



Request to Modify NYSRC Exception No. 12 With ASEA Spare Phase Transformer in Marcy AT-2

NYSRC RRS – August 3, 2017

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Overview

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Objectives

Request RRS concurrence to:

- Modify NYSRC Exception No. 12 when ASEA spare phase transformer is in-service in Marcy AT-2 765/345 kV transformer and with AT-2 overload relay enabled.

Present System Configuration

Marcy AT-1 765/345 kV Autotransformer

- Marcy AT-1 is an ASEA autotransformer bank. A fourth ASEA phase may be used as a spare either in Marcy AT-1 or AT-2
- Because of the AT-1 limited overload capability, an overload relay scheme is always enabled at Marcy AT-1 to enhance Moses-South thermal transfer capability (Exception No. 10).
- This relay is categorized as Type I, SPS # 48 on the NPCC list of Remedial Action Schemes

NYSRC Exception No. 10

The post-contingency flow on the Marcy AT-1 bank is allowed to exceed its STE rating for the loss of the Marcy AT-2 bank, provided that the overload relay protection on the AT-1 bank is in-service.

Present System Configuration *(cntd.)*

Marcy AT-2 765/345 kV Autotransformer

- Marcy AT-2 Westinghouse transformer has higher thermal ratings than Marcy AT-1, and does not have overload limitation issue.
- Exception No. 12 was put in place to enhance Moses-South thermal transfer capability.
- An Overload protection relay scheme associated with AT-2 is available, but disabled.

Exception No. 12

The post-contingency flow on the Marcy Transformer T2 is allowed to exceed its LTE rating up to its STE rating following the loss of Marcy Transformer T1.

System Configuration in the Fall of 2017

ASEA spare phase in Marcy AT-2 765/345 kV Autotransformer

- The ASEA AT-1 spare phase will be used in the AT-2 autotransformer bank during the sequential refurbishment of the AT-2 phases.
- The Overload protection relay scheme associated with AT-2 will be enabled. This relay is categorized as Type I, SPS # 41 on the NPCC list of Remedial Action Schemes

Proposed Modified Exception No. 12

*The post-contingency flow on the Marcy **AT-2** Transformer **T2** is allowed to exceed its LTE rating up to its STE rating following the loss of Marcy **AT-1** Transformer **T1**.*

When the AT-1 ASEA spare phase transformer is substituted in the Marcy AT-2 Westinghouse transformer bank, the post-contingency flow on the Marcy AT-2 bank is allowed to exceed its STE rating for the loss of Marcy AT-1 Transformer bank, provided that the overload relay protection on the AT-2 bank is in-service.

NYISO Protection Memo PA-5



NYISO Protection Memo PA-6

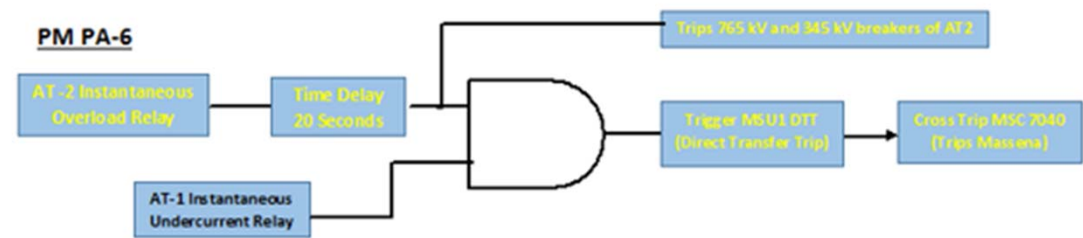
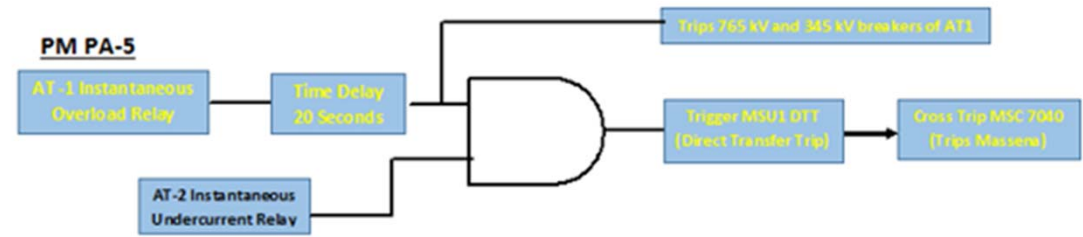


Logic Diagram of Protection Schemes

Marcy Autotransformer 1



Marcy Autotransformer 2



Purpose of the Study

- Determine impact on the Moses-South interface thermal transfer capabilities when ASEA spare phase is used in Marcy AT-2 transformer with AT-2 overload relay protection scheme enabled.
- Compare the Moses-South thermal transfer capability using existing exception No. 12 vs. proposed modified exception No. 12

Methodology & Criteria

- With ASEA spare phase in-service in Marcy AT-2 and AT-2 overload relay enabled, thermal transfer analysis was performed to calculate Moses-South interface limit for:
 - ✓ both normal and emergency transfer scenarios with and without modification to exception No. 12
- Consistent with the NYISO methodology.
- Used PSS MUST.
- Contingencies were simulated in accordance with NPCC criteria and NYSRC Reliability Rules (provided by NYISO).
- Analysis based on NYISO 2017 Summer and 2016-2017 Winter Operating Study peak load base cases.

Marcy Transformer Thermal Circuit Ratings

Equipment Configuration	Summer (MVA)			Winter (MVA)		
	Norm	LTE	STE	Norm	LTE	STE
ASEA AT-1 & with Overload Relay Enabled	1488	1650	1756	1756	1756	1756
Westinghouse AT-2 with same phases; No Overload Relay	1488	1650	1971	1917	2034	2297
AT-2 with ASEA spare phase & with Overload Relay Enabled	1488	1650	1756	1756	1756	1756

- Overall circuit thermal ratings are based on the NYPA Transmission Facilities Rating Book
- Circuit ratings are either limited by the 345 kV overhead connectors or the relay setting

Summer 2017 Normal Moses-South Thermal Transfer Limits

	MSC-7040 = 1310 MW	Impact (Δ MW)	MSC-7040 = 1600 MW	Impact (Δ MW)
Existing NYISO Limit	2564 (3)	-	2570 (1)	-
Spare phase in AT-2 with Exception 12	2413 (2)	-151	2372 (2)	-198
Spare phase in AT-2 with Modified Exception 12	2564 (3)	0	2570 (1)	0

LIMITING ELEMENT		RATING		LIMITING CONTINGENCY
(1) Marcy-Edic (UE1-7) 345 kV	@LTE	1650 MW	L/O	Marcy-Fraser Annex (UCC2-41) 345 kV (Series Capacitor) Chases Lake-Porter (11) 230 kV
(2) Marcy 765/345 kV AT-2 w/spare	@STE	1756 MW	L/O	Marcy 765/345 kV AT-1
(3) Moses-Adirondack (MA2) 230 kV	@LTE	386 MW	L/O	Chateauguay-Massena (MSC-7040) 765 kV Massena-Marcy (MSU1) 765 kV and TransÉnergie delivery

Summer 2017 Emergency Moses-South Thermal Transfer Limits

	MSC-7040 = 1310 MW	Impact (Δ MW)	MSC-7040 = 1600 MW	Impact (Δ MW)
Existing NYISO Limit	2669 (3)	-	2680 (2)	-
Spare phase in AT-2 with Exception 12	2413 (1)	-256	2372 (1)	-308
Spare phase in AT-2 with Modified Exception 12	2669 (3)	0	2893 (3)	+213

LIMITING ELEMENT		RATING		LIMITING CONTINGENCY
(1) Marcy 765/345 kV AT-2 w/spare	@STE	1756 MW	L/O	Marcy 765/345 kV T1 Transformer
(2) Marcy 765/345 kV AT-2	@STE	1971 MW	L/O	Marcy 765/345 kV AT-1
(3) Browns Falls - Taylorville #4 115 kV	@STE	134 MW	L/O	Chateauguay–Massena (MSC-7040) 765 kV Massena-Marcy (MSU1) 765 kV and TransÉnergie delivery

Winter 2016-17 Normal Moses-South Thermal Transfer Limits

	MSC-7040 = 600 MW (HQ->NY)	Impact (Δ MW)	MSC-7040 = 600 MW (NY->HQ)	Impact (Δ MW)
Existing NYISO Limit	2308 (2)	-	1331 (1)	-
Spare phase in AT-2 with Exception 12	2309 (2)	1	1332 (1)	1
Spare phase in AT-2 with Modified Exception 12	2309 (2)	1	1332 (1)	1

LIMITING ELEMENT		RATING		LIMITING CONTINGENCY
(1) Adirondack-Porter (12) 230 kV	@LTE	478 MW	L/O	Moses - Massena (MMS1) 230 kV Moses - Massena (MMS2) 230 kV
(2) Adirondack-Porter (12) 230 kV	@LTE	478 MW	L/O	Chateauguay-Massena (MSC-7040) 765 kV Massena - Marcy (MSU1) 765 kV and TransÉnergie delivery

Winter 2016-17 Emergency Moses-South Thermal Transfer Limits

	MSC-7040 = 600 MW (HQ->NY)	Impact (Δ MW)	MSC-7040 = 600 MW (NY->HQ)	Impact (Δ MW)
Existing NYISO Limit	2426 (1)	-	1484 (1)	-
Spare phase in AT-2 with Exception 12	2422 (1)	-4	1481 (1)	-3
Spare phase in AT-2 with Modified Exception 12	2422 (1)	-4	1481 (1)	-3

LIMITING ELEMENT		RATING		LIMITING CONTINGENCY
(1) Browns Falls-Taylorville (4) 115 kV	@STE	152 MW	L/O	Chateauguay–Massena (MSC-7040) 765 kV Massena – Marcy (MSU1) 765 kV and TransÉnergie delivery

Conclusions

1. NYPA would like to request a modification to NYSRC Exception No. 12 to help ameliorate the negative impact to Moses-South power transfer capability when ASEA spare phase is substituted in Marcy AT-2.
2. Thermal transfer analyses show that the proposed exception No. 12 modification provides benefits to the Moses-South transfer capability during the summer capability period ranging from 150 MW to 520 MW.
3. No negative impacts to reliability were identified.

Proposed modification to Exception No. 12 for Marcy AT-2 Transformer

Exception Reference No.	TO	Exception Category	Exception	NYSRC Reliability Rule
12	NYPA	Monitoring & <i>Special Protection System</i>	<p><u>Post Contingency Flow on Marcy AT-2 Transformer T2</u></p> <p>The post-contingency flow on Marcy AT-2 Transformer T2 is allowed to exceed its LTE rating up to its STE rating following the loss of Marcy AT-1 Transformer T1.</p> <p><i>When the AT-1 ASEA spare phase transformer is substituted in the Marcy AT-2 Westinghouse transformer bank, the post-contingency flow on the Marcy AT-2 Transformer bank is allowed to exceed its STE rating for the loss of Marcy AT-1 bank, provided that the overload relay protection on the AT-2 bank is in-service.</i></p>	B.1 and C.1*