Request to Develop or Modify Reliability Rules and Requirements (NYSRC Policy No. 1-7)
Submit request to raymond40@aol.com via the NYSRC site www.nysrc.org

Item	Information
1. PRR No. & Title of Reliability Rule or Requirement change	**PRR 120** Revision of Reliability Rule B.1, *Transmission System Planning Performance Requirements*
2. Rule change requester information	
Name	RRS
Organization	
3. New rule or revision to existing rule?	Revision
4. Need for rule change, including advantages and disadvantages	This revision is needed in order that B.1 is consistent with NPCC Directory 1 (R7 to R10) transmission planning criteria revisions, dated 9/30/15.
5. Related NYSRC rules	B.1(R1 to R4) to be revised
6. Section A – Reliability Rule Elements	
1. Reliability Rule	B.1 – no changes
2. Associated NERC & NPCC Standards and Criteria	No changes
3. Applicability	NYISO
7. Section B – Requirements	
Requirements	**R1.** Transmission facilities in the *NYS Bulk Power System* shall be planned to meet the respective performance requirements in Table B-1 and supplemental performance requirements in Table B-2~~1~~, for the *contingency* events as specified in Table B-1~~Table B-2~~. **R1.1.** Credible combinations of system conditions which stress the system shall be modeled, including load forecast, internal NYCA and inter-Area and transfers, transmission configuration, active and reactive resources, generation availability, and other dispatch scenarios. All reclosing facilities shall be assumed in service unless it is known that such facilities will be rendered inoperative. [New requirement based on Directory 1, R7.1.] **R2.** The impact of the extreme contingency event~~sies~~ listed in Table B-3 shall be assessed. ~~to recognize the performance assessments described in Table B-3 for the extreme *contingency* events as specified in Table B-4.~~ **R3.** Extreme System Conditions, events that have a low probability of occurrence, shall be assessed, one condition at a time, to determine the impact of these conditions on expected steady-state and dynamic system performance. These assessments shall provide an indication of system robustness or the extent of a widespread adverse system response. The conditions to be assessed are listed in the "Extreme System Conditions" category in Table B-3. ~~The impact of extreme system conditionsshall be assessed as described in Table ___.~~ [A portion of this change is taken from existing Table B-5. Table B-5 will be retired.]

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	R4. *Fault duty* levels shall be planned to be within appropriate equipment *ratings*. Fault duty levels shall be determined with all generation and all transmission facilities in service. **R4.1.** Determination of fault duty levels shall be with due regard to fault current limiting series reactor protocols. ~~**R5.** System expansion or reconfiguration plans shall include an assessment of their impact on the existing NYCA System Restoration Plan (NYCA SRP).~~ ~~**R5.1** Any impacts identified shall be described in terms of how and where the SRP may need to be modified, and made available to the *NYISO* Operating Group and the operating function of the appropriate *Transmission Owners* for consideration in the annual review and update of *NYISO* and *Transmission Owner* restoration plans as required by Reliability Rule F R1.~~[RRS should consider moving R5 and R5.1 to B-R2 (PRR 121).] [R5 moved to PRR 121.]
8. Section C – Compliance Elements	
1. Measures	**M1.** The NYISO shall maintain procedures for implementing the transmission planning criteria in R1 to through R4.~~Transmission facilities in the *NYS Bulk Power System* were planned in accordance with requirements defined in R1 though R5.~~
2. Levels of Non-Compliance	Levels 1-3 No changes. Level 4: The NYISO did not maintain procedures for implementing the transmission planning criteria in R1 through R4, in accordance with M1.~~plan transmission facilities in the *NYS Bulk Power System* in accordance with Requirements B-R1_R1 through R5.~~
3. Compliance Monitoring Process (See Policy 4):	
3.1 Compliance Monitoring Responsibility	No changes
3.2 Reporting Frequency	No changes
3.3 Compliance Reporting Requirements	No changes
9. Implementation Plan	The NYISO shall apply the revised B.1 requirements in PRR 120 in its 2016 Transmission Assessment.
10. Comments	
11. Date Rule Change Adopted	
12. PRR Revision Dates	1/23/15, 2/10/15, 3/10/15, 9/22/15, 10/16/15, 12/28/15, 1/6/16

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Table B-1

NYSRC Planning Design Criteria: Contingency Events and Performance~~Transfer Capability~~ Requirements[1]

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. Fault on any of the following: a. transmission circuit b. transformer c. shunt device d. generator e. bus section	Three-phase fault with normal fault clearing	i to viii
	2. Opening of any circuit breaker or the loss of the following: a. Transmission circuit b. Transformer c. Shunt devise d. Generator e. Bus section	No fault	
	3. Loss of single pole of a direct current facility	No fault	

[1] 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.

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
	4. Fault on any of the following: a. transmission circuit b. transformer c. shunt device d. generator e. bus section	Phase to ground fault with failure of a circuit breaker to operate and correct operation of a breaker failure protection system and its associated breakers.	i to viii
	5. Fault on a circuit breaker	Phase to ground fault, with normal fault clearing.	
	6. Simultaneous fault on two adjacent transmission circuits on a multiple circuit tower.	Phase to ground faults on different phases of each circuit, with normal fault clearing.	
	7. Simultaneous permanent loss of both poles of a direct current bipolar facility	Without an ac fault.	
	8. The failure of a circuit breaker to operate when initiated by an SPS after a fault on the following: a. transmission circuit b. transformer c. shunt device d. generator e. bus section	Phase to ground fault, with normal fault clearing.	
	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 fault	

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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
II **Event(s) after a first loss and after System Adjustment**	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.	Any Category I event as described above.	Performance requirements i to viii~~ix~~ apply. ~~Area generation and power flows are adjusted between outages by the use of resources available within ten minutes following notification and other system adjustments such asHVDC and phase angle regulator adjustments that can be made within 30 minutes.~~ 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.

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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, stabili**t**y 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~~Reliability Coordinating Committee~~ specifically accepts each request for exclusion. ~~(See Appendix E.)~~

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.

Table B-2

NYSRC Planning Design Criteria: Supplemental Performance Requirements

Type of Assessment	Performance Requirements for Thermal, Voltage and Stability Assessments
Thermal	**Pre-Contingency Assessment** 1. For normal transfers, no transmission facility shall be loaded beyond its normal *rating*. 2. For *emergency* transfers, no transmission facility shall be loaded beyond its *normal rating*. However, a facility may be loaded to the *long-term emergency (LTE) rating* pre-contingency, if the *short-term emergency (STE) rating* is reduced accordingly. **Post-Contingency Assessment** 1. For normal transfers, no facility shall be loaded beyond its *LTE rating* following the most severe of Contingency Events 1 through 9~~"a" through "g"~~ specified in Table B-1~~2~~. An underground cable circuit may be loaded to its *STE rating* as following: Loss of *Generation* - provided *ten (10) minute operating reserve* and/or phase angle regulation is available to reduce the loading to its *LTE rating* within fifteen (15) minutes and not cause any other facility to be loaded beyond its *LTE rating*. Loss of Transmission Facilities - provided phase angle regulation is available to reduce the loading to its *LTE rating* within fifteen (15) minutes and not cause any other facility to be loaded beyond its *LTE rating*. For Contingency Events 4, 5, 6, 7, 8, and 9~~"b", "c", "e", "f," and "g"~~ in Table B-1~~2~~ that are not confined to the loss of a single *element*, *Transmission Owners* may request permission from the *NYISO* to design the system so that post-contingency flows up to the *STE ratings* on the remaining facilities can occur. This is permissible provided operating measures are available to reduce the loading to its *LTE rating* within fifteen (15) minutes and not cause any other facility to be loaded beyond its *LTE rating*. Design exceptions should be well documented, including *NYISO* comments, and must be approved by the *NYSRC*. 2. For *emergency* transfers, no facility shall be loaded beyond its *STE rating* following the more severe of Contingency Events 1, 2, or3~~"a" or "d"~~ in Table B-1~~2~~. The *STE rating* is based on an assumed pre-loading equal to the *normal rating*. Therefore, if the limiting facility is loaded above its *normal rating* pre-contingency, the *STE rating* must be reduced accordingly.
Voltage	*Reactive power* shall be maintained within the *NYS Bulk Power System* in order to maintain voltages within applicable pre-disturbance limits for both normal and *emergency* transfers, consistent with the Reliability Rules and all applicable guidelines and procedures.

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Type of Assessment	Performance Requirements for Thermal, Voltage and Stability Assessments
	Pre-Contingency Assessment For both normal and *emergency* transfers, no bus voltage shall be below its pre-contingency low *voltage limit* nor be above its pre-contingency high *voltage limit*. **Post-Contingency Assessment** No bus voltage shall fall below its post-contingency low *voltage limit* nor rise above its post-contingency high *voltage limit*. For normal transfers, Contingency Events 1 through 9~~"a" through "g"~~ specified in Table B-1~~2~~ are applicable. For *emergency* transfers, Contingency Events 1 through 9 ~~"a" through "g"~~ specified in Table B-1~~2~~ are applicable.
Stability	*Stability* of the *NYS Bulk Power System* shall be maintained during and following the most severe of the design criteria contingencies 1 through 9~~"a" through "g"~~ specified in Table B-1~~2~~, with due regard to *reclosing*. For each of those design criteria contingencies that involves a *fault*, *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* by the "system B" *protection group*. **System Stability** 1. For normal transfers, the *stability* of the *NYS Bulk Power System* shall be maintained during and after the most severe of Contingency Events 1 through 9~~"a" through "g"~~ specified in Table B-1~~2~~. The *NYS Bulk Power System* must be stable if the *fault*ed *element* is re-energized by *delayed reclosing* before any manual system adjustment, unless specific alternate procedures are documented. 1. For *emergency* transfers, the *stability* of the *NYS Bulk Power System* shall be maintained during and after the more severe of Contingency Events 1 through 9 ~~"a" through '"g"~~ specified in Table B-1~~2~~. The *NYS Bulk Power System* must also be stable if the *fault*ed *element* is re-energized by *delayed reclosing* before any manual system adjustment. *Emergency* transfer levels may require *generation* adjustment before manually *reclosing* *fault*ed *element*s not equipped with automatic *reclosing* or whose automatic *reclosing* capability has been rendered inoperative. **Generator Unit Stability** With all transmission facilities in service, generator unit *stability* shall be maintained on all facilities not directly involved in clearing the *fault* for Contingency Events 1 through 9 ~~"a" through '"g"~~ specified in Table B-1~~2~~.

Table B-3

NYSRC Extreme Contingency Requirements[2]

Extreme Contingency and System Conditions, Fault type and Performance Assessments 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) and/or condition applied On the listed elements where applicable	Performance to be assessed
Extreme Contingency	1. Loss of the entire capability of a generating station.	No Fault	i, ii, iii.
	2. Loss of all transmission circuits emanating from a generating station, switching station, substation or dc terminal.	No Fault	
	3. Loss of all transmission circuits on a common right-of-way.	No Fault	
	4. Fault on of any of the following: a. transmission circuit b. transformer c. shunt device d. generator e. bus section	Three-phase fault with failure of a circuit breaker to operate and correct operation of a breaker failure protection system and its associated breakers (with due regard to successful and unsuccessful reclosing).	
	5. Fault on a circuit breaker	Three-phase fault, with normal fault clearing	
	6. Sudden loss of a large load or major load center.	No Fault	
	7. The effect of severe power swings arising from disturbances outside the *NYS Bulk Power System.*	Fault applied as necessary.	

[2] Table B-3 incorporates Table 2 of NPCC Directory 1 with the following modifications: (1) bolded NPCC glossary terms have been removed, and (2) NYSRC glossary terms are shown in italics.

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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) and/or condition applied On the listed elements where applicable	Performance to be assessed
	8. Failure of a Special Protection System, to operate when required following the normal contingencies listed in Table B-1, Category I, Single Event.	As listed in Table B-1, Category I, Single Event.	
	9. The operation or partial operation of a Special Protection **System** for an event or condition for which it was not intended to operate.	No Fault	
	10. Sudden loss of fuel delivery system to multiple plants, (e.g. gas pipeline contingencies).	No Fault.	
Extreme System Conditions	Contingency events listed in Table 1, Category I, Single Event	Peak load conditions resulting from extreme weather.	i (b, c), ii, iii.
		Generating unit(s) fuel shortage (e.g. gas supply adequacy or low hydro) under normal weather peak conditions	i (c), ii, iii

Performance Assessment

i.. Model the following pre-contingency conditions:

a. **The testing shall be conducted at megawatt ("MW") transfers at a level which is expected at least 75% of the time on a *load* flow duration basis, but not to exceed the maximum operating limit for the *interface* being tested. This may be at or near the normal transfer limit for some *interfaces*.**

~~transfers within or between Transmission Planner and Planning Coordinator Areas should be studied at values not expected to be exceeded more than 25% of the time.~~

b. Load flows chosen for analysis should reflect reasonable power transfer conditions or highly probable dispatch patterns of generation. ~~for the transfers being~~

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c. appropriate load representation (e.g. active and reactive power as a function of voltage) for transient tests and post transient load flows.

ii.. Examine post contingency steady state conditions, as well as stability, overload, cascading outages and voltage collapse to obtain an indication of system robustness and determine the extent of any widespread system disturbance

iii. Where assessment concludes there are serious consequences, an evaluation of implementing a change to design or operating practices to address such contingencies shall be conducted.

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Table B-4 (DELETE TABLE)

NYSRC Planning Design Criteria:- Extreme Contingency Performance Assessments

1	Model the following pre-contingency conditions: a. Pre-contingency *load* flows chosen for analysis should reflect reasonable power transfer conditions. b. The testing shall be conducted at megawatt ("MW") transfers at a level which is expected at least 75% of the time on a *load* flow duration basis, but not to exceed the maximum *operating limit* for the *interface* being tested. This may be at or near the *normal transfer limit* for some *interfaces*. c. Analytical studies shall be performed to determine the effect of the extreme contingencies in Table B-34.
2	Assessment of the extreme contingencies listed in Table B-34 shall examine post-contingency *steady state* conditions as well as overload cascading and voltage collapse.
3	After due assessment of extreme contingencies, measures will be utilized where appropriate, to reduce the frequency of occurrence of such contingencies, or to mitigate the consequences that are indicated as a result of testing for such contingencies.

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