

B. Transmission Planning, cont.

Table B-1

NYSRC Planning Design Criteria: Contingency Events and Performance Requirements³

Contingency events, Fault type and Performance requirements to be applied to bulk power system elements

Category	Contingency events Simulate the removal of all elements that protection systems, including Special Protection Systems, are expected to automatically disconnect for each event that involves an AC fault.	Fault type (permanent) On the listed elements where applicable	Performance requirements
I Single Event	1. <i>Fault</i> on any of the following: a. transmission circuit b. transformer c. shunt device d. generator e. bus section	Three-phase <i>fault</i> with normal <i>fault clearing</i>	i to viii
	2. Opening of any circuit breaker or the loss of the following: a. transmission circuit b. transformer c. shunt device d. generator e. bus section	No <i>fault</i>	
	3. Loss of single pole of a direct current facility	No <i>fault</i>	
	4. <i>Fault</i> on any of the following: a. transmission circuit b. transformer c. shunt device d. generator e. bus section	Phase to ground <i>fault</i> with failure of a circuit breaker to operate and correct operation of a breaker failure <i>protection system</i> and its associated breakers.	

³ Table B-1 incorporates Table 1 of NPCC Directory 1, with the following modifications: (1) bolded NPCC glossary terms have been removed, (2) more stringent NYSRC contingency event criteria are shown in bold, and (3) NYSRC glossary terms are shown in italics. NPCC performance criteria at the bottom of Table B-1 is supplemented by more stringent and specific NYSRC performance criteria in Table B-2.

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Category	Contingency events Simulate the removal of all elements that protection systems, including Special Protection Systems, are expected to automatically disconnect for each event that involves an AC fault.	Fault type (permanent) On the listed elements where applicable	Performance requirements
	5. <i>Fault</i> on a circuit breaker 6. Simultaneous <i>fault</i> on two adjacent transmission circuits on a multiple circuit tower. 7. Simultaneous permanent loss of both poles of a direct current bipolar facility 8. The failure of a circuit breaker to operate when initiated by an SPS after a <i>fault</i> on the following: a. transmission circuit b. transformer c. shunt device d. generator e. bus section	Phase to ground <i>fault</i> , with normal <i>fault clearing</i> . Phase to ground <i>faults</i> on different phases of each circuit, with normal <i>fault clearing</i> . Without an ac <i>fault</i> . Phase to ground <i>fault</i> , with normal <i>fault clearing</i> .	
	9. The failure of a circuit breaker to operate when initiated by an SPS after opening of any circuit breaker or the loss of the following: a. transmission circuit b. transformer c. shunt devise d. generator e. bus section f. loss of any element	No <i>fault</i>	

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Category	Contingency events	Fault type (permanent)	Performance requirements
<p align="center">II Event(s) after a first loss and after System Adjustment</p>	<p>Simulate the removal of all elements that protection systems, including Special Protection Systems, are expected to automatically disconnect for each event that involves an AC fault.</p> <p>1. Following the loss of any critical: a. transmission circuit, b. transformer, c. series or shunt compensating device or d. generator e. single pole of a direct current facility and after System Adjustment, Category I Contingencies shall also apply.</p>	<p>On the listed elements where applicable</p> <p>Any Category I event as described above.</p>	<p>Performance requirements i to viii apply.</p> <p>Allowable system adjustments that can be made within 30 minutes between outages include: generation and power flows by the use of ten (10) minute operating reserve and, where available, phase angle control and HVDC control.</p>

Performance Requirements for the contingencies defined in Table B-1:

- i. Loss of a major portion of the system or unintentional separation of a major portion of the system shall not occur.
- ii. Loss of small or radial portions of the system is acceptable provided the performance requirements are not violated for the remaining bulk power system.
- iii. Voltages and loadings shall be within applicable limits for the pre-contingency conditions.
- iv. Voltages and loadings shall be within applicable emergency limits for post-contingency conditions except for small or radial portions of the system as described in it.
- v. The *stability* of the bulk power system shall be maintained during and following the most severe *contingencies*, with due regard to successful and unsuccessful reclosing except for small or radial portions of the system as described in it.
- vi. For each of the contingencies that involve *fault clearing*, *stability* shall be maintained when the simulation is based on *fault clearing* initiated by the “system A” *protection group* and also shall be maintained when the simulation is based on *fault clearing* initiated by the “system B” *protection group*. When applying this requirement to contingency Event *no 6*, the failure of a *protection group* shall apply only to one circuit at a time. When evaluating contingency Event #4 breaker, failure *protection* is assumed to operate correctly, even if only a single breaker failure *protection* system exists.
- vii. Regarding contingency *no 6*, if multiple circuit towers are used only for station entrance and exit purposes and if they do not exceed five towers at each station, then this condition is an acceptable risk and therefore can be excluded. Other similar situations can be excluded on the basis of acceptable risk, provided that the NYSRC Executive Committee specifically accepts each request for exclusion.
- viii. Transient voltage response shall be within acceptable limits established by the Planning Coordinator and the Transmission Planner, except for small or radial portions of the system as described in it.