

**CENTRAL MAINE POWER COMPANY  
RESPONSE TO OFFICE OF THE PUBLIC ADVOCATE'S DATA REQUEST  
NO. 4  
DOCKET No. 2008-255**

**CONFIDENTIAL  
MATERIAL  
ATTACHMENTS**

**October 23, 2008**

**OPA-04-04**

**Q.** On page 106 of 373 of Exhibit I-2, reference is made to SPSs that have recently been modified or that are in the process of modification. It states that a reliability assessment of the SPSs was performed as part of the MPRP at 2017 load levels, but that, since then, the SPSs have been changed and finalized, requiring follow-up assessment:

- a. Please describe these changes and provide a copy of any correspondence between CMP and NPCC and/or the NE-ISO regarding these changes.
- b. Has this follow-up assessment been performed?
- c. Do the analysis results reflected in Appendix D reflect this follow-up assessment?
- d. If no to (c), please provide the analysis results for the follow-up assessment.

**A.** a. & b. The reliability assessment was performed with the current SPS designs and triggers as described in Volume VIII, Exhibit I-2 – Section 8. The designs of the SPSs were changed in 2006 and implementation was completed in 2007 following significant operating studies. Copies of the current Maine Yankee DCT SPS and the Maxcy's-Bucksport SPS descriptions are provided as Attachment 1 and 2, respectively, for reference. **These attachments are confidential and are being provided under the terms and conditions of First Revised Protective Order No. 2, Critical Energy Infrastructure Information, dated August 27, 2008.** The correspondence between CMP and NPCC or ISO New England regarding these changes is voluminous and will be made available for inspection at Central Maine Power Company's General Office by appointment. Please contact [debra.mills@cmpco.com](mailto:debra.mills@cmpco.com) via e-mail or call (207) 626-9798 to make an appointment.

- c. Yes.
- d. See response to c above.

**Response Prepared and Submitted By:**

Rick Conant

Manager Power System Studies

RLC Engineering, LLC

David Conroy

Manager of System Planning

Central Maine Power

**Attachment(s):**

OPA-04-04\_Attachment1

OPA-04-04\_Attachment2

<b>ISO</b> new england	<b>Transmission Operating Guides – Special Protection Schemes</b>	
	<b>Owner: Director Operation Support Services</b>	<b>Revision Number: 2</b>
	<b>© ISO New England Inc. 2008</b>	<b>Effective Date: July 16, 2008</b> <b>Valid Through: 07/16/2010</b>

**CONFIDENTIAL**

## Maine Yankee Double Circuit Tower (DCT) SPS Guide

### Contents

I. DESCRIPTION.....	2
Revision History .....	6

*The information contained in this document is for use by ISO New England staff only and is subject to modification. ISO New England Inc. is not responsible for any reliance on this document by others, or for any errors or omissions or misleading information contained herein.*

**CONFIDENTIAL**

## I. DESCRIPTION

The SPS is a Type I, that is armed 80% of the time, and whose function is Generation Rejection, NPCC #141.

The Maine Yankee Double Circuit Tower (DCT) SPS is designed to trip Maine Independence Station (MIS) plant generation and trip generation and/or runback HVdc imports in the Maritimes on either of two condition:

- 1) loss of both the Maine Yankee-Buxton (375) 345 kV line and the Maine Yankee-Maxcys (392) 345 kV line with all three breakers at Maine Yankee (KG1/375, K392/375, and K392-1) tripped, or
- 2) loss of both the Maine Yankee-Buxton (375) 345 kV line and the Maine Yankee-Surowiec (377) 345 kV line with all four breakers at Maine Yankee (KG1/375, K392/375, KG-1, and K378-1) tripped. These line pairings share common towers along the right-of-way and at river crossings and do not meet standard double-circuit tower exclusion requirements. Therefore, loss of two lines simultaneously is considered a single design contingency.

The SPS will trip MIS generation, and also trip the generation or runback HVdc imports in the Maritimes that are armed for operation of either the Dedicated Path Logic (DPL) SPS, or the Maritimes Islanding (MI) SPS, in order to ensure system stability. Additionally, the SPS shall be completely disarmed to better manage thermal overloads when system instability is not of concern. The ISO and CMP EMS systems will monitor the relevant system conditions and provide alarms to annunciate the correct SPS arming states and required manual operator SCADA actions as follows:

- 1) SPS arming/disarming
  - a. The Maine LCC operator shall manually arm the SPS when the Maine Yankee-South Interface MW flow is greater than 300 MW
  - b. The Maine LCC operator shall manually disarm the SPS when the Maine Yankee-South Interface MW flow is less than 200 MW
  - c. In order to prevent frequent arming/disarming of the SPS a 100 MW dead band will be utilized
- 2) SPS selection of Maritimes generation/HVdc arming
  - a. **If** MIS is off-line the Maine LCC operator shall instruct the Bangor operator to manually arm the generation and/or HVdc rejection associated with the MI SPS

Transmission Operating Guides - SPS	MY Double Circuit Tower SPS
-------------------------------------	-----------------------------

CONFIDENTIAL

- b. **If** MIS is on-line **AND** the

*Surowiec-South Interface MW flow – (MIS MW + DPL SPS generation and/or HVdc rejection MW) is less than 800 MW*

the Maine LCC operator shall instruct the Bangor operator to manually arm the generation and/or HVdc rejection associated with the DPL SPS.

- c. **If** MIS is on-line **AND** the

*Surowiec-South Interface MW flow – (MIS MW + DPL SPS generation and/or HVdc rejection MW) is greater than 900 MW*

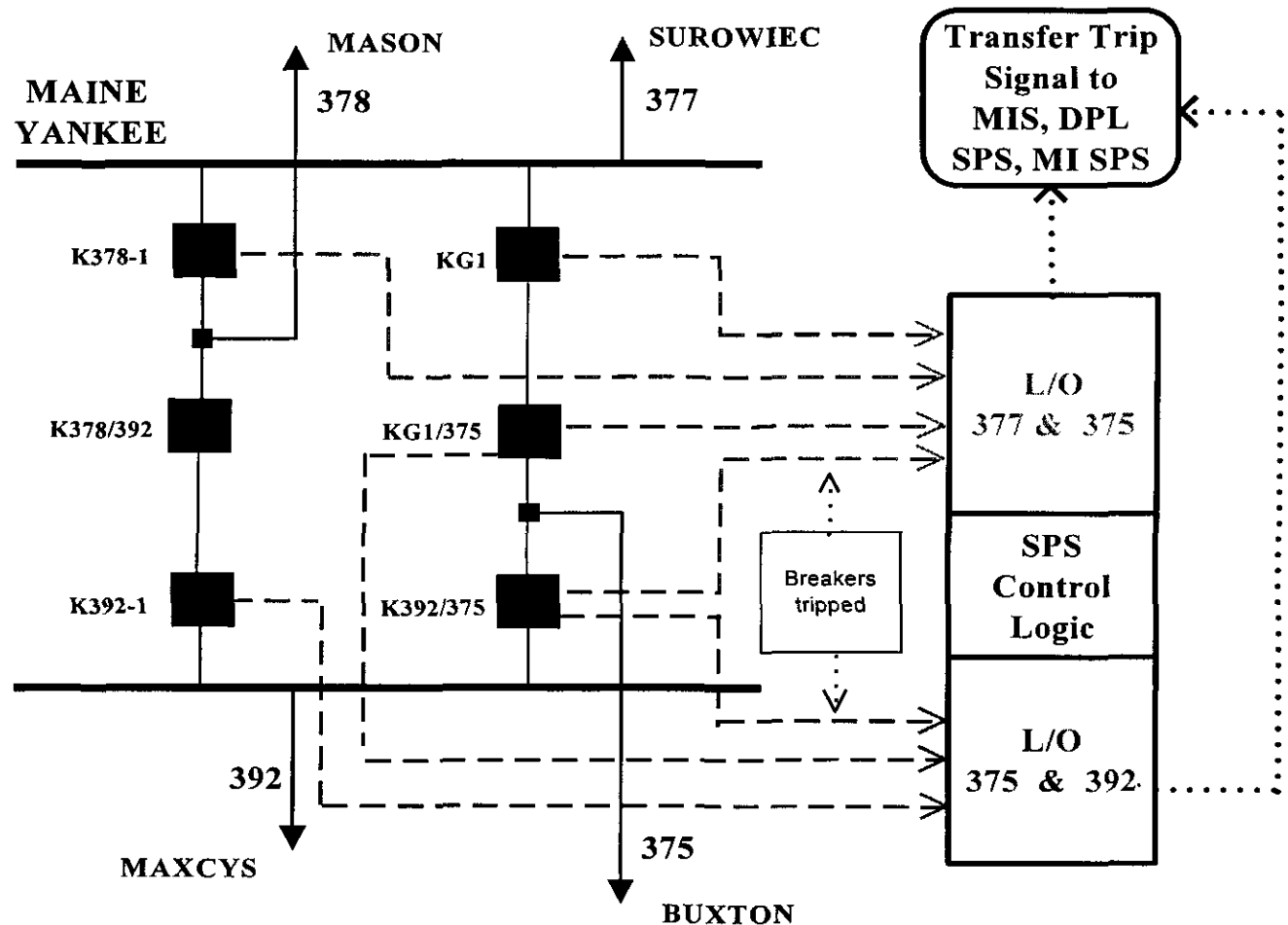
the Maine LCC operator shall instruct the Bangor operator to manually arm the generation/HVdc rejection associated with the MI SPS

- d. In order to prevent frequent changes in the selection of DPL SPS or MI SPS arming a 100 MW dead band will be utilized

The SPS should be expected to be armed as described in “a” or “b” the majority of the time. The ISO and CMP EMS systems will alarm the operators if the total SPS generation and HVdc imports armed for rejection exceeds 1200 MW, due to source loss concerns. The logic provided should prevent this from ever occurring. Note that this SPS creates an equivalent loss-of-source contingency for New England that must be appropriately covered with reserve.

Transmission Operating Guides - SPS	MY Double Circuit Tower SPS
-------------------------------------	-----------------------------

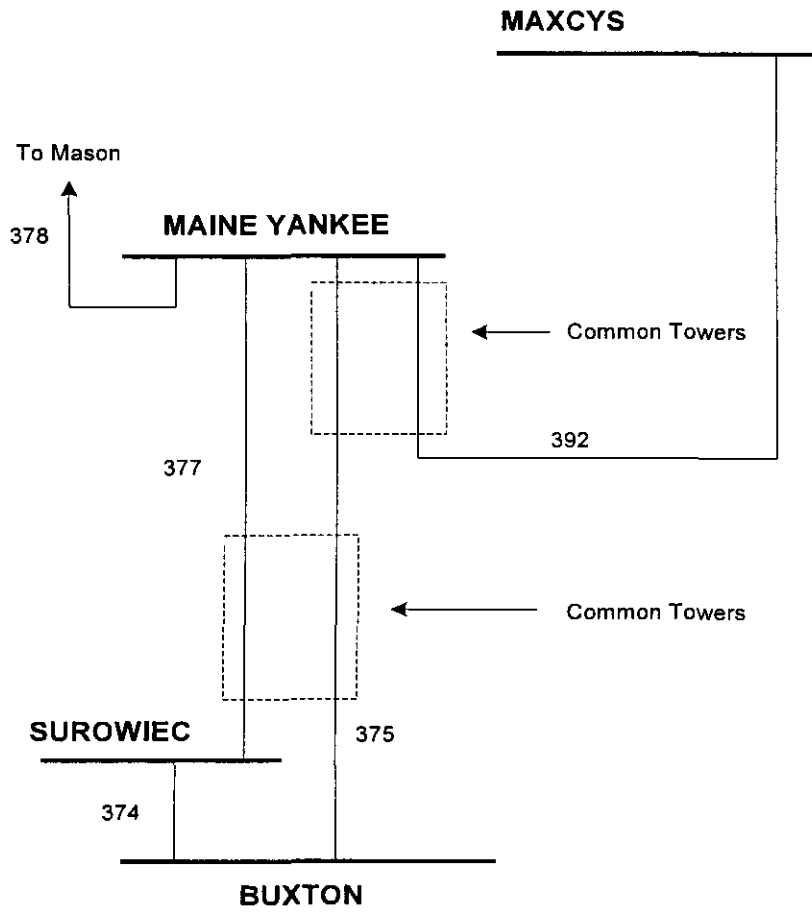
CONFIDENTIAL



This SPS was installed as a result of analysis performed under the System Impact Study for interconnection of MIS at the Graham 115 kV switchyard. Studies determined that simultaneous loss of two 345 kV lines would cause instability. The studies concluded for both double circuit tower contingencies that initiating the trip of MIS plant generation ensures adequate system response and post-contingency system stability. As a result of the Northeast Reliability Interconnect (NRI) Project this SPS has been modified. It has the ability to trip generation or runback HVdc imports in New Brunswick to ensure system stability for the associated increased transfer capabilities, and it can be completely disarmed to better manage thermal overloads when system instability is not of concern.

In addition to sensing the tripped breaker position, the SPS also monitors the associated breaker failure relaying to prevent a stuck breaker condition from disabling the SPS.

Transmission Operating Guides - SPS	MY Double Circuit Tower SPS
-------------------------------------	-----------------------------



CONFIDENTIAL

<b>Transmission Operating Guides - SPS</b>	<b>MY Double Circuit Tower SPS</b>
--	------------------------------------

**CONFIDENTIAL**

**Revision History**

<b>Rev. No.</b>	<b>Date</b>	<b>Reason</b>	<b>Contact</b>
10	10/19/06	Old Format	Jim Helton
0	12/01/07	Revised for NRI project and reformatted into individual SPS (removed from SPS Document)	Jim Helton
1	03/05/08	Revised due to the ISO EMS cannot accurately model the SPS actions to ensure thermal security,	Jim Helton
2	07/16/08	ISO EMS can accurately model the MY DCT SPS, removed the SPS disarming requirement	Jim Helton

<b>ISO</b> new england	<b>Transmission Operating Guides – Special Protection Schemes</b>	
	<b>Approved By: Manager Operation Support Services</b>	<b>Revision Number: 2</b>
	<b>© ISO New England Inc. 2008</b>	<b>Effective Date: September 23, 2008</b> <b>Review Due Date: 09/23/2010</b>

**CONFIDENTIAL**

## Maxcys-Bucksport SPS Guide

### Contents

I. DESCRIPTION.....	2
Revision History .....	5

*The information contained in this document is for use by ISO New England staff only and is subject to modification. ISO New England Inc. is not responsible for any reliance on this document by others, or for any errors or omissions or misleading information contained herein.*

<b>Transmission Operating Guides - SPS</b>	<b>Maxcys-Bucksport SPS</b>
--	-----------------------------

**CONFIDENTIAL**

**I. DESCRIPTION**

The SPS is a Type I, that is armed 100 % of the time, and whose function is Transmission Cross Tripping and Generation Rejection NPCC #178.

This SPS trips breakers at the Maine Independence Station Plant, Bucksport, and Maxcys Substations during all-facility-in conditions according to Table 1 below:

**Table 1 - Maxcys-Bucksport SPS All-Facility-In Conditions**

Orrington-South (MW)	SPS Arming Level	Trip Bucksport K86-1 and K203-2 Breakers		Trip MIS GTG-1, GTG-2, ST-G and Bucksport 52L Generator Breakers		Trip Maxcys KT3L-1, KT3L-2, K388-1, and K392-3 Breakers	
		Loss of 388	Loss of 392	Loss of 388	Loss of 392	Loss of 388	Loss of 392
>400 MW (North-South Flows)	TWO-NS	YES	YES	YES	YES	NO	YES
>225 MW (North-South Flows)	ONE-NS	YES	NO	YES	NO	NO	NO
<-155 MW (South-North Flows)	ONE-SN	YES	NO	NO	NO	NO	NO
<-215 MW (South-North Flows)	TWO-SN	YES	YES	NO	NO	NO	YES

When one of the facilities listed in Table 3 is out of service, this SPS will trip breakers at the Maine Independence Station Plant, Bucksport, and Maxcys Substations according to Table 2 below

**Table 2 - Maxcys-Bucksport SPS Facility-Out Conditions**

Orrington-South (MW)	SPS Arming Level	Trip Bucksport K86-1 and K203-2 Breakers		Trip MIS GTG-1, GTG-2, ST-G and Bucksport 52L Generator Breakers		Trip Maxcys KT3L-1, KT3L-2, K388-1, and K392-3 Breakers	
		Loss of 388	Loss of 392	Loss of 388	Loss of 392	Loss of 388	Loss of 392
>225 MW (North-South Flows)	TWO-NS	YES	YES	YES	YES	NO	YES
>125 MW (North-South Flows)	ONE-NS	YES	NO	YES	NO	NO	NO
<-65 MW (South-North Flows)	ONE-SN	YES	NO	NO	NO	NO	NO
<-125 MW (South-North Flows)	TWO-SN	YES	YES	NO	NO	NO	YES

The actions that the SPS takes are the same under both all-facility-in and facility-out conditions. However, these actions are required to be taken at different levels of Orrington-South Interface flows for all-facility-in conditions and facility-out conditions.

Due to the “normally open” bus tie switch, SPS actuation of the Maxcys KT3L-1 and KT3L-2 breakers splits the Maxcys 115 kV bus such that the sections 68, 84 and 88 are connected to Maxcys Bus 2, while the 60, 67, and 80 sections are connected to Maxcys Bus 1

Transmission Operating Guides - SPS	Maxcys-Bucksport SPS
-------------------------------------	----------------------

**CONFIDENTIAL**

**Table 3 - Facility-Out Conditions That Require Facility-Out Arming Of The Maxcys-Bucksport SPS**

Transmission Lines (includes associated line-end-open, breaker open and bus outage conditions) <sup>1</sup>	Autotransformers (includes associated breaker open and bus outage conditions) <sup>1</sup>	Breakers
115 kV Section 60: Maxcys-Browns-Bowman	Maxcys 345/115 kV 3X	Bucksport KBS 1/2
115 kV Section 62: Surowiec-Crowleys	Mason 345/115 kV 9X	
115 kV Section 64: Surowiec-Gulf Island	Surowiec 345/115 kV 1X	
115 kV Section 65: Orrington-Bucksport		
115 kV Section 67: Detroit-Maxcys		
115 kV Section 68: Maxcys-Mason		
115 kV Section 80: Maxcys-Highland		
115 kV Section 86: Bucksport-Belfast-Highland		
115 kV Section 203: Bucksport-Detroit		
115 kV Section 204: Mason-Newcastle		
115 kV Section 205: Orrington-Betts Rd-Bucksport		
115 kV Section 208: Surowiec-Raymond		
115 kV Section 209: Raymond-Kimball		
115 kV Section 212: Gulf Island-Bowman		
115 kV Section 226: Newcastle-Highland		
345 kV Section 378: Mason-Maine Yankee		
345 kV Section 388: Maxcys-Orrington		

<sup>1</sup> As an example, the Section 203 listing also include outages of the Bucksport 115 kV bus 2, Bucksport K203-2 breaker, Detroit 115 kV bus 1, and the Detroit K203-1 breaker.

Section 388 line open detection is determined by the status of Orrington breakers K388-3 and K396/388, or Maxcys breakers K388-1 and K388/392, or Section 388 line protection. Section 392 line open detection is determined by the status of Maxcys breakers K392-3 and K388/392, or Maine Yankee breakers K392/375 and the series K392-1 and K378/392 breakers (both series breakers closed required for continuity of path, either series breaker open for discontinuity of path.), or Section 392 line protection.

Breaker failure logic is included for all breaker operations associated with the SPS.

The SPS arming level is determined automatically by the CMP Energy Management System (EMS), based on Orrington South flow according to the previous logic tables.

The SPS provides thermal, voltage and transient stability protection of the northern Maine transmission system for the loss of 345 kV Sections 388 or 392 during heavy Orrington South Interface transfer conditions in both the North to South and South to North directions.

CONFIDENTIAL

For breaker maintenance work, each breaker associated with the Maxcys-Bucksport SPS has a corresponding maintenance control switch that must be used to preserve the associated relay logic. This allows the breaker to be opened and closed during maintenance without affecting the reliability of the Maxcys-Bucksport SPS.

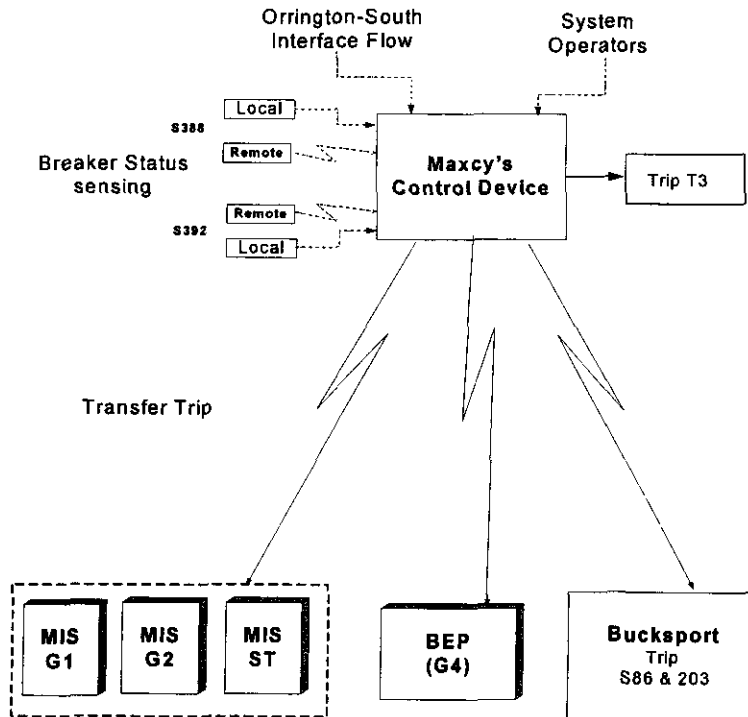
At no time should the following combinations of Maine Yankee breaker maintenance switches be placed in the OFM position at the same time, doing so may result in operation of the Maxcys-Bucksport SPS:

- K392-1 and K392/375
- K378/392 and K392/375

For line maintenance work, some of the lines have motor-operated air break switches to disconnect the lines, and some of the lines only have breakers to disconnect the lines. After the line switches are opened, the breakers are normally closed to restore the busses for system reliability. When the line switch is open but the breakers are closed, the maintenance control switch for each breaker associated with the open line must be set to the Out For Maintenance (OFM) position to preserve the reliability of the Maxcys-Bucksport SPS.

The SPS scheme is depicted in the following figures:

Figure 1 - Maxcys-Bucksport SPS Hardware Scheme



<b>Transmission Operating Guides - SPS</b>	<b>Maxcys-Bucksport SPS</b>
--	-----------------------------

**CONFIDENTIAL**

**Revision History**

<b>Rev. No.</b>	<b>Date</b>	<b>Reason</b>	<b>Contact</b>
0	09/19/07	Revised into separate SPS	Jim Helton
1	03/05/08	Revised into SPS individual format, Add in special note for breaker K378/392.	Jim Helton
2	9/23/08	Remove K378/392 breaker procedure, document updated OFM procedure, updated to include modification to trip K388-1 and K392-3 breakers for loss of 392	Jim Helton