




Énergie NB Power

NB Power Transmission Guide for Selecting Study Contingencies



	Title: Guide for Selecting Study Contingencies	Document No.: CO1-T09300-0003	Page: i of iii
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PREFACE

This document has been developed to describe the process that is followed when selecting design contingencies for studies based on applicable criteria.

DOCUMENT APPROVAL

This document was produced and reviewed by the Transmission Planning Department.

Planning Engineer:

APPROVED

Signature


Date

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APPROVED

Signature

Date

 Énergie NB Power	Title: Guide for Selecting Study Contingencies	Document No.: CO1-T09300-0003	Page: ii of iii
		Effective Date: 2013/09/30	Rev.: 00

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	Title: Guide for Selecting Study Contingencies	Document No.: CO1-T09300-0003	Page: iii of iii
		Effective Date: 2013/09/30	Rev.: 00

TABLE OF CONTENTS

	Page
1.0 INTRODUCTION	1
1.1 Purpose	1
1.2 Document Control.....	1
2.0 COMPLIANCE REQUIREMENTS.....	2
2.1 Reliability Standards.....	2
2.2 Northeast Power Coordinating Council Criteria	2
3.0 TRANSMISSION PLANNING CRITERIA	3
4.0 SELECTING DESIGN CONTINGENCIES	4
5.0 CONSIDERATION WHEN SIMULATING CONTINGENCIES	5
5.1 Contingencies List	5
6.0 REFERENCES	6
7.0 REVISION HISTORY.....	7

	Title: Guide for Selecting Study Contingencies	Document No.: CO1-T09300-0003	Page: 1 of 7
		Effective Date: 2013/09/30	Rev.: 00

1.0 INTRODUCTION

The function of the NB Power Transmission Planning Group is to ensure the co-ordinated development of a safe, reliable, efficient and economical transmission system for the benefit of Province of New Brunswick.

The planning process involves the use of computer simulated power system studies to demonstrate that the power system meets certain planning criteria for the present and projected uses of the system. These planning criteria dictate how the power system must respond in the steady state as well as following certain design contingencies. These design contingencies are described in the applicable NERC, NPCC, and NB Power Transmission criterion as outlined in sections 2, 3 and 4 of this document.


1.1 Purpose

The purpose of this document is to describe how the Transmission Planning group selects design contingencies for studies based on the applicable criteria.

1.2 Document Control

This document is intended as a working document to be reviewed at a minimum once a year by the Planning Group to ensure that it contains current information.

Control of this document will follow the document control requirements as described in Procedure SU6-A00050-0002. No controlled hardcopy versions of the document will be maintained. A controlled version of the document will be maintained on the SharePoint site under "Planning". Any copies (printed or digital) made of this document are considered to be "uncontrolled documents".

	Title: Guide for Selecting Study Contingencies	Document No.: CO1-T09300-0003	Page: 2 of 7
		Effective Date: 2013/09/30	Rev.: 00


2.0 COMPLIANCE REQUIREMENTS

2.1 North American Electric Reliability Corporation (NERC) Criteria

The Planning Group will ensure that the design contingencies used in planning studies meet the applicable criteria set out in the NERC Reliability Standards pertaining to transmission planning. Information pertaining to these standards is available on the NERC website (www.nerc.com).

2.2 Northeast Power Coordinating Council (NPCC) Criteria


The Planning Group will ensure that the design contingencies used in planning studies meet the criteria set out in the NPCC Document Directory #1, entitled “Design and Operation of the Bulk Power System”. These criteria are applicable to all power system elements which are considered to be part of the Bulk Power System (BPS) by NPCC. The criteria for classifying which elements of the power system are BPS is set out in the NPCC Document A-10 entitled “Classification of Bulk Power System Elements”. This information is available on the NPCC website (www.npcc.org).

	Title: Guide for Selecting Study Contingencies	Document No.: CO1-T09300-0003	Page: 3 of 7
		Effective Date: 2013/09/30	Rev.: 00

3.0 TRANSMISSION PLANNING CRITERIA

The NERC Standards and NPCC Criteria set out general criteria that the power system must be designed too in regard to study time-frames and acceptable pre- and post-contingency conditions for certain defined study contingencies (for the portion of the power system to which they each apply, being BES or BPS).


This NBPT Transmission Planning Criteria sets out the specific acceptable pre- and post-contingency response of the power system for all elements of the power system, which includes all elements 69 kV and above. This criterion is specified Section 3.0 of the document entitled "Transmission Planning Criteria".

	Title: Guide for Selecting Study Contingencies	Document No.: CO1-T09300-0003	Page: 4 of 7
		Effective Date: 2013/09/30	Rev.: 00

4.0 SELECTING DESIGN CONTINGENCIES FOR PLANNING STUDIES

When doing planning studies, care should be taken to include all contingencies which may have an impact on the topic of study, and which properly test the power system for compliance with the NERC Standards, the NPCC Criteria, as well as the NB Power Transmission Criteria. Post-contingency system conditions must satisfy the appropriate criteria to which the contingency applies.

In addition to all of the design contingencies indicated in Section 5.0 below, design contingencies which satisfy the Single Contingency Criteria (N-1) as described in Section 3.2 of the document entitled “Transmission Planning Criteria” must also be considered when doing transmission planning studies, other than those studies which are undertaken only to indicate compliance with NERC and NPCC planning criteria.

	Title: Guide for Selecting Study Contingencies	Document No.: CO1-T09300-0003	Page: 5 of 7
		Effective Date: 2013/09/30	Rev.: 00


5.0 CONSIDERATION WHEN SIMULATING CONTINGENCIES

The following will be considered when simulating contingencies:

- Faults are assumed to be permanent. Any reclosing is simulated into the permanent fault.
- When testing for normal fault clearing of a 3-phase fault for transmission lines connected to a BPS Bus at one end, the fault is assumed to be at the BPS end. For transmission lines connected to multiple BPS Busses, the fault is assumed to be at the end which is connected to the bus that has the highest fault level.
- When testing for normal fault clearing of a 3-phase fault for transformers connected to a BPS Bus on one side, the fault is assumed to be on the BPS side. For transformers connected to BPS Busses on both sides, the fault is assumed to be at the high side of the transformer. In the case where there are multiple parallel transformers between the same BPS Busses which trip independently, only one transformer must be tested. If they are not the same size, the largest one will be selected.
- Breaker Failure contingencies are listed for each breaker associated with a BPS Bus Element which is tripped.
- Contingencies that result in the same elements being left out of service post-contingency are considered redundant and are not required to be tested unless there is a possibility that the sequence of element tripping may have an impact on the post-contingency conditions.

5.1 Contingency List

The Transmission Planning group will maintain a current list of all transmission planning contingencies that will indicate which particular NERC or NPCC criteria each contingency satisfies. This list will be reviewed every year and updated as needed.

	Title: Guide for Selecting Study Contingencies	Document No.: CO1-T09300-0003	Page: 6 of 7
		Effective Date: 2013/09/30	Rev.: 00

6.0 REFERENCES

Directory 1 Design and Operation of the Bulk Power System, Northeast Power Coordinating Council. December 1, 2009

Document A-10 Classification of Bulk Power System Elements. Northeast Power Coordinating Council. December 1, 2009

New Brunswick Power Corporation, Transmission Guide for Electrical Facility Ratings. September 2012.

New Brunswick Power Corporation, Transmission Guide for Base Case Development. September 2013.

New Brunswick Power Corporation, Transmission Guide for Selecting Study Contingencies. September 2013

New Brunswick Power Transmission Corporation, Point Lepreau Nuclear Plant Interface Requirements Agreement.

Standard *TPL-001 System Performance Under Normal Conditions*, North American Electric Reliability Corporation, Effective Date: May 13, 2009

Standard *TPL-002 System Performance Following Loss of a Single BES Element*, North American Electric Reliability Corporation, Effective Date: April 23, 2010

Standard *TPL-003 System Performance Following the Loss of Two or More BES Elements*, North American Electric Reliability Corporation, Effective Date: April 23, 2010

Standard *TPL-004 System Performance Following Extreme BES Events*, North American Electric Reliability Corporation, Effective Date: April 1, 2005

NBPT Document entitled "NB Power Transmission Planning Criteria"

