Use Case 2: As-Build Equipment Installation/Commissioning

Summary:

This use case describes the procedure that must be carried out when commissioning a circuit breaker in a substation via a SCADA system to the control room. A.

Actor(s):

Name	Role description
Substation Engineer	Person responsible for establishing the breaker settings from a location external to the substation.
System or Network Operator	• Person responsible for select-before-operate, with security, operation of the breaker. • Performs supervisory control (through SCADA-DMS) • Carries out the operation plans • Ensures the safety of the public and field crews • Guides the field crew where to locate equipment • Manages field resources • Carries out activities on the network through agents

Participating Systems:

System	Services or information provided
Network Operation	Either a manual or a computer system to manage the Network Operation. The control room where, usually via a wall diagram or a computerized presentation of the network, the Control Engineer sanctions work on the network via switching schedules, safety documentation, and other authorized procedures.
SCADA system	The system used to carry commands from the control room, and indications/alarms/analogues from the substation

Pre-conditions:

Security requires that operator password be valid for the action to be taken. Specifically the system operator is responsible for initiating a close command, initiating a trip command; receiving and processing breaker status (sum of the pole positions), and receiving and processing alarms.

Assumptions / Design Considerations:

State any known assumptions, limitations, or constraints that may affect this use case. Consider:

- Timing requirements
- Frequency of use
- Sizing characteristics, etc.

Normal Sequence:

Use Case Step	Description
Substation Engineer downloads substation configuration.	It is assumed that during commissioning of the substation automation system the substation engineer would receive, via download from the substation host over the WAN, a complete description of the substation configuration including the capabilities of all power system devices and their IEDs
Substation Engineer established the breaker settings as part of the commissioning process.	The breaker settings include a definition of the type of load connected to the breaker (grounded wye capacitor bank, ungrounded capacitor bank, shunt reactor)
System operator establishes the settings for reporting. • Create control blocks • Set control blocks • Delete control blocks • Get attributes • Set attributes • Create event enrollments • Set event enrollments • Delete event enrollments	The substation automation system functional components shall provide the capability for spontaneous reporting, report by exception, cyclic reporting, journal reporting (sequence of events), and report on request. Control of ***server*** reporting is defined by the system operator's specification of input parameters. The ***server*** is responsible for loading these parameters into the condition monitoring and evaluation algorithms. The ***server*** generates reports whenever triggers are activated based on condition monitoring and evaluation.
System operator initiates breaker close or trip	Operator initiation of breaker close requires selection of a breakerID, then a command to close the breaker. This in turn will cause the selection of appropriate bus voltage VTs by the substation host, and the command by the substation host to the bus voltage VT IEDs to send bus voltage to the breaker IEDs via the substation LAN every 0.1 seconds.
Select-Before-Operate	1. First the operator select the breaker to be closed or tripped on the display. 2. Then after the selected breaker notifies the operator that the breakerID has been selected. 3. Then the operator can issue a close or trip command.

Exceptions / Alternate Sequences

Describe any alternative actions that may be required that deviate from the normal course of activities. Should the alternate sequence require detailed descriptions, consider creating a new Use Case.

Post-conditions:

Selectable options must be displayed on the operator workstation display.
Confirmation of actions taken must be displayed on the operator workstation display.
Notes:

1. Dynamic updates of the substation configuration will be generated by the power system device IEDs and sent to the substation configuration database in the substation host.

2. Normal operations include sending time from the substation host to all power system IEDs based on the master clock. Time data will be sent every second via the substation LAN or over a separate timing wire connecting the master clock to each IED.
3. The substation host will record normal operation logs of data received from all power system IEDs via the substation LAN. Change-only data of breaker position, BFI data, and alarms will be recorded. For this use case no cyclic data will be logged.
4. If more than one synchronized breaker operation is occurring at the same time we assume that different operators initiated each closing operation. A single operator will select and close one breaker, then select and close the next breaker. A single operator will not select several breakers and the close them at the same time.
5. Select before operate is defined as a sequence of control services consisting of the ***select*** service and the ***control/operate*** service. The ***select*** service is used to arm an SBO device prior to operation. The ***control/operate*** service is used to carry out a control command after a ***select*** has succeeded. This sequence has the effect that clients can lockout other clients from operating a point for a predetermined period of time so that it is the only client that can operate the point.