The following information submitted for this Part 4 of FERC Form No. 715 consists of PJM's current Planning Criteria, and each member transmitting utility's additional detailed planning criteria document.
FERC Form No. 715
Part 4
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I INTRODUCTION

A. PURPOSE

With the changes to the electric transmission systems regulations promulgated by FERC under orders 888, 889, and 2000, the transmission planning process has expanded and is led by the PJM Interconnection’s Regional Transmission Expansion Plan. The distribution planning process continues to be performed by PSE&G staff. This document is intended to identify the PSE&G specific planning principles, interaction between the transmission and distribution systems, and additional requirements that are needed to assure consistent, safe, and reliable service to customers in the PSE&G service territory.

B. APPLICATION

These criteria are intended to state broad principles or policies rather than design specifications. All connections to the transmission and distribution system whether they are utility owned or not, should adhere to these principles. Arbitrary or unreasonable application of the criteria is to be avoided, and modifications will at times be found justified in unusual situations. For example, higher than average service reliability is usually called for in high load density business areas or for critical loads; and conversely, some lower level of service reliability may be justified in areas of very low load density or when specifically requested by a large customer for reasons of economy. Where more than one criteria covers a given situation, or where both Public Service Electric & Gas Co. (PSE&G) Planning Criteria, the ReliabilityFirst Corporation (RFC) Criteria, the North American Electric Reliability Corporation (NERC) cover the same situation, the criteria resulting in the highest reliability of service shall be applied.

Enhancements to the power system should balance system reliability, ease of operation, environmental concerns, and economics. In order to accomplish these long-term goals operating conditions and procedures should be taken into account in both the design and analysis of the bulk power system. This will ensure the operation of the system is not compromised when changes are made to the power system design. Close attention should be paid to the environmental impact of all changes to the power system. All system enhancements should work in harmony with their surroundings. Each system change should be made with the intention of improving the reliability and/or the economics of the bulk power system. The economics of each option should be considered before a decision is made. A balance of all of these factors will ensure a prudent system enhancement.

C. BASIS

NERC Planning Standards and RFC planning criteria shall be the basis for PSE&G Transmission System planning. The facilities that are to be used in the analysis are contained in the PJM Open Access Transmission Tariff facilities list. Although these criteria are for the most part deterministic, the allowed consequences are more severe for those
contingencies with a relatively lower probability of occurrence. The development of the criteria is based partly on a balancing of service quality, cost of service and environmental impact. Other criteria are based on experience; for example, the boundary between acceptable and unacceptable voltage variations. It is recognized that many of the contingencies specified in these criteria occur very infrequently at the specified load levels and system conditions. However, the facilities installed to meet these criteria should provide an overall system capable of meeting the contingencies that do occur in actual operations.

D. ORGANIZATION OF MATERIAL

The ratings required for planning purposes are defined in Section II. The methods used to determine these ratings are consistent with the methods used by the PJM Interconnection, LLC Regional Transmission Organization (RTO). Section III describes the nominal and acceptable voltages at connections to transmission and distribution system customers and acceptable load drop levels and durations. Section IV addresses power quality issues including harmonics and transients. Section V covers the basis for documenting generation, Merchant Transmission, and Special Protective Systems requirements. Section VI covers the Short Circuit requirements, circuit breaker ratings, short circuit duties and pre-fault voltage requirements. Section VII covers Equipment assessment and Storm hardening. Section VII, VIII & IX covers all the distribution system contingencies and acceptable load drop levels and durations.

The specific contingencies which the system must be able to withstand in order to provide adequate service are defined in the NERC Reliability Standards (TPL-001, TPL-002, TPL-003, and TPL-004), for generation, transmission, and switching stations. Each element of the system must be adequate for any of the contingencies in any other element of the system; for example the sub-transmission system must be adequate for criteria established for transmission contingencies. Provision for outages in other companies' systems that affect PSE&G facilities is made through the criteria.

For each element of the electric system, the quality of service required for various load levels is given. The acceptable load interruptions and acceptable voltages for the various load levels and contingencies are also stated.

II APPLICABLE RATINGS

Loadings of facilities shall be within appropriate ratings. For Bulk Electric System (BES) Transmission facilities, these ratings should be consistent with those submitted to PJM and documented on their web site as indicated in these criteria. These ratings are based on 35°C summer and 10°C winter ambient temperature, and shall be used in the planning of the system. Normal, emergency, and load dump thermal ratings are required for each temperature set (32, 41, 50, 59, 68, 77, 86, 95 °F). The transfers of load, by readjustment
of system facilities following outages, are acceptable means of providing adequate service with the remaining facilities, as defined by PSE&G or PJM operations manuals. Special ratings other than those listed below should not be used except under emergency conditions.

A. TRANSMISSION FACILITIES (100 kV AND ABOVE)

1. Normal Rating:
   This rating, based on the specified ambient air or soil temperature shall be used in both the planning and operation of the system. All loads and transactions that are loaded on the system shall not cause these ratings to be exceeded with all related facilities in service.

2. Emergency Rating:
   The emergency rating for Transmission facilities is the four hour rating based on the specified ambient air or soil temperature, that shall be used in both the planning and operation of the system. Contingency loading of the applicable element should not exceed these ratings for more than fifteen (15) minutes. It is assumed that within that time, either generation will be applied or switching shall occur to reduce the contingency loading below the LTE rating.

4. Load Dump Rating:
   This is the rating that shall not be exceeded beyond 5 minutes and allows emergency switching. If an event occurs on the system that the loading reaches or exceeds this rating, immediate load dump shall be implemented. This rating shall not be implemented during the planning process but only in operation.

B. TRANSMISSION AND DISTRIBUTION FACILITIES (BELOW 100 kV)

1. Normal Rating:
   This rating, based on specified ambient air or soil temperature, and time of day, shall be used in both the planning and operation of the system. All loads and transactions that are loaded on the system shall not cause these ratings to be exceeded with all related facilities in service.

2. 30-Minute Rating:
   This rating is for continuous loadings and provides for the time interval necessary to do any necessary switching to relieve overloads at attended stations or at unattended stations using relays or supervisory control.
3. **1-Day (24 Hour) Rating:**
   This rating is at normal load factors and provides for the emergency outage of facilities that can be restored to service in one day.

4. **1-Week Rating:**
   This rating is at normal load factors and provides for multiple generator contingencies and the relocation and substitution of spare transformers when up to one week is required.

5. **1-Month Rating:**
   This rating is at normal load factors and provides for multiple generator contingencies and the relocation and substitution of spare transformers when up to one month is required.

6. **Network Emergency Rating:**
   This rating is at normal load factors and is 110% of a network cable’s normal rating. The Network Emergency Rating provides for normal secondary network operations and is applicable to network planning under contingency conditions. Emergency 1-Day (24 Hour) cable ratings can be utilized during any actual unscheduled contingency outage.

C. **GENERATING EQUIPMENT**

   Normal and emergency net ratings for winter and summer are required along with maximum peaking megawatt ratings for the summer period.

1. **Manufacturer's maximum rating for the generator (kW and kVA) and the turbine (kW)**

2. **Summer Normal Net Rating**
   This rating is a guide for normal system conditions during the summer period.

3. **Summer Emergency Gross and Net Rating**
   This rating can be used under emergency generation, transmission or sub-transmission conditions as applicable during the summer period.

4. **Summer Maximum Peaking Rating**
   This rating only applies to gas turbines during the summer period. This rating can be used, under special circumstances, under extreme emergency generations, transmission or sub-transmission conditions beyond any condition covered in these criteria.

5. **Winter Normal Rating**
   This rating is a guide for normal system conditions during the winter
6. **Winter Emergency Gross and Net Rating**
   This rating can be used under emergency generation, transmission or sub-transmission conditions as applicable during the winter period.

### III VOLTAGES

#### A. NOMINAL VOLTAGES (60 Hertz, AC Volts)

- Secondary: 120; 208; 240; 265; 277; 460; 480
- Primary: 4,160; 13,200
- Sub-transmission: 13,200; 26,400
- Transmission Non-BES: 69,000
- Transmission BES: 138,000; 230,000; 345,000; 500,000

#### B. ACCEPTABLE VOLTAGES

1. Steady state voltages at transmission stations that are connected to transmission customers shall be in accordance with ANSI C84.1-2006 American National Standard for Electric Power Systems and Equipment - Voltage Ratings (60Hz). At stations that do not have directly connected customers, such as switching stations, the PJM standard voltage range shall apply. The ANSI values are contained in Table 1, Voltage Limitations, except for contingencies for which interruptions are acceptable. In certain special cases, such as service to tall buildings where meters are on upper floors, voltages shall be considered acceptable if within limits at the point of service connection.

2. Customer voltages outside of the limits of Table 1 (Voltage Limitations) are acceptable for a customer whose load power factor is below the Tariff specification of 0.85 if studies indicate that voltages would be within limits if the customer increased his power factor to the minimum Tariff specification.

3. Voltage dips, attributable to the start-up and operation of large customer loads such as motors or arc furnaces, shall be limited as indicated on Figure 1, Permissible Voltage Fluctuations. Special study is required if:
   
   a. The effect on substation or switching station buses exceeds 0.4% of nominal, or
   b. The effect on 69-, 138-, 230-, 345-, or 500- kV buses exceeds 0.2% of nominal.

4. Voltage schedules are not included here as they are not criteria. They are, rather, targets to help meet criteria.
5. These voltage criteria will not be applied during imposed voltage reductions.

6. Under normal conditions, the range of voltage variation is not intended to represent the maximum variation as a result of a sudden load increase or the single correction by a voltage regulating device. Rather the range represents an acceptable bandwidth within which customer equipment should operate properly. Single step changes in voltage level either as a result of load changes or voltage regulating devices should be limited to as small an incremental change as can be reasonably obtained with commercially available techniques. Typically, limiting single step changes to 2% or less of nominal voltage is recommended.

C. ACCEPTABLE LOAD DROP LEVELS AND DURATIONS

Transmission facilities shall be required to be constructed if either of the criteria in the below table are violated.

The Maximum Load Drop shall be the estimated load that is expected at a system peak load level. It shall apply to stations supplying native load or for Merchant Transmission facilities that are supplying native load in another control area.

<table>
<thead>
<tr>
<th>Contingency</th>
<th>Facility Type</th>
<th>Maximum Load Drop</th>
<th>Maximum Duration (Any Load Level)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NERC Cat B</td>
<td>All</td>
<td>175 MW</td>
<td>Momentary</td>
</tr>
<tr>
<td>NERC Cat C</td>
<td>All circuits &gt;100 kV not in a designated urban area</td>
<td>300 MW</td>
<td>24 Hours</td>
</tr>
<tr>
<td></td>
<td>All underground circuits &gt;100 kV in a designated underground metropolitan area (a)</td>
<td>175 MW</td>
<td>Momentary</td>
</tr>
<tr>
<td></td>
<td>All 69 kV circuits</td>
<td>20 MW</td>
<td>24 Hour</td>
</tr>
<tr>
<td>NERC Cat C.2</td>
<td>All circuits &gt;100 kV</td>
<td>100 MW</td>
<td>24 Hours</td>
</tr>
</tbody>
</table>

For loss of loads that are less than the above criteria, restoration or sectionalizing of failed equipment or alternate facilities shall be available to supply the load within 24 hours for an NERC Category C or n-1-1 event.

Notes:
(a) Designated underground metropolitan areas are Newark and Hudson Waterfront
TABLE 1

VOLTAGE LIMITATIONS

<table>
<thead>
<tr>
<th></th>
<th>Normal</th>
<th></th>
<th>Emergency</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Max.</td>
<td>Min.</td>
<td>Variation</td>
<td>Max.</td>
</tr>
<tr>
<td>Secondary Customers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of Nominal</td>
<td>104(e)</td>
<td>96(e)</td>
<td>8(e)</td>
<td>106</td>
</tr>
<tr>
<td>Primary Customers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of Nominal</td>
<td>105</td>
<td>98</td>
<td>7</td>
<td>106</td>
</tr>
<tr>
<td>Sub-Transmission Customers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of Nominal</td>
<td>105</td>
<td>98</td>
<td>6</td>
<td>105</td>
</tr>
<tr>
<td>Transmission Customers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of Nominal</td>
<td>105</td>
<td>98</td>
<td>5(b)</td>
<td>105</td>
</tr>
<tr>
<td>Transmission Nodes (c) (d)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of Nominal</td>
<td>105</td>
<td>98</td>
<td>5 (b)</td>
<td>105</td>
</tr>
</tbody>
</table>

Notes:

(a) Minimum voltages 3% below these values are acceptable when switching operations not dependent on availability of a traveling operator can be performed to correct the voltage to meet the emergency criteria within 30 minutes. Further voltage reductions are acceptable if automatic switching operations or automatic controls will correct the voltage to applicable minimum values within 2 seconds.

(b) The post transient voltage drop should be consistent with the voltage criteria currently used in actual system operation (i.e. no more than 5% voltage drop and a post contingency voltage of 0.95 per unit or higher).

(c) Transmission Nodes are those Tariff facilities that do not have any wholesale customers directly connected. Example of such facilities is Deans Switching station. Those locations shall be governed by the PJM standard voltage criteria.

(d) Transmission Nodes include 69 kV facilities that do not have any wholesale customers directly connected.

(e) New Jersey Administrative Code (NJAC) 14:5-3.2 “Adequacy of service” requires tighter voltage regulation tolerances for only specific secondary voltage levels than
does ANSI C84.1. For practical and operational purposes in uniformly addressing the regulation of secondary voltages levels, PSE&G has adopted the practice of applying the NJAC 14:5-3.2 voltage criteria to all secondary voltage classes.

IV POWER QUALITY

A. HARMONICS DISCUSSION

Increased customer usage of non-linear types of loads, such as switched mode power supplies, can create increased harmonic distortion in utility and customer electrical systems. Unrestricted harmonic propagation can result in a variety of electrical and telecommunications problems including increased equipment heating, resonance conditions, fuse and capacitor failures, and telephone interference conditions. At very high levels, harmonic distortion may result in mis-operation or random drop-out of customer systems.

Typically, harmonics are a function of load conditions where non-linear devices draw electrical power in a non-sinusoidal manner. The resulting current waveform consists of various multiples of 60 Hz power. In electrical systems having a high source impedance, current distortion will affect the voltage waveform more significantly. In addition, harmonic currents being of an unbalanced nature will add in the neutral thus impacting other systems referencing the common neutral system.

Ideally, harmonics can be prevented through utilization of power conversion devices that draw power in as near a sinusoidal fashion as possible. Alternatively, damaging harmonics can be managed by maintaining a low impedance electrical source. Where a low impedance source cannot be provided, various filtering and conditioning techniques are commercially available.

Although PSE&G maintains a fairly low impedance source affording suitable short circuit availability to avoid harmonic distortion of the electrical supply, proper design should include adherence to set harmonic limitations. Institute of Electrical and Electronic Engineers (IEEE) Standard 519-1992, Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems, or its latest version, is the definitive utility industry guideline regarding harmonics for both utility and customer systems. PSE&G recognizes this standard and utilizes it in applying appropriate limitations at the point of connection to utility customer's service equipment.
B. TRANSIENT DISTURBANCE DISCUSSION

While system planning criteria traditionally addresses the prevention and minimization of momentary and long term outage contingencies, the resulting redundancy typically increases exposure to transient disturbances. The physics and nature of electrical phenomena dictates that during a short circuit or drastic system reconfiguration, undesirable voltage sags, surges, and swells will occur.

Mitigation and protection from these types of events involves complex review and analysis of the utility system, customer electrical infrastructure and affected equipment and systems.

Ongoing preventive maintenance, maintaining a utility source with low source impedance and fast fault clearing times, and the use of sound design practices are the most effective means of minimizing the impact of transient events. The protection and/or de-sensitization of affected customer equipment and systems has generally been recognized and accepted by both utility and customer segments as the most effective and economic technique of assuring continuous process and equipment up-time. Coordination of designs between utility and customer systems will ensure the highest degree of service quality and continuity based on economic justification.

The use of an equipment susceptibility curve such as the CBEMA (Computer and Business Equipment Manufactures Association) curve depicted in IEEE Standards 446-1995 and 1100-2005, is recommended as a guide in determining vulnerability of customer equipment and systems to transient events originating from within the utility system.
V. SYSTEM RESERVE REQUIREMENTS

A. MEGAWATT RESERVE

Sufficient megawatt generating capacity shall be contracted and sufficient transmission to provide emergency transfer capability to meet PS reliability criteria. These criteria require that for the PSE&G system the probability of load exceeding the available capacity sources shall not be greater, on the average, than one day in ten years. The installed generation capacity is based on PJM studies.

The Capacity Emergency Transfer Objective (CETO) is the capacity transfer which PSE&G or any designated zone within PSE&G must have in a given year and for a given generation configuration to provide sufficient emergency assistance to meet the reliability criteria stated above. In any given year when the Capacity Emergency Transfer Limit (CETL) is less than the CETO it is necessary to install either additional transmission, demand side management, or additional internal generation. In any given year when there is insufficient generating capacity in interconnected systems for emergency assistance it is necessary to install additional generation.

The basic elements involved in planning the generating capacity reserve requirements of a system include the characteristics of load and generating capacity and capacity benefit of ties. The analysis of system reserve includes consideration of load forecast uncertainty. The analysis of system generating capacity, which consists of units of different sizes and types, includes the following characteristics affecting reliability:

1. Summer emergency rating
2. Seasonal changes in capability
3. Forced outage rate
4. Planned outage rate
5. Maintenance outage rate.

Ties provide the capacity transfer required in an emergency. The available tie capacity is specified as the CETL as defined in PJM Manual 14B.
B. **MEGAVAR RESERVE**

Sufficient reactive capacity must be provided to maintain adequate bulk power system reliability and to meet customer voltages as described in the various voltage and reliability criteria included throughout these Planning Criteria. Both load and merchant transmission facilities shall not absorb significant amounts of MVAR’s from the transmission system. The minimum power factor from a load or merchant transmission facility shall be 0.98.

The type of reactive to be installed is to be based on an evaluation of the overall system reactive requirements and available reactive sources.

C. **SPECIAL PROTECTIVE SYSTEMS**

Special Protective Systems (SPS) shall be used only to achieve reliability criteria during maintenance outages. They shall not be used as a substitute for constructing or reinforcing the transmission system. The specific criteria as to type of SPS shall be in accordance with MAAC legacy documents.

D. **MERCHANT TRANSMISSION FACILITIES**

Merchant transmission facilities shall be planned in accordance with the PJM RTEP process. Specific modifications to that process are:

1. Load dump magnitudes and durations for NERC and RFC criteria shall be the same as in section III C of this document.
2. Torsional analysis of local generation shall be conducted with the exact same software control system as will be used on the facility.
   a. Changes in software revisions will be re-certified prior to field installation.
   b. Identification of any interactions will be remedied by trip of the merchant facility.
   c. All modes of operation of the merchant facility will be studied.
3. Harmonic analysis and negative sequence injections shall not result in exceeding recommended limits on any existing generator or load with existing sources taken as the base line.
4. Impact on the cathodic protection of existing underground systems shall be predicted and verified after installation.
VI. SHORT CIRCUIT REQUIREMENTS

A. SHORT CIRCUIT DISCUSSION

Short circuits are generally caused by insulation failure, flashovers, broken conductors, physical damage, human error, and many others. It is essential to isolate the faulted device from the power source to protect equipment, utility personnel and the general public. Circuit breakers are devices that are used to protect equipment against overcurrent and short circuit conditions and isolate faulty devices from the power source. In the process, they ensure the security of the electric power system and enhance reliability of service. The most serious overcurrents are those created by short circuit faults and, for that reason, it is critical to evaluate the extent of the current flow that each circuit breaker is called upon to interrupt under such fault conditions.

Circuit Breaker Short Circuit Ratings

The short circuit rating of a circuit breaker refers to the symmetrical component of short circuit current in rms amperes that the breaker can safely interrupt. The rating is guided by IEEE Standard C37.010 which provides specifications for the calculation of rated breaking current, withstand current, making current and peak withstand current of any circuit breaker. The short circuit interrupting rating of a breaker is usually specified in kilo-amperes (kA) although other units, such as MVA, may also be used.

Short Circuit Duty

The short circuit duty of any breaker is the maximum current that can flow through the breaker into the fault, usually with all lines and generation sources in service. Since the fault may conceivably occur on either side of the breaker, the total fault current that can be delivered to a fault, referred to as the bus total, is generally higher than what any breaker needs to interrupt. For this reason, a detailed short circuit analysis needs to be performed to ensure that all circuit breakers can safely interrupt the fault current that may flow through them for any system short circuit condition. Also affecting the calculation of the fault current going through the breaker is the pre-fault voltage, the clearing time of the breaker and the relationship between real and reactive power flow. In the calculation of short circuit duty for any particular breaker, it is assumed that all other breakers associated with the fault have opened and that the breaker in question is the last fault clearing device to operate.
B. PRE-FAULT VOLTAGE – TRANSMISSION SYSTEM (69-kV and Above)

1. The pre-fault voltage shall be 1.10 per unit for all short circuit calculations at 500-kV and above.
2. The pre-fault voltage shall be 1.00 per unit for all short circuit calculations for all other Transmission voltage levels exceeding 100-kV.
3. The pre-fault voltage shall be 1.05 per unit for all short circuit calculations for Transmission voltage levels below 100-kV.

C. PRE-FAULT VOLTAGE - DISTRIBUTION SYSTEM (Below 69-kV)

4. The pre-fault voltage shall be 1.05 per unit for all Subtransmission and Distribution short circuit calculations below 69-kV.

VII. EQUIPMENT ASSESSMENT AND STORM HARDENING

A. INSIDE PLANT

Transmission and Distribution Facilities:

In order to maintain system integrity and reliability of the transmission and distribution system, condition assessment of switching and substation assets will be periodically reviewed. Condition assessment will include physical condition, age, electrical parameters, past history of asset as well as performance of similar equipment in a peer group. Based on equipment performance, condition assessment and system needs, recommendations will be made to maintain or replace facilities.

Also, in order to maintain system integrity and reliability of PSE&G Stations, PSE&G shall provide redundant facilities to meet sufficient station light and power load requirements including maintaining oil pressure on all pipe type cables. This includes a minimum of two independently fed light and power supplies, each capable of supporting light and power load throughout the station, and generator back-up facilities with black start capability as deemed necessary.
B. **OUTSIDE PLANT**

Transmission and Distribution Facilities Underground and Overhead:

In order to maintain system integrity and the reliability of the outside plant system (i.e. external to the station), a condition assessment of overhead and underground assets shall be periodically performed. The condition assessment will include parameters such as physical condition, age, electrical parameters, environmental, and past history of asset as well as performance of similar equipment in a peer group. The operational benefits of new designs will also be evaluated. Based on equipment performance, condition assessment and system needs, recommendations will be made to maintain or replace facilities.
### VII. PLANNING CRITERIA FOR SUBSTATION CONTINGENCIES

<table>
<thead>
<tr>
<th>A.</th>
<th>B.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The outage of any single transformer in a Distribution station</td>
<td>The outage a substation bus or section of such bus</td>
</tr>
<tr>
<td>(1). With proper operation of breakers and relays</td>
<td>(2). With failure of first line relaying or breakers</td>
</tr>
</tbody>
</table>

#### ACCEPTABLE CUSTOMER VOLTAGES

| If contingency occurs at any load level | Emergency | Emergency | Emergency |

#### ACCEPTABLE RATINGS

| If contingency occurs at any load level | 1-Day Emergency | 1-Day Emergency | 1-Day Emergency |

#### ACCEPTABLE LOAD INTERRUPTIONS

<table>
<thead>
<tr>
<th>Secondary Networks</th>
<th>Radial Primaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum allowable load interrupted</td>
<td>0 to 10 MVA, 24 MVA, 24 MVA</td>
</tr>
<tr>
<td>Acceptable duration of interruption</td>
<td>60 sec., 5 sec., None</td>
</tr>
</tbody>
</table>

| Comments: | 1, 2, 3, 4 | 2 | 2 |

(1) A single radial primary may be interrupted for up to six hours if its planned backup is an available mobile transformer.
(2) In special situations, 30-minute Emergency Ratings may be applied.
(3) Radial Primaries no greater than 10 MVA may be interrupted for up to three (3) hours.
(4) See Section III-C for rationale on Acceptable Load Interruptions.
## VIII. PLANNING CRITERIA FOR SUBTRANSMISSION CONTINGENCIES

### FOR THESE CONTINGENCIES

#### APPLY THESE CRITERIA

<table>
<thead>
<tr>
<th>A.</th>
<th>B.</th>
<th>C.</th>
<th>D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The outage of any single subtransmission circuit</td>
<td>The outage of a double circuit open-wire pole line</td>
<td>The outage of any two circuits (aerial cable and open wire) which are on a single pole line and are the sole supply for any load</td>
<td>The overlapping outage of any single subtransmission circuit and any generator or transformer outage lasting more than three weeks</td>
</tr>
</tbody>
</table>

### ACCEPTABLE CUSTOMER VOLTAGES

If contingency occurs at:

<table>
<thead>
<tr>
<th>Voltage Range</th>
<th>Acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>91 to 100% of Peak Load</td>
<td>Emergency</td>
</tr>
<tr>
<td>90% or less of Peak Load</td>
<td>Normal</td>
</tr>
<tr>
<td>Emergency</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Emergency</td>
<td>Emergency</td>
</tr>
</tbody>
</table>

### ACCEPTABLE RATINGS

If contingency occurs at:

<table>
<thead>
<tr>
<th>Voltage Range</th>
<th>Acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>81 to 100% of Peak Load</td>
<td>1-Day Emergency</td>
</tr>
<tr>
<td>80% or less of Peak Load</td>
<td>Normal</td>
</tr>
<tr>
<td>1-Day Emergency</td>
<td>1-Day Emergency</td>
</tr>
<tr>
<td>Normal</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Not Applicable</td>
<td>1-Day Emergency</td>
</tr>
</tbody>
</table>

### ACCEPTABLE LOAD INTERRUPTIONS

<table>
<thead>
<tr>
<th>Maximum allowable load interrupted</th>
<th>Secondary Networks</th>
<th>Secondary Primaries</th>
<th>Radial Networks</th>
<th>Radial Primaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 10 MVA</td>
<td>0 to 10 MVA</td>
<td>0 to 10 MVA</td>
<td>0 to 24 MVA</td>
<td>0 to 24 MVA</td>
</tr>
<tr>
<td>Above 45 MVA</td>
<td>Above 45 MVA</td>
<td>Above 45 MVA</td>
<td>45 MVA</td>
<td>45 MVA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Acceptable duration of interruption</th>
<th>For Each Circuit</th>
<th>Secondary Networks</th>
<th>Secondary Primaries</th>
<th>Radial Networks</th>
<th>Radial Primaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 sec.</td>
<td>60 sec.</td>
<td>60 sec.</td>
<td>60 sec.</td>
<td>24 hours</td>
<td>None</td>
</tr>
<tr>
<td>60 sec.</td>
<td>60 sec.</td>
<td>60 sec.</td>
<td>60 sec.</td>
<td>None</td>
<td>60 sec.</td>
</tr>
<tr>
<td>24 hours</td>
<td>None</td>
<td>60 sec.</td>
<td>5 sec.</td>
<td>None</td>
<td>60 sec.</td>
</tr>
</tbody>
</table>

| COMMENTS: | 1, 2 | 1, 2 | 1, 2 |

(1) Radial Primaries no greater than 10 MVA may be interrupted for up to three (3) hours
(2) A Single Line Customer may have their Peak Load interrupted for the duration of the restoration
### IX. PLANNING CRITERIA FOR DISTRIBUTION CONTINGENCIES

**FOR THESE CONTINGENCIES**

**APPLY THESE CRITERIA**

<table>
<thead>
<tr>
<th>A</th>
<th>The outage of any single radial distribution circuit or any part such a circuit except service runs</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>The outage of a single distribution circuit which supplies a secondary network</td>
</tr>
<tr>
<td>C</td>
<td>The overlapping outage of any two dedicated 13-kV or 26-kV circuits which supply a secondary network</td>
</tr>
</tbody>
</table>

#### ACCEPTABLE CUSTOMER VOLTAGES

<table>
<thead>
<tr>
<th>If contingency occurs at:</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>91 to 100% of Peak Load</td>
<td>On the circuit to which load has been transferred</td>
<td>Emergency</td>
<td>Emergency</td>
</tr>
<tr>
<td>90% or less of Peak Load</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
</tr>
</tbody>
</table>

#### ACCEPTABLE RATINGS

<table>
<thead>
<tr>
<th>If contingency occurs at:</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>81 to 100% of Peak Load</td>
<td>On the circuit to which load has been transferred</td>
<td>On the circuit(s) to which load has been transferred</td>
<td>On the circuit(s) to which load has been transferred</td>
</tr>
<tr>
<td>80% or less of Peak Load</td>
<td>1-Day Emergency</td>
<td>Network Emergency</td>
<td>Network Emergency</td>
</tr>
<tr>
<td></td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
</tr>
</tbody>
</table>

#### ACCEPTABLE LOAD INTERRUPTIONS

<table>
<thead>
<tr>
<th>Maximum allowable load interrupted</th>
<th>Radial Primary</th>
<th>Radial Primary</th>
<th>Single Primary</th>
<th>Throwover Customer</th>
<th>Secondary Network</th>
<th>Applicable Secondary Network Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 5 MVA</td>
<td>0 to Above</td>
<td>0 to Above</td>
<td>0 to 10 MVA</td>
<td>0 to 10 MVA</td>
<td>0 to 24 MVA</td>
<td>0 to 24 MVA</td>
</tr>
<tr>
<td>5 MVA</td>
<td>5 MVA</td>
<td>Load</td>
<td>Load</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60 sec.</td>
<td>60 sec.</td>
<td>3 hours</td>
<td></td>
<td></td>
<td>60 sec.</td>
<td>None</td>
</tr>
</tbody>
</table>

**COMMENTS:**

(a) In general, a 13-kV circuit is limited by the loop loading. All interstation capacity tie loops and circuits providing back-up to a 13-kV Unit, must be limited to 16 MVA. Other loops can be loaded to 20 MVA if a normally open head end tie switch equipped with SCADA is installed.

(b) Distribution networks supplied at 26-kV and above should be limited to 50 MVA. Networks supplied below 26-kV should be limited to 24 MVA.