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

1. PR6 No. 8 This of Reliability Rule or Requirement change PR6 120 Revision of Reliability Rule B.1, Transmission System Planning Performance Requirements 2. Role change requester information Revision 3. New rule or revision to existing rule? Revision 4. Need for rule change, including advantages and disadvantages Revision 5. Related NYSR rules B.1 R1 to R4] to be revised 6. Section A - Reliability Rule Elements B.1 no changes 1. Reliability Rule Elements B.1 no changes 2. Associated NKRC NYCS B.1 no changes 3. Applicability NW TSO 7. Section B - Requirements R.1. Transmission facilities in the WS Bulk Power System shall be planned to meet the respective performance requirements in Table B-2, for the contingency events as specified in Table B-1, and specifier and modeled. Including load forecast, internal NYCA and inter-Area and transfers transmission configuration, arking a faithee S-1 and Specifier at first bescale configuration, arking a faithee S-1, and Specifier at first bescale configuration, arking a faithee S-1, and Specifier at first bescale configuration arking system faither shall be patient and respect respects, specifier at first bescale configuration, arking a faithee S-1, and Specifier at first bescale configuration, arking a faithee S-1, and Specifier at first bescale configuration, arking a faithee S-1, and Specifier at first bescale configuration, arking a faithee S-1, and Specifier at first bescale configuration, arking a faithee S-1, and Specifier at first bescale configuration, arki		st to <u>raymond40@aol.com</u> via the NYSRC site <u>www.nysrc.org</u>	
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12. PRR Revision Dates	1/23/15, 2/10/15, 3/10/15, 9/22/15, 10/16/15, 12/28/15		
11. Date Rule Change Adopted			
10. Comments			
9. Implementation Plan	The NYISO shall apply the revised B.1 requirements in PRR 120 in its 2016 Transmission Assessment.		
Requirements			
3.3 Compliance Reporting	No changes		
3.2 Reporting Frequency	No changes		
3.1 Compliance Monitoring Responsibility	No changes		
 Compliance Monitoring Process (See Policy 4): 			
2 Compliance Monitoring	through R5.		
	facilities in the NYS Bulk Power System in accordance with Requirements B R1_R1		
	Level 4: The NYISO did not <u>maintain procedures for implementing the transmission</u> <u>planning criteria in R1 through R4, in accordance with M1. plan transmission</u>		Formatted: Left
2. Levels of Non-Compliance	Levels 1-3 No changes.		
	System were planned in accordance with requirements defined in R1 though R5.		
	planning criteria in R1 to through R4. Transmission facilities in the NYS Bulk Power		
1. Measures	M1. The NYISO shall maintain procedures for implementing the transmission		
 Section C – Compliance Elements 	<u>ــــــــــــــــــــــــــــــــــــ</u>		Formatted: Font: Not Bold
	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.]		Formatted: Font: 8 pt
	consideration in the annual review and update of NYISO and Transmission		
	may need to be modified, and made available to the NYISU Operating Group and the operating function of the appropriate Transmission Owners for		
	_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		Formatted: Left
	their impact on the existing NYCA System Restoration Plan (NYCA SRP).		
	R5. System expansion or reconfiguration plans shall include an assessment of		Formatted: Normal, Left, Indent: Left: 0.38", First line: Line spacing: single
	current limiting series reactor protocols.	\sim	Formatted: Font: 10 pt, Bold
	R4.1. Determination of fault duty levels shall be with due regard to fault		Formatted: Font: 10 pt
	facilities in service.		Line spacing: single Formatted: Font: 10 pt
	Fault duty levels shall be determined with all generation and all transmission		Formatted: Normal, Left, Indent: Left: 0", First line: 0"
	R4. Fault duty levels shall be planned to be within appropriate equipment ratings.		Formatted: Font: 10 pt
	Table [A portion of this change is taken from existing Table B-5. Table B-5 will be retired.]		
	assessed are listed in the "Extreme System Conditions" category in Table B-3. The impact of extreme system conditionsshall be assessed as described in		
	extent of a widespread adverse system response. The conditions to be		
	These assessments shall provide an indication of system robustness or the		

Table B-1

NYSRC Planning Design Criteria: Contingency Events and Performance Transfer Capability Requirements¹

Category	Contingency events	Fault type (permanent)	Performance requirements
	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.	On the listed elements where applicable	
	1. Fault on any of the following:	Three-phase fault with normal fault	
	a. transmission circuit	clearing	
I	b. transformer		
	c. shunt device		
	d. generator		
Single	e. bus section		
Event	2. Opening of any circuit breaker_or the loss of the following:	No fault	i to viii
	a. Transmission circuit		
	b. Transformer		
	c. Shunt devise		
	d. Generator		
	e. Bus section		
	3. Loss of single pole of a direct current facility	No fault	

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

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	Fault type (permanent)	Performance requirements			
	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.	On the listed elements where applicable				
	4. Fault on any of the following:	Phase to ground fault with failure of				
	a. transmission circuit	a circuit breaker to operate and				
	b. transformer	correct operation of a breaker				
	c. shunt device	failure protection system and its				
	d. generator	associated breakers.				
	e. bus section					
	5. Fault on a circuit breaker	Phase to ground fault, with normal				
		fault clearing.	i to viii			
	6. Simultaneous fault on two adjacent transmission circuits	Phase to ground faults on different		4		Formatted: Space After: 0 p
	on a multiple circuit tower.	phases of each circuit, with normal			C	
	*	fault clearing.				
	7. Simultaneous permanent loss of both poles of a direct	Without an ac fault.				
	current bipolar facility					
	8. The failure of a circuit breaker to operate when initiated by	Phase to ground fault,				Formatted: Font: Not Bold
	an SPS after a fault on the following:	with normal fault clearing.				Formatted: Font: Not Bold
	a. transmission circuit				\sim	Formatted: Font: Not Bold
	b. transformer				C	officiated. Fond. Not bold
	c. shunt device					
	d. generator					
	e. bus section					
	9. The failure of a circuit breaker to operate when	No fault		•		Formatted: Indent: Left: 0.2
	initiated by an SPS after opening of any circuit				U	0.5", List tab + Not at 0.24"
	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			•		Formatted: Numbered + Lev

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Category	Contingency events	Fault type (permanent)	Performance requirements
	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.	On the listed elements where applicable	
	1. Following the loss of any critical:	Any Category I event as described	Performance requirements i to
п	a. transmission circuit,b. transformer,	above.	<u>viii</u> ix apply.
	c. series or shunt compensating device or		Area generation and power flows
Event(s)	d. generator		are adjusted between outages by the
after a first	e. Single pole of a direct current facility		use of resources available within ten
loss and	_and after System Adjustment, Category I		minutes following notification and
after	Contingencies shall also apply.		other system adjustments such
System			asHVDC and phase angle regulator
Adjustment			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.

Performance Requirements for the contingencies defined in Table <u>B-1</u>:

- 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

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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 <u>NYSRC Executive</u> <u>Committee Reliability Coordinating Committee</u> 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.

Type of Assessment	Performance Requirements for Thermal, Voltage and Stability Assessments
	Pre-Contingency Assessment
Thermal	1. For normal transfers, no transmission facility shall be loaded beyond its normal <i>rating</i> .
	 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
	 For normal transfers, no facility shall be loaded beyond its <i>LTE rating</i> following the most severe of Contingency Events <u>1 through 9"a" through "g</u>" specified in Table B-<u>1</u>2.
	An underground cable circuit may be loaded to its STE rating as following:
	Loss of <i>Generation</i> - provided <i>ten (10) minute operating reserve</i> and/or phase angle regulation is available to reduce the loading to its <i>LTE rating</i> within fifteen (15) minutes and not cause any other facility to be loaded beyond its <i>LTE rating</i> .
	Loss of Transmission Facilities - provided phase angle regulation is available to reduce the loading to its <i>LTE rating</i> within fifteen (15) minutes and not cause any other facility to be loaded beyond its <i>LTE rating</i> .
	For Contingency Events <u>4</u> , <u>5</u> , <u>6</u> , <u>7</u> , <u>8</u> , and <u>9</u> "b", "e", "e", "f," and "g" in Table B- <u>1</u> ² that are not confined to the loss of a single <i>element</i> , <i>Transmission Owners</i> may request permission from the <i>NYISO</i> to design the system so that post-contingency flows up to the <i>STE ratings</i> on the remaining facilities can occur. This is permissible provided operating measures are available to reduce the loading to its <i>LTE rating</i> within fifteen (15) minutes and not cause any other facility to be loaded beyond its <i>LTE rating</i> .
	Design exceptions should be well documented, including NYISO comments, and must be approved by the NYSRC.
	 For emergency transfers, no facility shall be loaded beyond its STE rating following the more severe of Contingency Events <u>1</u>, <u>2</u>, <u>or3"a" or "d"</u> in Table B-<u>1</u>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	
Assessment		
	Pre-Contingency Assessment	
	For both normal and <i>emergency</i> transfers, no bus voltage shall be below its pre-contingency low <i>voltage limit</i> nor be above its pre-contingency high <i>voltage limit</i> .	
	Post-Contingency Assessment	
	No bus voltage shall fall below its post-contingency low <i>voltage limit</i> nor rise above its post- contingency high <i>voltage limit</i> . For normal transfers, Contingency Events <u>1 through 9"a" through</u> <u>"g"</u> specified in Table B- <u>1</u> ² are applicable. For <i>emergency</i> transfers, Contingency Events <u>1 through</u> <u>9 "a" through "g"</u> specified in Table B- <u>1</u> 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 <u>1 through <u>9</u>"a" through "g"</u> specified in Table B- <u>1</u> 2, with due regard to <i>reclosing</i> . For each of those design criteria contingencies that involves a <i>fault, stability</i> shall be maintained when the simulation is based on <i>fault clearing</i> initiated by the "system A" <i>protection group</i> and also shall be maintained when the simulation is based on <i>fault clearing</i> by the "system B" <i>protection group</i> .	
	System Stability	
	 For normal transfers, the stability of the NYS Bulk Power System shall be maintained during and after the most severe of Contingency Events <u>1 through 9"a" through "g</u> specified in Table B-<u>1</u>2. The NYS Bulk Power System must be stable if the faulted elemen is re-energized by delayed reclosing before any manual system adjustment, unles specific alternate procedures are documented. 	
	 For emergency transfers, the stability of the NYS Bulk Power System shall be maintained during and after the more severe of Contingency Events. <u>1 through 9</u> <u>"a" through "g</u> specified in Table B-<u>1</u>2. The NYS Bulk Power System must also be stable if the faulted element is re-energized by delayed reclosing before any manual system adjustment Emergency transfer levels may require generation adjustment before manually reclosing faulted elements 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 <i>stability</i> shall be maintained on all facilities not directly involved in clearing the <i>fault</i> for Contingency Events <u>1 through 9</u> $\frac{a''}{a''}$ through $\frac{a''}{a''}$ specified in Table B- <u>1</u> 2.	

Table B-3

NYSRC Extreme Contingency Requirements²

Extreme Contingency and System Conditions, Fault type and Performance Assessments to be applied to bulk power system elements.

<u>Category</u>	<u>Contingency events</u> <u>Simulate the removal of all elements that protection systems, including</u> <u>Special Protection Systems, are expected to automatically disconnect</u> <u>for each event that involves an AC fault.</u>	Fault type (permanent) and/or condition applied	Performance to be assessed
<u>Extreme</u> <u>Contingency</u>	Loss of the entire capability of a generating station. 2. Loss of all transmission circuits emanating from a generating station, switching station, substation or dc terminal.	<u>No Fault</u> No Fault	
	3. Loss of all transmission circuits on a common right-of- way. 4. Fault on of any of the following: a. transmission circuit b. transformer c. shunt device d. generator e. bus section	<u>No Fault</u> 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).	<u>i, ii, iii.</u>
	5. Fault on a circuit breaker 6. Sudden loss of a large load or major load center. 7. The effect of severe power swings arising from	<u>Three-phase fault, with normal fault clearing</u> <u>No Fault</u> 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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<u>Category</u>	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	Performance to be assessed
	 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.	<u>No Fault</u>	
	10. Sudden loss of fuel delivery system to multiple plants, (e.g. gas pipeline contingencies).	<u>No Fault.</u>	
Extreme System Conditions	Contingency events listed in Table 1, Category I, Single Event	Peak load conditions resulting from extreme weather. Generating unit(s) fuel shortage (e.g. gas supply adequacy or low hydro) under normal weather peak conditions	<u>i (b, c), ii, iii.</u>

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:	Formatted: Font: 10 pt
	a. Pre-contingency <i>load</i> 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 <i>load</i> flow duration basis, but not to exceed the maximum operating <i>limit</i> for the <i>interface</i> being tested. This may be at or near the <i>normal transfer limit</i> for some <i>interfaces</i> .	
	c. Analytical studies shall be performed to determine the effect of the extreme contingencies in Table B-<u>34</u>.	Formatted: Font: 10 pt
2	Assessment of the extreme contingencies listed in Table B-34 shall examine post-contingency <i>steady state</i> conditions as well as overload cascading and voltage collapse.	Formatted: Font: 10 pt
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.	