Newfoundland Labrador

Government of Newfoundland and Labrador
Department of Environment and Conservation
Water Resources Management Division

PERMIT TO ALTER A BODY OF WATER

Pursuant to the *Water Resources Act*, SNL 2002 cW-4.01, Section(s) 48

Date: **JULY 10, 2013**

File No: **536-12**
Permit No: **ALT6933-2013**

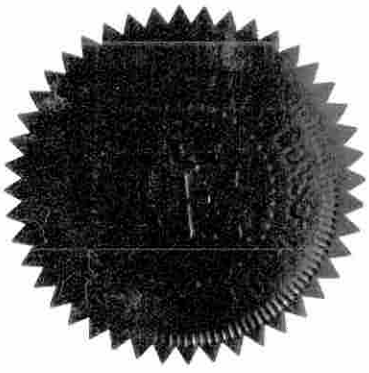
Proponent: **Nalcor Energy**
500 Columbus Drive
P.O. Box 12800
St. John's NL A1B 0C9

Attention: **Peter Madden**

Re: **Lower Churchill Muskrat Falls - Dams, Powerhouse, Spillway and North Spur Stabilization**

Permission is hereby given for : **the construction of Powerhouse and Intake, Spillway and Transition Dams, North RCC Dam, Rockfill Dams, Cofferdams, North Spur stabilization and associated activities outlined in the application received on March 25, 2013 required for the Muskrat Falls hydroelectric generation facility.**

- This permit does not release the proponent from the obligation to obtain appropriate approvals from other concerned provincial, federal and municipal agencies.
- The proponent must obtain the approval of the Crown Lands Division of the Department of Environment and Conservation if the project is being carried out on Crown Land.
- This permit is subject to the terms and conditions indicated in Appendix A (attached).
- It should be noted that prior to any significant changes in the design or installation of the proposed works, or in event of changes in ownership or management of the project, an amendment to this permit must be obtained from the Department of Environment and Conservation under Section 49 of the *Water Resources Act*.
- Failure to comply with the terms and conditions will render this permit null and void, place the proponent and their agent(s) in violation of the *Water Resources Act* and make the proponent responsible for taking any remedial measures as may be prescribed by this Department.



MINISTER

GOVERNMENT OF NEWFOUNDLAND AND LABRADOR
Department of Environment and Conservation

Permit No: ALT6933-2013

APPENDIX A

Terms and Conditions for Environmental Permit

Lower Churchill Muskrat Falls - Dams, Powerhouse, Spillway and North Spur Stabilization

Special Conditions

1. Prior to construction of upstream cofferdam and diversion of Churchill River an Emergency Preparedness Plan (EPP) must be submitted to **Director of Water Resources Management Division (WRMD)**. The proponent must also provide a written notification to the Director of WRMD prior to start of construction of cofferdams within the Churchill River.

2. This permit includes temporary cofferdams to ensure dry working conditions during construction as per application submitted by proponent. Additional temporary cofferdams may be constructed under the authority of this permit to complete the work outlined in the application.

Dam/Reservoir Design

3. The dam(s) and appurtenant structures shall be constructed at the following coordinates:

Name	Datum	Northing (m)	Easting (m)	Zone
Intake Channel Cofferdam	NAD83	5901693	649168	20
Gated Spillway	NAD83	5901850	649097	20
Upstream Cofferdam	NAD83	5902010	648855	20
Downstream Cofferdam	NAD83	5902030	649030	20
North RCC Dam / overflow dam	NAD83	5902048	648930	20
South Rockfill Dam	NAD83	5901500	649130	20

4. The dam(s) must have the following dimensions:

Name	Height of Dam (m)	Height of Spillway (m)	Maximum Water Elevation (m)	Minimum Water Elevation (m)	Minimum Freeboard (m)
Intake Channel Cofferdam	n/a	n/a	25.0	8	1
Gated Spillway	n/a	40	45.1	38.5	n/a
Upstream Cofferdam	30	n/a	25	8	1
Downstream Cofferdam	5	n/a	8	2	1
North RCC Dam	45	39.3	45.1	38.5	n/a
South Rockfill Dam	20	n/a	45.1	38.5	1.2

5. To safely convey peak flows the dam(s) must be designed according to the following hydraulic criteria:

Name	Design Return Period (years)	Minimum Flow Capacity (m^3/s)
Intake Channel Cofferdam	20	5990
Gated Spillway	PMF	25060
Upstream Cofferdam	20	5990
Downstream Cofferdam	20	5990
North RCC Dam	PMF	25060
South Rockfill Dam	PMF	25060

6. Reservoirs must be provided with a spillway of adequate capacity to safely discharge design flows at non-erosive velocities without causing flooding of the reservoir or damage to the spillway or section downstream channel.

7. The range of normal operating water levels in the reservoir shall be between elevations 38.5 metres and 39.0 metres.

Dam Construction

8. Reservoir shorelines with moderately steep slopes or vulnerability to wave induced erosion, must be adequately protected with armour stone, rip-rap, or by other suitable measures.

9. The dam structure must be constructed with a sluice gate of adequate capacity to provide continuous flow to downstream areas and to enable reservoir dewatering for dam or reservoir maintenance.

10. The area to be flooded by the reservoir must be prepared by removing timber, brush, and slash.

11. The transportation of labour and materials to the site must be along existing access roads where possible

12. The dam and spillway must be inspected regularly to identify any indications of structural failure, leaking, erosion or other problem so that immediate action can be taken to rectify the problem.

13. The work must meet the requirements of the Environmental Protection Plan (latest approved version) for the project.

Dam Safety

14. The North RCC Dam and the South Rockfill Dam have been conditionally classified in the VERY HIGH Consequence category based on the 2007 Canadian Dam Association (CDA) guidelines. To meet the CDA's Dam Safety guidelines (Current Edition) for dams of this classification, the owner must:
    - Carry out an annual Dam Safety Inspection and provide the results to this Department,
    - Carry out a Dam Safety Review and submit a Dam Safety Report to this Department within two years of the start of reservoir filling and a maximum of every **five years** after that,
    - Develop within one year of the issuance of this permit, and in consultation with this Department, an Operation, Maintenance and Surveillance (OMS) Manual for the operation and closure phases,
    - Prepare an Emergency Preparedness Plan (EPP) prior to filling reservoir.

Stream Diversion Design

15. The stream diversion(s) must have the following dimensions:

Name	Bottom Width (m)	Depth of Channel (m)	Bank Slope (H:V)	Flow Area (m^2)	Bed Slope (%)
Three Kettle Lakes Area	varies	varies	2.5:1	unknown	varies (~3-20)

16. To safely convey peak flows, the stream diversion(s) must be designed according to the following hydraulic criteria:

Name	Design Return Period (years)	Maximum Flow Capacity (m^3/s)	Maximum Flow Velocity (m/s)
Three Kettle Lakes Area	100	5.86	unknown

17. An approximately 332.5 metre long permanent discharge channel may be excavated to carry the waters of Three Kettle Lakes to the Churchill River.

18. The new channel must provide adequate capacity to safely discharge flood flows at a velocity no greater than that which would occur in the natural channel.

19. A minimum freeboard of 0.5 metres must be provided between the design high water level and the top of the channel bank to prevent overtopping.

Fording

20. Except for single passenger all terrain vehicles, crossings by other vehicles or construction equipment shall be limited to one trip in and one trip out unless temporary structures are constructed to protect the natural stream.

21. Timbers or rocks shall be placed in streams to facilitate crossing or to minimize damage to the channel sections provided the streams are not unnecessarily constricted or backed up.

22. Alteration of the natural minimum streamflow is not permitted in order to preserve aquatic life.

23. Stream banks at fording sites that contain loose or erodible material must be adequately stabilized before crossing to minimize any siltation of streams.

24. Infilling must not cause increased water elevation upstream or increase flow velocity downstream of the site. Reduction of the natural cross sectional area of any watercourse is not permitted.

25. The fording sites must be located at shallow sections of the channels where there are low approach grades, and where the channels consists of stable non-erodible rock or cobbles.

26. Fording shall only be carried out during periods of low water levels.

27. When the fording sites are no longer required, the proponent must dismantle and remove all constructed works and restore the sites to their original condition. All material placed in streams must be completely removed.

28. A complete oil spill clean-up kit must be on site at all times when gasoline or fuel powered equipment is being used or refuelled. The kit must contain the following:
    - One hand operated fuel pump
    - One recovery container such an empty 205 litre drum
    - One shovel
    - One pick ax
    - Five metres of containment boom
    - Five absorbent pads
    - Twenty-five litres of loose absorbent material

General Alterations

29. Any work that must be performed below the high water mark must be carried out during a period of low water levels.

30. Any flowing or standing water must be diverted around work sites so that work is carried out in the dry.

31. Water pumped from excavations or work areas, or any runoff or effluent directed out of work sites, must have silt and turbidity removed by settling ponds, filtration, or other suitable treatment before discharging to a body of water. Effluent discharged into receiving waters must comply with the *Environmental Control Water and Sewage Regulations, 2003.*

32. All operations must be carried out in a manner that prevents damage to land, vegetation, and watercourses, and which prevents pollution of bodies of water.

33. The use of heavy equipment in streams or bodies of water is not permitted. The operation of heavy equipment must be confined to dry stable areas.

34. All vehicles and equipment must be clean and in good repair, free of mud and oil, or other harmful substances that could impair water quality.

35. During the construction of concrete components, formwork must be properly constructed to prevent any fresh concrete from entering a body of water. Dumping of concrete or washing of tools and equipment in any body of water is prohibited.

36. Wood preservatives such as penta, CCA or other such chemicals must not be applied to timber near a body of water. All treated wood or timber must be thoroughly dry before being brought to any work site and installed.

37. Any areas adversely affected by this project must be restored to a state that resembles local natural conditions. Further remedial measures to mitigate environmental impacts on water resources can and will be specified, if considered necessary in the opinion of the Department.

38. The bed, banks and floodplains of watercourses, or other vulnerable areas affected by this project, must be adequately protected from erosion by seeding, sodding or placing of rip-rap.

39. All waste materials resulting from this project must be disposed of at a site approved by the Department of Service NL.

40. Periodic maintenance such as painting, resurfacing, clearing of debris, or minor repairs, must be carried out without causing any physical disruption of any watercourse. Care must be taken to prevent spillage of pollutants into the water.

41. The owners of structures are responsible for any environmental damage resulting from dislodgement caused by wind, wave, ice action, or structural failure.

42. Sediment and erosion control measures must be installed before starting work. All control measures must be inspected regularly and any necessary repairs made if damage is discovered.

43. The attached Completion Report (Appendix B) for Permit No. 6933 must be completed and returned to this Department upon completion of the approved works.

44. This Permit is valid for five years from the date of issue. Work must be completed by that date or the application and approval procedure must be repeated.

45. The location of the work is highlighted on the Location Map for this Permit attached as Appendix C.

46. Pictures must be submitted along with the completion report, showing the project site prior to and after development.

Water Resources EA Commitments

47. The Proponent must establish an index network of climate stations throughout the reach of the project area. These stations may be used to distinguish Project impacts from climate change impacts, assess any Project impacts on the Mud Lake ice bridge and be used for operational purposes. The proposed climate network stations must be submitted to Water Resources Management Division for review and approval.

48. As per OC 2012-061(Lower Churchill Hydroelectric Generation Project Undertaking Order) the Proponent must include in its Environmental Effects Monitoring Plan provisions to undertake groundwater monitoring in Mud Lake. Any proposed monitoring and reporting must be submitted to the Water Resources Management Division for review and approval.

49. As per OC 2012-061 (Lower Churchill Hydroelectric Generation Project Undertaking Order) the Proponent must include in its Environmental Effects Monitoring Plan provisions to undertake ice formation monitoring. Any proposed monitoring and reporting must be submitted to the Water Resources Management Division for review and approval.

50. As per Section 49.2 of the Water Resources Act the minister may amend any terms and conditions outlined in this permit or add new terms and condition by issuing an amendment to this permit.

cc: File Copy for Binder

cc: Manager, Water Investigations Section
Department of Environment and Conservation
Water Resources Management Division
P.O. Box 8700
St. John's NL A1B 4J6

cc: Ms. Michelle Roberge
Section Head, Habitat Planning and Operations
Marine Environment and Habitat Management Division
Department of Fisheries and Oceans
PO Box 5667
St. John's NL A1C 5X1

cc: Chef Jean-Charles Piétacho
Conseil des Innus d'Ekuanishit
35, rue Manitou, C.P. 420
Mingan, QC G0G 1V0

cc: Chef Raymond Bellefleur
Conseil de bande des Montagnais d'Unamen Shipu
Carte postale 121
La Romaine QC G0G 1M0

cc: Chef Rodrigues Wapistan
Conseil des Montagnais de Natashquan
78, rue Mashkush
Natashquan QC G0G 2E0

cc: Chef Réal McKenzie
Conseil de la Nation Innu Matimekush-Lac John
172 Pearce Lake
Carte postale 1390
Schefferville, QC G0G 2T0

cc: Chief Isaac Pien
Naskapi Nation of Kawawachikamach
1009 Naskapi Road, P.O. Box 5111
Nuchimiyuschiiy, QC G0G 2Z0

cc: Conseil des Innus de Pakua Shipu
Carte postale 178
Pakua Shipi, QC G0G 2R0

cc: David Andre
172 Pearce Lake, Case Postale 1930
Schefferville QC G0G 2T0

cc: Ken Rock
Innu Takuaikan Uashat mak Mani-Utenam
P.O. Box 8000
265 Boul. Des Montagnais
Uashat, QC G4R 4L9

cc: Larry Innes and Paula Reid
Innu Nation
P.O. Box 119
Sheshatshiu, NL A0P 1M0

cc: Marie-Christine Gagnon
BCF LLP

1100, boul. René Levesque Ouest, 25e étage
Montréal, QC H3B 5C9

cc: Morgan Kendall
O'Reilly & Associes
1155 University, Bureau 1007
Montreal QC H3B 3A7

cc: Mr. Brian Harvey
Director, Policy and Planning (A), Aboriginal Affairs Branch
Intergovernmental and Aboriginal Affairs Secretariat

cc: Mr. George Russell Jr.
Environment and Resource Manager
NunatuKavut Community Council
P.O. Box 460, Station C
Happy Valley-Goose Bay
NL A0P 1C0

cc: Mr. John Mameamskum
P.O. Box 5111
Kawawachikamach QC G0G2Z0

cc: Mr. Steve Pellerin
Nalcor Energy
Hydro Place, 500 Columbus Drive
P.O. Box 12800
St. John's, NL A1B 0C9

cc: Mr. Tom Sheldon
Director
Environment Division
Nunatsiavut Government
P.O. Box 70
Nain, NL A0P 1L0

cc: Paul Renzoni
General Advisor, Naskapi Nation of Kawawachikamach
5800 Monkland Avenue
2nd Floor
Montreal QC H4A 1G1

Newfoundland Labrador

Government of Newfoundland and Labrador
Department of Environment and Conservation
Water Resources Management Division

Appendix B - Completion Report

Pursuant to the *Water Resources Act*, SNL 2002 cW-4.01, Section(s) 48

Date: **JULY 10, 2013**

File No: **536-12**
Permit No: **ALT6933-2013**

Proponent: **Nalcor Energy**
500 Columbus Drive
P.O. Box 12800
St. John's NL A1B 0C9

Attention: **Peter Madden**

Re: **Lower Churchill Muskrat Falls - Dams, Powerhouse, Spillway and North Spur Stabilization**

Permission was given for : **the construction of Powerhouse and Intake, Spillway and Transition Dams, North RCC Dam, Rockfill Dams, Cofferdams, North Spur stabilization and associated activities outlined in the application received on March 25, 2013 required for the Muskrat Falls hydroelectric generation facility.**

I (the proponent named above or agent authorized to represent the proponent) do hereby certify that the project described above was completed in accordance with the plans and specifications submitted to the Department of Environment and Conservation and that the work was carried out in strict compliance with the terms and conditions of the Permit issued for this project.

Date: _____ Signature: _____

This completion report must be completed and forwarded to the following address upon completion of the approved work.

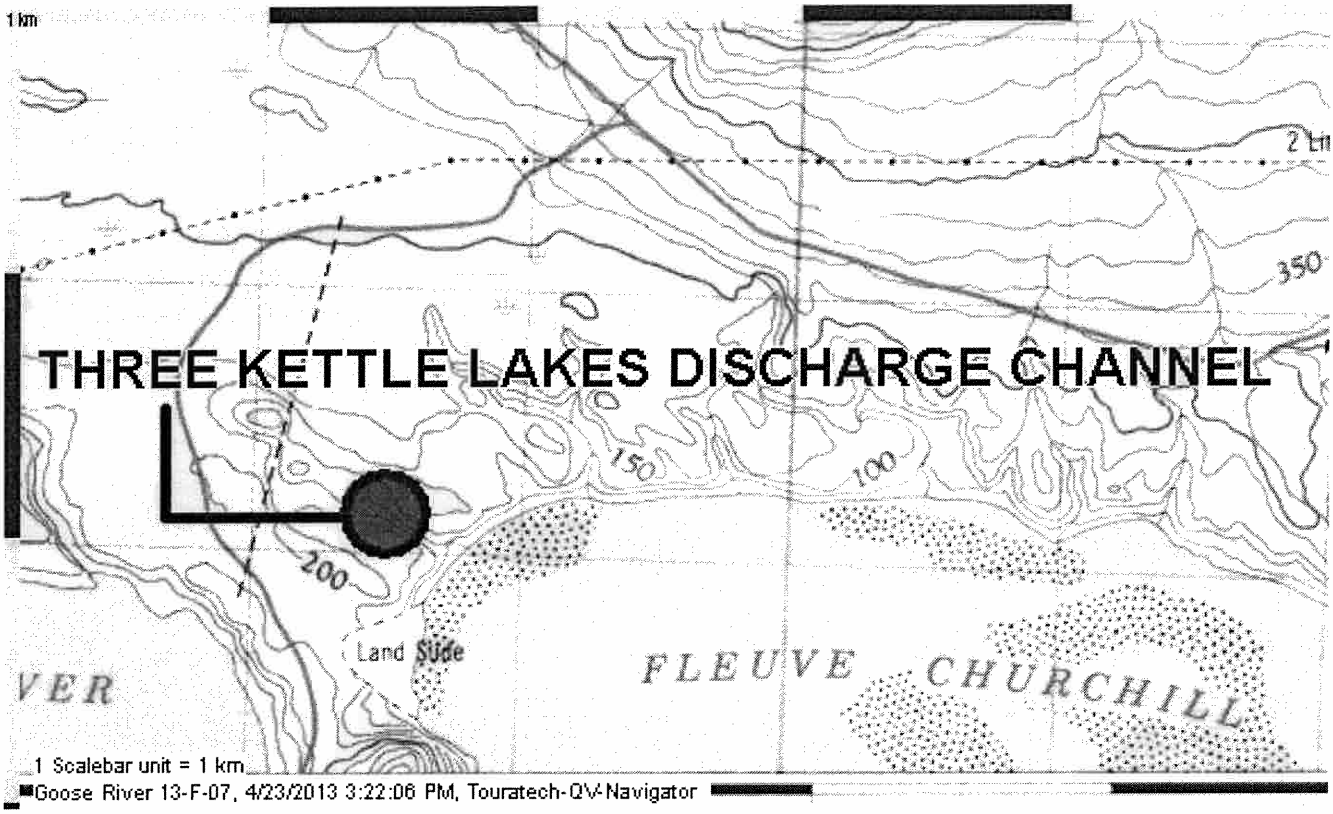
Department of Environment and Conservation
Water Resources Management Division
PO Box 8700
St. John's NL A1B 4J6

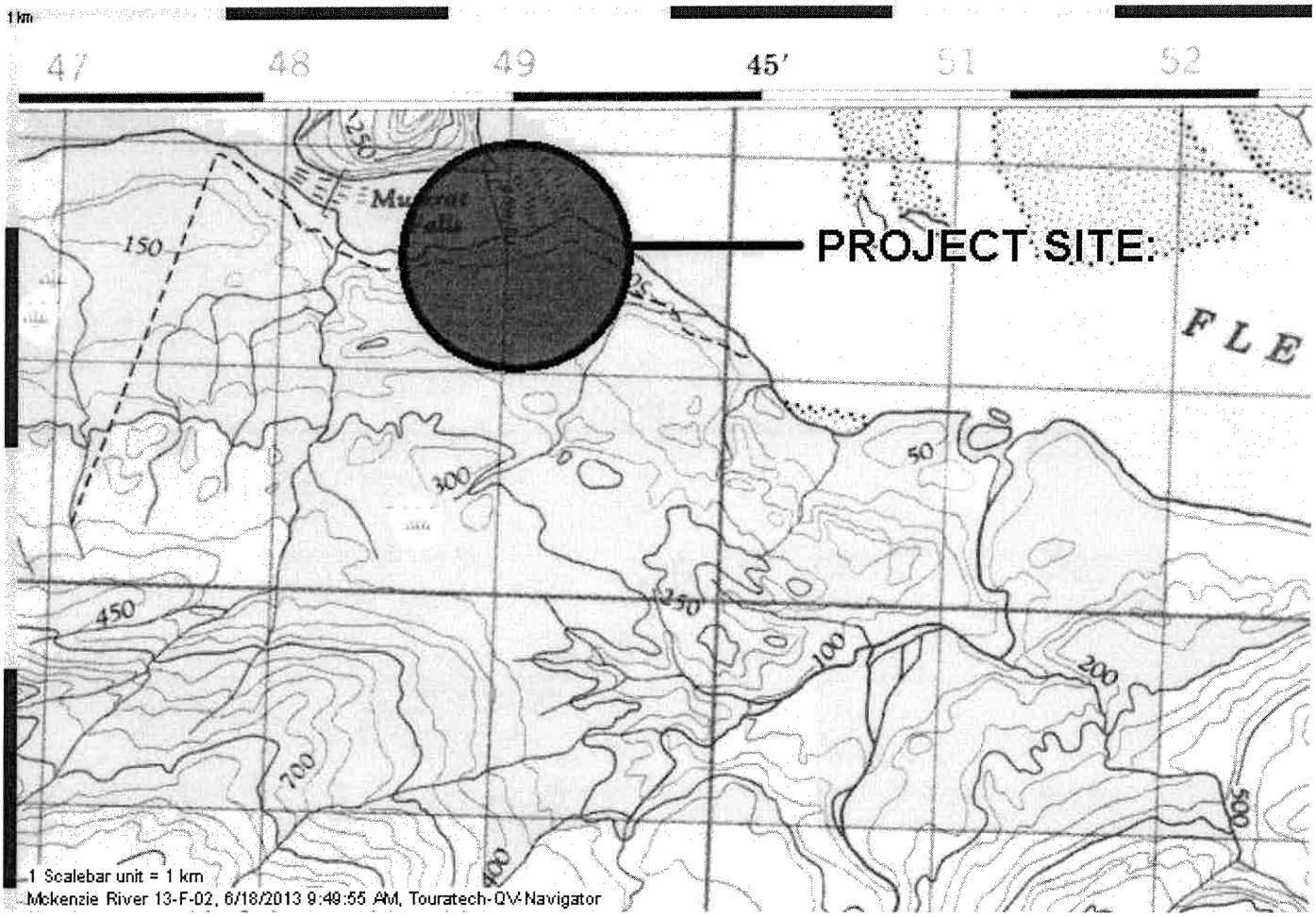
GOVERNMENT OF NEWFOUNDLAND AND LABRADOR
Department of Environment and Conservation

Permit No: ALT6933-2013

APPENDIX C

Location Map for Environmental Permit




1 km
47
48
49
45'
51
52
PROJECT SITE:
150
300
450
700
400
250
100
200
500
50
1 Scalebar unit = 1 km
Mckenzie River 13-F-02, 6/18/2013 9:49:55 AM, Touratech-QV-Navigator