V. Design, Application, Maintenance & Operation Technical Requirements

V.I PJM Design and Application of AC Station Service for Transmission Facilities

1.0 Specification

1.1 As a minimum requirement, AC station service systems and equipment shall be designed for the purpose intended and should support Clause II (Transmission System Design Criteria) and be specified to meet latest requirements of all applicable industry standards, including but not limited to ANSI, IEEE, NEMA, OSHA, and NESC.

1.2 AC station service equipment is available in varying degrees of quality. Equipment installed in a transmission facility should be designed to operate reliably during the design life of the facility. This generally requires quality products and specifications should reflect this need.

1.3 Low side interrupting breakers are preferred. However, certain situations or low voltage circuit sections may require fuse protection for high fault clearing speed.

1.4 All copper electrical contact parts and conducting mechanical joints should be silver surfaced and aluminum electrical contact parts and conducting mechanical joints should be tin surfaced.

1.5 AC station service cables may be run in the same tray systems as other AC circuits 480 V and below and with 125 vdc control circuits, however, they are not recommended to be commingled with low level digital signal circuits and analog signal circuits.

1.6 AC circuits should be adequately sized and designed to limit voltage drop to no more than 5% continuous and 10% momentary from the service point to the further connected load supplied.

1.7 The main power sources for the AC station service systems must be from independent supplies and/or separate power busses. Depending upon the station requirements, supply may be required only from the station main high voltage busses. A system study is required to confirm station service supply reliability requirements.

2.0 Application and Installation

2.1 Loads are generally categorized by electrical size in determining the appropriate supply voltage. Typical voltages would be 480 V/277 V, 208 V/120 V, and 240 V/120 V.2.2 Service reliability further categorizes loads as they are allocated to service panels with (essential loads) and without backup or alternate supplies and transfer switches. All equipment critical to the operation of the transmission facility should be provided with backup station service. This would include power transformers, breakers, SCADA, telecommunications, battery chargers, fire pumps, transmission cable oil pressure systems, motor-operated disconnect switches, etc.

2.2 Transfer switches may be installed internal or external to their associated switchboards, however, if they are located externally, they should be located adjacent to the switchboard to minimize the exposure of the single set of cables supplying the switchboard. For large electrical loads, such as a power transformer with oil pumps, dedicated transfer switches would be located at the power apparatus with primary and alternate power supplies. It is recommended to provide an electrical and physical separation for the supplies routed to the switch.

2.3 All devices connected to the AC station service system must be capable of operating continuously and properly without malfunction or overheating in the voltage range specified by the designer of the system.

2.4 AC station service system components must be installed in accordance with manufacturer's instructions and applicable industry standards.

2.5 All AC station service systems shall be adequately monitored and alarmed, for all voltage levels and phases, to assure that improper operation and abnormal conditions are reported for immediate corrective action.

2.6 AC station service systems should be physically arranged to facilitate safe and effective inspection and maintenance.

2.7 If a transmission facility is considered as critical facility by Transmission Owner, it is recommended to provide emergency engine-generator sets sized to carry essential loads considering a reasonable diversity factor, when alternate reliable sources are not available. If not, facilities should be available for prompt connection of emergency generation. Remoteness of the location, adversity of weather conditions, refueling cycles, etc. should be considered in determining required fuel capacity. Recommended essential load could include by not limited to: battery chargers, heaters, compressors, cable oil pumps, lighting loads, heat & AC for indoor environmental control for batteries & other electronic equipment if specifically required, fire pump, etc.

3.0 Maintenance

3.1 See Section V.L.2.I for maintenance requirements.