Lesson Learned
Load Shedding Plans for Localized Events

Primary Interest Groups
Transmission Owners
Transmission Operators
Balancing Area
Load Serving Entity


Details: The fire protection system on the 115 kV-345 kV transformer in Substation “A” activated causing the transformer to isolate. The resulting separation resulted in a loss of voltage support from the 345 kV system to the 115 kV system in the area. The immediate sag in voltage impacted several pieces of equipment at generating unit A1, which is located within a few hundred feet of the “A” Substation. The loss of Unit A1, in combination with the 115 kV system being isolated from the 345 kV system, caused very high system loads in the area and resulted in very low voltages in the southwest part of the Balancing Area footprint.

Corrective Actions: System Operators responded by placing all available capacitors in service to provide voltage support, and reactive power loading was increased on all generators that were online in the areas experiencing low voltage. Attempts to start generators in the area were also initiated, but low voltages caused two Combustion Turbines to fail to start. The distribution cooperative located in the area that was experiencing low voltage was contacted and made customer appeals to reduce energy consumption, which included direct contact with several irrigation customers. These efforts were ultimately successful in restoring voltage to acceptable levels without the need for System Operators to initiate load shedding.

Lesson Learned: Although voltage was stabilized and ultimately restored to normal values without any load shedding on the system, a review of the event indicated that System Operators were hesitant to shed load when the situation might have warranted load shedding.

Furthermore, a review of the event pointed to a deficiency in the options available for manual load shedding. There are currently three manual load shedding blocks available to the System Operators via EMS/SCADA. Each of the three blocks provides load shedding capability of approximately 10% of total Balancing Area load. The load shedding for each block is dispersed fairly evenly across the system footprint. In situations where voltage decay is limited to a specific area, widespread load shedding is not ideal.
EMS/SCADA personnel will work with transmission engineering to develop additional manual load shedding blocks which provide localized load shedding capability to target load shedding to the problematic areas in these situations.

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This Lesson Learned was prepared by the SPP Registered Entity that experienced the event. Company specific identifiers were removed to maintain confidentiality.