

**SETTLEMENT AGREEMENT  
OF  
NEW BRUNSWICK SYSTEM OPERATOR  
AND  
NEW BRUNSWICK POWER TRANSMISSION CORPORATION**

**I. INTRODUCTION**

1. New Brunswick System Operator (“NBSO”) and New Brunswick Power Transmission Corporation (“NBPT”) enter into this Settlement Agreement (“Agreement”) to resolve all outstanding issues arising from a non-public investigation resulting in NBSO’s determinations and findings, pursuant to NBSO Market Procedure 08 - NBSO Reliability Compliance Program- New Brunswick (“MP-08”), of violations , VTN 2010005 and VTN 2010006, by NBPT of the North American Electric Reliability Corporation (‘NERC’) Reliability Standard FAC-003-1 - Transmission Vegetation Management Program.

**II. STIPULATION**

2. The facts stipulated herein are stipulated solely for the purpose of resolving, between NBSO and NBPT, the matters discussed herein and do not constitute stipulations or admissions for any other purpose. NBSO and NBPT hereby stipulate and agree to the following:

**Background**

3. The NBSO has the responsibility under the NB Electricity Act to make and enforce Market Rules pertaining to the reliability of the New Brunswick bulk power system (“BPS”).
4. The NBSO has entered into Memorandums of Understanding with NERC and the Northeast Power Coordinating Council (“NPCC”) to adopt and enforce NERC and NPCC reliability standards, implement NERC and NPCC compliance monitoring and enforcement processes and to consult with NERC and NPCC on compliance related matters.
5. The NBSO administers MP-08, a reliability compliance program applicable in NB, which includes provisions for a compliance registry, the adoption of reliability standards and compliance monitoring and enforcement processes.

6. NBPT is a wholly owned subsidiary of NB Power Holding Corporation. NBPT owns, operates and maintains 49 terminals, switchyards and telecommunication sites interconnected by more than 6,700 km of transmission lines ranging in voltage from 69 kV to 345 kV. The NBPT transmission system is interconnected with neighbouring electrical systems in Quebec, Maine, Nova Scotia and Prince Edward Island.
7. NBPT is registered as a Transmission Owner under NBSO MP-08 and is required to comply with adopted reliability standards applicable to that function.

### **Alleged Violation**

8. NERC Reliability Standard FAC-003-1 “Transmission Vegetation Management Program” is adopted under MP-08 and requires Transmission Owners to prepare, keep current, and implement a Transmission Vegetation Management Plan to prevent transmission outages due to vegetation contacts by maintaining clearances between transmission lines and vegetation growing along the transmission right-of-way (“RoW”).
9. FAC-003-1 also requires the Transmission Owner to report any outages resulting from a vegetation contact to the compliance authority (NBSO).
10. On July 19, 2010 NBPT submitted two “Transmission Outage Caused by Vegetation Contact 48 Hour Report Forms” to NBSO. The submittals were made under a reporting process implemented by the NBSO in January 2009.
11. **Line 2130 Report.** NBPT indicated in the report that Line 2130 between Keswick and Newcastle tripped due to a Phase B to ground fault at 14:27 on July 6, 2010.
12. The fault was located approximately 30 km from the Keswick Terminal. The load on the line at the time of the trip was 43 MW (later determined to be approximately 12% of the rated load). The weather at the time was mainly sunny with a temperature of 28C.
13. NBPT reported that the line was returned to service at 15:50 and that the outage did not affect customers. NBPT further reported that the outage was caused by 10-12 foot trees growing on top of a hill at Structures 137 and 138.
14. Following the contact, a line patrol was ordered and trees that were found with burnt tops between Structures 137 and 138 were removed.
15. **Line 3004 Report.** NBPT indicated in the report that Line 3004 between Coleson Cove and Norton tripped due to a Phase A to ground fault at 10:51 and then again at 11:08 am, on July 15, 2010.

16. The fault was located approximately 30 km from Coleson Cove. The load on the line at the time of the first trip was 86 MW (later determined to be approximately 8% of the rated load), and 80 MW at the time of the second trip (later determined to be approximately 7% of the rated load). The weather at the time was mainly sunny with a temperature of 25C.
17. NBPT reported that the line was returned to service at 16:32 and that one customer experienced processing issues during the outage. NBPT further reported that the outage was caused by large maple trees on the banks of the Nerepis River.
18. Following the contacts, a line patrol was ordered and trees that were found with burnt tops between Structures 79 and 80 were removed.
19. The NBSO investigation and enforcement process relating to alleged violations is set out in Part 6 of MP-08.
20. On review of the vegetation contact reports the NBSO established that L2130 and L3004 are part of the NB BPS and are subject to the requirements of FAC-003-1. NBSO further concluded that, as NBPT reported the contacts were the result of vegetation growing into the line from within the RoWs, there was sufficient basis to begin the enforcement process for an alleged violation.
21. The NBSO notified NPCC compliance staff of the vegetation contact reports and provided NPCC with a summary of the events on July 23, 2010.
22. The NBSO issued Preliminary Notices of Alleged Violations on July 28, 2010, to notify NBPT that the NBSO was initiating a compliance investigation into the vegetation contact events and directed NBPT to preserve all data relating to the events.
23. The NBSO followed up with a request for information to NBPT on July 30, 2010. The information requested included a copy of the current NBPT vegetation management program, NBPT's root cause analysis of the events and proposed mitigation actions to prevent future occurrence, as well as inspection and clearing records for L2130 and L3004.
24. NBPT submitted a response to the request for information on August 31, 2010.
25. NBPT provided a copy of their Integrated Vegetation Management Plan, dated October 5, 2008.
26. From information submitted relating to L2130, NBPT's root cause analysis was limited to a determination that 10-12 foot trees growing on a berm created during the construction of a woods road resulted in the vegetation contact. The line had been last cleared in 2004 and had been air patrolled twice since January 2008, identifying four vegetation abnormalities that were reported to have been addressed. A ground patrol was carried out in March 2009. NBPT reported that L2130 would be completely cleared by hydro axe as part of the 2010

maintenance plan and that the 2011 plan would include herbicide application on private land for L2130.

27. From information submitted relating to L3004, NBPT's root cause analysis was limited to a determination that during clearing operations to address abnormal vegetation along the Neripis River in December 2009, work was carried out on the south side of the river but a clump of maples mixed with a patch of alders on the north side of the river was not identified and that this clump of maple trees was the cause of the contact. The line had been air patrolled three times since January 2008 and three abnormal vegetation issues were followed up on, including the work at the Neripis River. The last ground patrol of L3004 was conducted in March 2006. NBPT reported that following the contact an inspection was carried out on the buffer zone along the Neripis River on July 19, 2010, and as a result of this inspection, a crew was dispatched on July 20, 2010 to remove vegetation on the north side of the river. NBPT further indicated that clearing between structures 169 to 300 was scheduled for the 2010 maintenance plan.
28. After reviewing the information provided by NBPT, and in consideration that the two vegetation contacts being investigated followed a previous FAC-003 violation less than a year before, the NBSO had concerns with the overall state of the NBPT vegetation management program, and in NBPT's preparedness to effectively address what appeared to be systemic issues in their program.
29. NBSO proceeded to engage additional expert resources and carry out a comprehensive assessment of the NBPT vegetation management program to ensure that underlying issues would be identified and effectively addressed through a mitigation plan.
30. The assessment, which was carried out from December 2010 to February 2011, included on site interviews with key managers and staff. The focus of the assessment was to identify the root causes of the outages and the mitigation actions that would be necessary to address those causes to reduce the likelihood of further contacts.
31. The assessment report was made available to NBPT on March 21, 2011.
32. The assessment of the NBPT vegetation management program identified a number of areas requiring improvements and factors that are believed to have contributed to the vegetation contacts.
33. Cutbacks in herbicide application, cutbacks in staff, favourable growing conditions and restrictions on cutting vegetation in greenbelts combined to create a backlog of uninspected and untreated RoWs. Herbicide application was stopped in 1990 (it was reintroduced in 2009 on a partial basis). Ground control crews were cut from two to one in 2005, which resulted in line patrols every 8 years instead of every 4 years. In addition the Vegetation Manager position was cut with those duties taken on by one of two remaining Forest Technicians which

reduced the program's capacity and profile in competing with other programs for company resources. Above normal temperatures and rainfall in 2009 and 2010 resulted in a higher vegetation growth rate than had been the previous experience. An increase in the number ornamental tree and greenbelt sites and restrictions on cutting in these areas also significantly increased the risk of vegetation contacts.

34. Inherent limitations in air and ground patrols and the lack of training in identifying vegetation risks limited NBPT's ability to consistently detect and report abnormal conditions. The primary purpose of air patrols was to assess the condition of physical assets (eg. structures, conductors, insulators). Air patrollers had limited time and training to effectively identify and record observations relating to vegetation, and reported difficulty in estimating clearances while flying above the vegetation canopy. Ground patrol staff also had limited training in identifying vegetation risks.
35. Patrol schedules were not synchronized with clearing schedules limiting the integration of real time inspection information into the planning and execution of the cutting program. Line patrols can occur at anytime during a cutting cycle, which can limit the availability of up-to-date inspection information in the later stages of a cutting cycle that might identify the need to carry out clearing work sooner than planned.
36. The lack of up-to-date "as built" information, out-of-date species and growth data and lack of a documented clearance standard makes it difficult to measure and plan an effective cutting program. The inspection programs are based on standard clearance requirements and standard growth rates for assumed species and do not take into account varying clearance requirements for different voltage systems under maximum thermal load, abnormal growth rates due to lack of herbicide use and changed growing conditions, a different and faster growing species mix, or special considerations such as higher vegetation in greenbelt areas. There is limited use of as built information to refine tree height allowances in response to varying span lengths or variations in the RoW terrain.
37. Difficulty in managing the vegetation program because of multiple computer systems and disjointed databases and the lack of trending analysis and incident investigation process. In 2010, the vegetation program used three separate, complex and unfriendly data management systems to capture a limited amount of information and plan future work, which reduces the capability to report analyze and manage risk of potential contact situations. When burnt tops or other near misses are observed there is no follow up investigation or root cause analysis. There were no formal internal investigations into the outages due to vegetation contact reported to NBSO. An increased number of high priority work orders and reduced program capacity sometimes resulted in reducing the priority of a work order or clearing the work order, without due consideration of special circumstances involved with a particular section of the RoW.

38. The lack of an effective overall management system limits NBPT's ability to understand and address vegetation risks. Although the vegetation program is identified as a component of NBPT's Environmental Management System, management system tools such as goal setting, trending, reporting, incident investigation, system and process auditing and continual improvement have not been are not fully implemented. The lack of a fully implemented management system limits the availability of quality information for NBPT Management to fully understand the risks and allow the operational planning and budgeting necessary to effectively address those risks.
39. NBSO finds that NBPT failed to maintain the minimum required clearance (Clearance 2 distance) between its transmission line and surrounding vegetation, as required by FAC-003-1, and this resulted in vegetation contacts and outage of Lines 2130 and 3004.

### **III. PARTIES SEPARATE REPRESENTATIONS**

#### **Statement of NBSO and Summary of Findings**

40. In light of the evidence and circumstances described above, NBSO finds that on July 6, 2010 and July 15, 2010, NBPT did not maintain its specified clearances between the ungrounded energized conductors and vegetation growing in the RoW of Line 2130 and Line 3004 respectively, and that this constitutes violations of NERC reliability standard FAC-003-1, Requirement 2.
41. In determining the penalty for the Line 2130 violation the NBSO considered the actual degree of risk or harm the violation imposed on the BPS. The NBSO did not find any extenuating circumstances that would warrant a reconsideration of the High Violation Risk Factor that was initially assigned for a violation of Requirement 2. The NBSO took into consideration that the trip of L2130 did not result in any System Operating Limits or Interconnection Reliability Operating Limits being exceeded; and that no customers were affected by the outage. The NBSO acknowledges that NBPT self reported the violation, took timely and corrective action to remove problem vegetation and restore the line to service, was cooperative throughout the investigation and has established a reliability compliance program for NERC standards. The NBSO also took into account that this was NBPT's second violation of FAC-003-1 within a one year period.
42. In determining the penalty for the Line 3004 violation the NBSO considered the actual degree of risk or harm the violation imposed on the BPS. The NBSO did not find any extenuating circumstances that would warrant a reconsideration of the High Violation Risk Factor that was initially assigned for a violation of Requirement 2. The NBSO took into consideration that although the trip of L3004 did not result in any System Operating Limits or Interconnection Reliability Operating Limits being exceeded, it was necessary to place restrictions on the NB/NS interface to maintain reliability; and that one industrial

customer did experience processing issues during the outage. The NBSO acknowledges that NBPT self reported the violation, took timely and corrective action to remove problem vegetation and restore the line to service, was cooperative throughout the investigation and has established a reliability compliance program for NERC standards. The NBSO also took into account that this was NBPT's third violation of FAC-003-1 within a one year period.

- 43. The NBSO believes that this Agreement is in the best interest of maintaining the reliability of the NB BPS.

**Statement of NBPT**

- 44. NBPT believes that this Agreement is in the best interest of maintaining the reliability of the NB BPS.

**IV. MITIGATION ACTIONS, REMEDIES AND SANCTIONS**

- 45. In response to the outages of Line 2130 and 3004 due to vegetation contact, and in addition to other actions discussed below as a result of this settlement, NBPT has either performed or will perform the following mitigation actions as part of this Agreement:

<b>Completed Actions</b>		
<b>Areas</b>	<b>Action</b>	<b>Date Completed</b>
Vegetation Contact Assessment and Work	Air patrols conducted on Lines 2130 and 3004 to confirm location and exact cause of outage.	July 6 and 15, 2010
	Trees removed on Lines 2130 and 3004 to address vegetation contact.	July 2010
Inspection and Clearing Backlog	Budget increased in 2011 to address backlog. Completed 2,400 acres out of 4,000 acres machine cut backlog in 2011.	April 2011
	Budget increased in 2012 to address backlog. Completed the remaining 1,600 acres machine cut backlog in 2012.	April 2012
Compliance with Requirements of FAC-003-1	Consulting firm retained to conduct a gap analysis of reliability standards applicable to Transmission Owner and Transmission Planner.	September 2010
	Participation in NBSO third-party compliance assessment of IVMP.	December 2010
	Participation in vegetation management best practices project through the Center for Energy Advancement through Technological Innovation (CEATI) to understand how other utilities are complying with FAC-003 since the transmission blackout of August 2003.	December 2010
	IVMP reviewed and updated to address items identified by the Gap Analysis and NBSO third-party compliance assessment.	May 2011

<b>Completed Actions</b>		
<b>Areas</b>	<b>Action</b>	<b>Date Completed</b>
	Consulting services retained to perform LIDAR to collect as-built information on transmission lines 2101, 2102, 2109, 2131, 2130, 3001 and 3011. Lines were selected based on their potential risk to the BPS as a result of their design and are scheduled for inspection over the next two (2) years.	June 2012
Resources to Sustain IVMP	Vegetation Management Department reorganized into management zones to ensure that work is accomplished safely, effectively and in accordance with the IVMP.	February 2011
	Two new full time equivalent positions to carry out the IVMP which will allow annual program requirements to be met.	May 2012
	Two additional vehicles and two ATVs purchased for the new positions	May 2012
	New positions trained prior to commencing work.	May 2012
Effectiveness of Inspections and Patrols	Vegetation Clearance and Inspection Guide developed to provide practical approaches for field personnel to determine the necessary clearance on the bulk power system and to meet the requirements of reliability standard FAC-003-1.	December 2010
	Growth model developed to determine cycles to allow for planning based on predictable growth rates.	January 2012
	Training for patrollers on vegetation management clearance requirements and the reporting procedure to follow in the event of potential clearance violations.	April 2012
Improvements to Information Management Systems	Implementation of interface between Stakeout database and SAP database to allow the planning and detailing of work and the creation of work orders.	June to October 2011
Quality Assurance for IVMP	Environmental Management System (EMS) improvements implemented to fully integrate vegetation management activities into existing procedures and processes (e.g. nonconformances, audit, training, documentation, etc.).	April 2011 to December 2011

<b>Actions to be Completed</b>		
<b>Areas</b>	<b>Action</b>	<b>Date To Be Completed</b>
Compliance with Requirements of FAC-003-1	Inspection cycle reviewed for each line voltage based on growth model and conductor sag.	October 2012
	Modeling of LIDAR data of transmission lines 2101, 2102, 2109, 2131, 2130, 3001 and 3011 to verify as-built and to update IVMP accordingly. Based on results of the modeling, LIDAR may be expanded to other BPS lines.	April 2013
Improvements to Information Management Systems	Implementation of a GIS vegetation layer linked database	March 2014
Quality Assurance for IVMP	Compliance audit performed of IVMP as part of EMS	June 2013

46. NBPT will provide NBSO quarterly status reports on mitigation actions yet to be completed, or more frequently at the request of the NBSO. The NBSO may also require NBPT to submit evidence to verify completion of mitigation actions.
47. NBPT estimates its cost to complete the mitigation actions identified in Section IV to be \$1,811,416. The funding and mitigation efforts associated with this settlement are above and beyond the programs and budget for the NBPT 2011 and 2012 IVMP.
48. In view of the factors noted in Paragraphs 41 and 42 of this Agreement, and in consideration of the cost of the mitigation action noted in the paragraph immediately above, NBPT is not subject to pay any financial penalty to the NBSO under this Agreement.

**V. ADDITIONAL TERMS**

49. The signatories to this Agreement agree that they enter into the Agreement voluntarily and that, other than the recitations set forth herein, no tender, offer or promise of any kind by any member, employee, officer, director, agent or representative of NBSO or NBPT has been made to induce the signatories or any other party to enter into this agreement.
50. NBSO will report the terms of all settlement agreements relating to compliance matters to NERC and NPCC.
51. NBPT agrees that this Agreement represents a final settlement of all matters set forth herein and NBPT waives its right to any further hearings and appeal.

52. NBSO reserves the right to initiate enforcement, penalty and sanction actions against NBPT in accordance with MP-08 in the event that NBPT fails to comply with the terms of this agreement.
53. Each of the undersigned warrants that he or she is an authorized representative of the entity designated, is authorized to bind such entity and accepts the Agreement on the entity's behalf.
54. The undersigned representative of each party affirms that he or she has read the Agreement, that all of the matters set forth in the Agreement are true and correct to the best of his or her knowledge, information and belief, and that he or she understands that the Agreement is entered into by such party in express reliance on those representations, provided, however, that such affirmation by each party's representative shall not apply to the other party's statements of position set forth in Section II of this Agreement.
55. This Agreement is executed in duplicate, each of which so executed shall be deemed to be an original.

Agreed to and accepted:



Kevin C. Roherty  
President & CEO  
New Brunswick System Operator

October 3, 2012

Date



Sherry Thomson  
Vice President  
New Brunswick Power Customer Service,  
Distribution and Transmission

October 9, 2012

Date