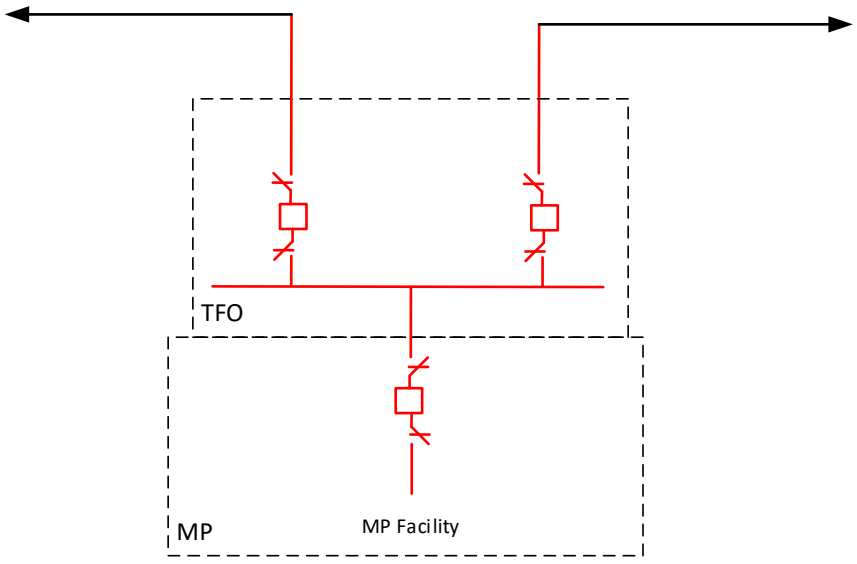
Joint Substation Naming and Numbering for TFO and MP Guideline

1. Purpose

This guideline is intended to provide advice on good practice for how joint substations are to be named and numbered for sites shared by transmission facility owners (TFOs) and market participants (MPs), as illustrated by Figure 1 below. This guideline does not consider the naming of joint substations shared by two TFOs.

Figure 1: Example Joint Substation



2. Concerns

- Inconsistent naming and numbering of substations with examples of various combinations for joint configurations.
- Concerns about field confusion, overlapping numbering, and switching errors with two separate parties operating different parts of the same substation.

- Concerns about operational confusion and errors with two separate names/numbers for what is functionally the same substation.
- Substation naming and numbering needs to be possible and clear for both modeling and energy management system (EMS) operations of the AESO and TFOs.

3. Joint Operations

Co-ownership within a common substation between TFOs and MPs (or other parties) always presents some elevated risk of safety incidents related to switching errors which must be addressed by joint-operating agreements between parties and is considered within this guideline. The AESO's position is that TFOs and MPs should always consider a joint-operating agreement between parties whereby one party is designated as the facility operator. The purpose of this guideline is to support AESO's mandate of assigning facility names and numbers and is not an endorsement of the practice of sharing facility operations between parties.

4. Investigation

- Discussion with AltaLink, ATCO, EPCOR, and ENMAX was held to get their input on joint naming and numbering.
  - Strong preference from some TFOs to have separate numbering based on safety and field operations.
  - ATCO provided support for Option 5.
  - AML initially favoured Option 2 but in a later review of this draft, they were also supportive for Option 5.
  - Discussion with AESO EMS and SCADA team members: Previous limitations due to zero impedance buses in modeling is no longer present.
  - Supervisory control and data acquisition (SCADA) can be modelled in multiple ways and EMS diagrams can delineate for operators the divided ownership of substations and show the whole substation regardless of division.
- Additional discussions regarding safety concerns of switching plans and practices:
  - Each switching device within a substation generally uses the substation number plus a unique device identifier that is coordinated between all parties e.g. 15S2078, 899S749X, 678S3, where 15S, 899S and 678S are the respective substation numbers.

5. Options Considered

The options in Table 1 explore different naming conventions for these joint substations, from having a single substation name and number to having a combination of substation names and numbers.

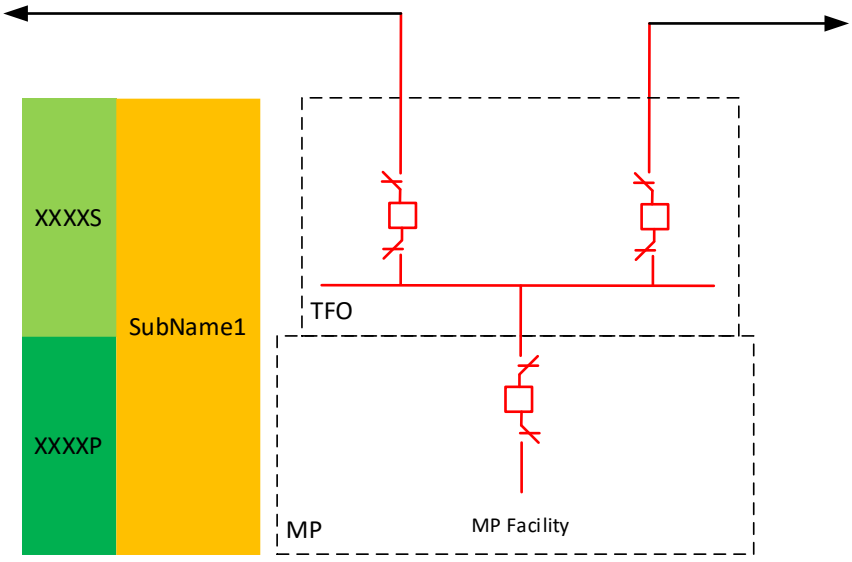
Table 1: Option Comparisons

Configuration	Example	Pros	Cons
1. Single Substation Name & Number for the entire substation	XXXXS SubName1	• Simple; removes concerns related to separate substation names and/or numbers.	• No ownership delineation • Doesn't address switching plan safety concerns
2. Unique Substation Names & Unique Numbers for TFO and MP sections	XXXXS SubName1 / YYYYS SubName2	• Fully distinct • Addresses safety concerns	• Extra name usage for single substation • More challenging name recognition for operators
3. Unique Substation Names & Common Number for TFO and MP sections	XXXXS SubName1 / XXXXS SubName2		• Same as 2 • Doesn't address switching plan safety concerns
4. Common Substation Name & Different Numbers for TFO and MP sections	XXXXS SubName1 / YYYYS SubName1	• Addresses safety concerns	• Extra number usage for single substation • Name associated with two numbers may cause confusion and operator errors
5. Common Substation Name and Number & Different Number Suffix for TFO and MP sections	XXXXS SubName1 / XXXXP SubName1	• Addresses safety concerns • Distinct but related number • Single name for substation and number means this is the least complex solution that addresses the identified concerns	• Related number adds some complexity
6. Related Name (suffix) & Different Number Suffix	XXXXS SubName1 / XXXXP SubName1 Plant	• Addresses safety concerns • Distinct but related number	• Related name (e.g., Plant suffix) can cause confusion between substation and the asset. No standardized suffix for all cases

6. Recommended Option

For joint TFO and MP substations Option 5 is recommended as illustrated in Figure 2.

Figure 2: Recommended Option



It addresses switching concerns by having the unique suffix delineating the devices operated by different parties but retains a common substation name and number which reflects that it is still electrically a single substation. It does not increase the quantity of substation numbers and names that operators need to remember for recall of location/region or introduce potential confusion with the facility and/or asset name (i.e. the generator). Per current and best practice, unique device numbers for the complete site shall continue to be coordinated between the TFO and MP (e.g., XXXXS101 and XXXXP101 is not acceptable).

Historically, there was an EMS modelling requirement for having line numbers between differing facility codes that resulted in lines within joint substations. This constraint no longer exists. This option also more clearly shows the relationship between the TFO and MP within the substation which is an advantage for regulatory filings.

7. Selected Option

Option 5 will be used going forward for joint TFO and MP substation.

Appendix A

- Existing Examples of joint TFO and MP substations:
- Willow Lake 2009S [TFO] / AHS 01 279S [MP] (line numbers assigned to buses 7L126/7L182)
- Russell 632S [TFO] / Castle River 239S [MP] (40m line 413L with single 90 deg structure)
- Elkwater 264S [TFO and MP] (one shared name/number)
- Horizon Mining 838S / Horizon Expansion 838S (AESO TASMo only has Mining, ATCO SLD uses Expansion with reference to CNRL 75 Mining/Extraction Sub)
- Muskeg River 847S [TFO] / Hartly 919S [MP] (two bus connections)
- Riverside 388S [TFO] / Granite 342S [MP] / Opal 439S [MP] (single line breaker for 388S into ISD)