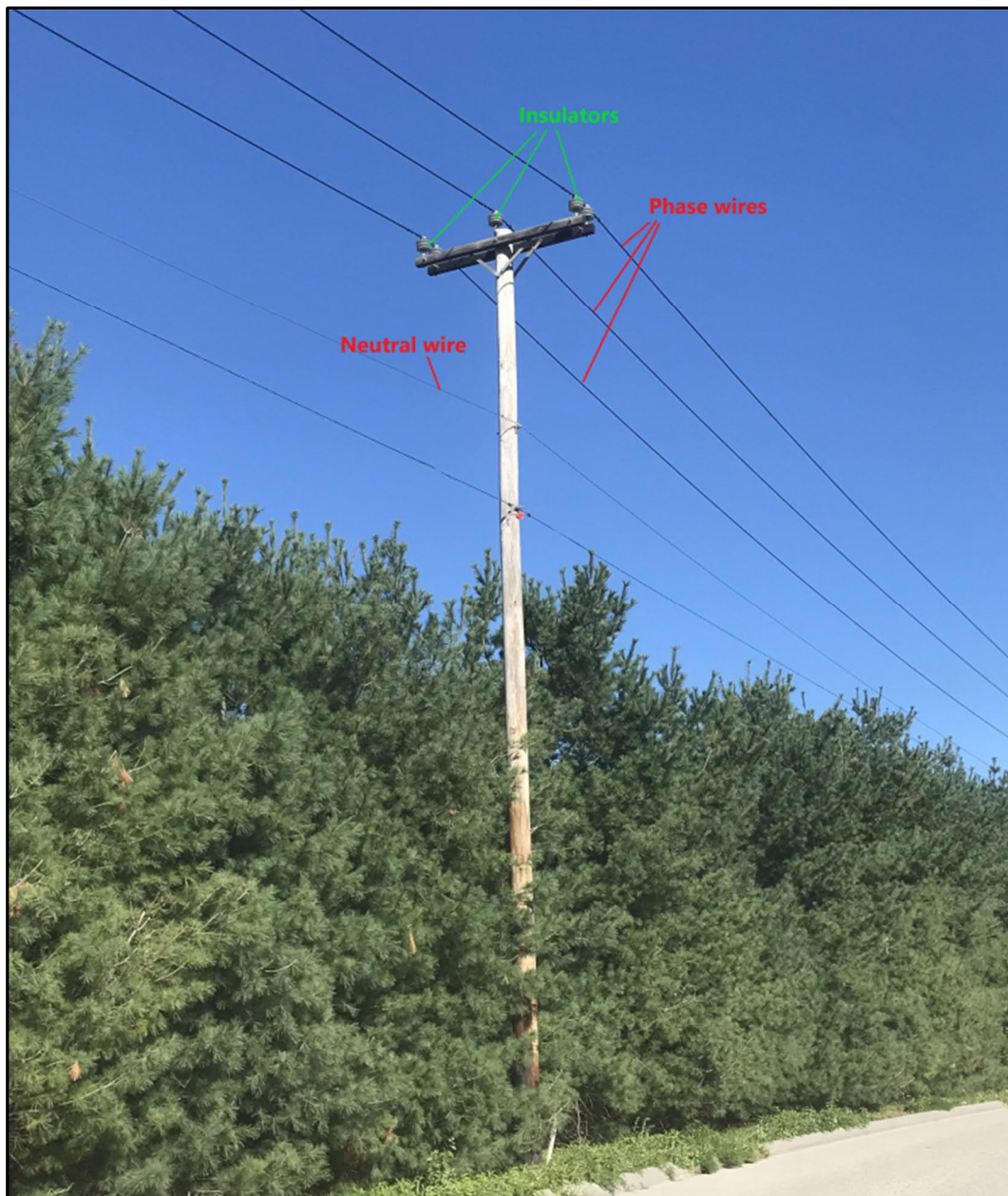


Figure 2 – A 34.5 kV Distribution Line (Three-phase four-wire; post insulators)



Take care of the environment.
Printed in black and white and only if necessary.

Transmission & Distribution Facility Classification

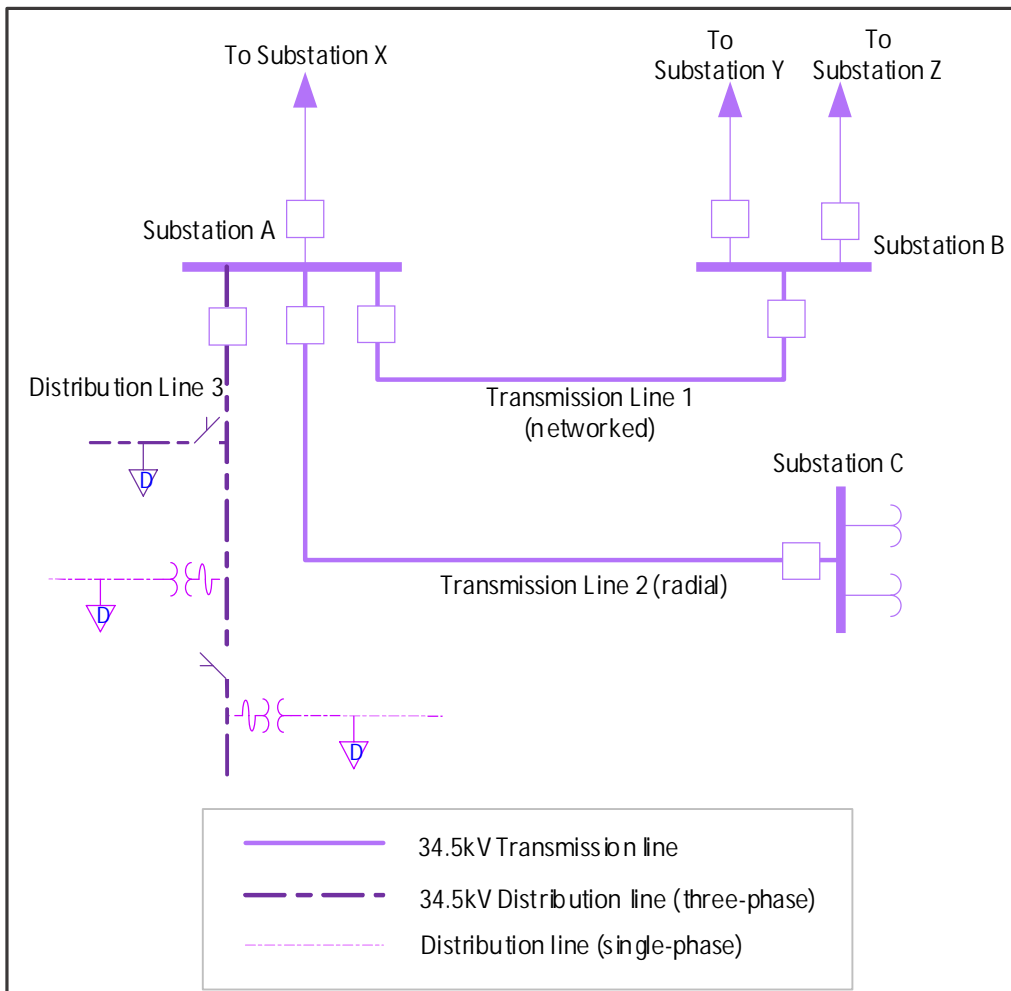


Figure 3 – One Line Example of 34.5kV Transmission vs. Distribution Lines



Take care of the environment.
Printed in black and white and only if necessary.