

March 27, 2017



Peter Madden
Regulatory Compliance Lead
Lower Churchill Project

Dear Peter,

RE: Headpond Water and Sediment Sampling Program – March 27, 2017 Update

1.0 INTRODUCTION

In order to provide additional monitoring coverage of possible changes in methyl mercury concentrations in water during headpond formation, the provincial government requested an additional sampling program be implemented by Nalcor. Nalcor provided a program description to government and engaged Amec Foster Wheeler to implement the sampling program. This memo provides updates information regarding the headpond water and sediment sampling program related to additional results; sample location and headpond activities since the memo provided on February 9, 2017.

2.0 SAMPLING PROGRAM

Sampling began on October 14, 2016 to capture existing, natural methyl mercury concentrations before any headpond formation. The program initially included a total of seven sample sites stretching between Rigolet to the east and upriver of the Muskrat Falls reservoir area at Grizzle Rapids in the west. However, at the request of Water Resources Management Division (WRMD), sample sites were reorganized in mid-December 2016. This included additional sampling sites in Goose Bay and Lake Melville and relocating Site 6 to an area near the Blackrock Bridge (Figure 1). Samples collected at Site 10 (identified as N11 on Figure 1) were originally collected from surface, halocline and below halocline. This sampling was modified to include surface and just above halocline in the freshwater layer only, beginning at the December 20 sampling event, as per WRMD request.

Each initial site location was generally sampled for both water and sediment every 3-4 days between November 5 and December 11, 2016. Following the dewatering of headpond, on November 18 2016, additional samples were collected to ensure a minimum of two baseline samples from each newly-established sample location. Following re-impoundment in February 2017, a weekly sampling regime has been ongoing for all 11 sample locations (as per Figure 1) as per WRMD request.

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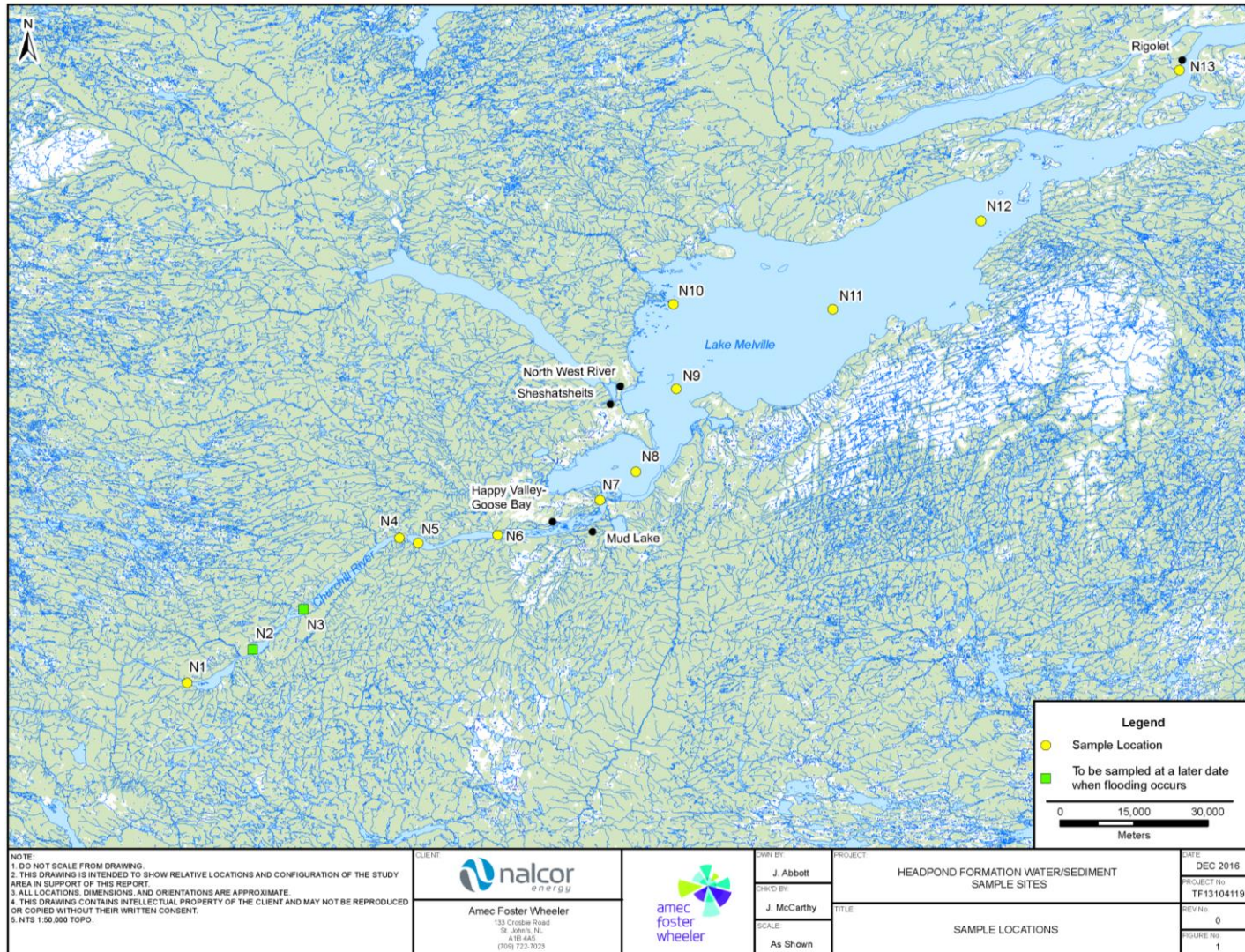


Figure 1: Map of sample locations, Lower Churchill River to Rigolet

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Water and sediment samples have been analyzed for total mercury, dissolved methyl mercury, and total methyl mercury as well as other parameters that are known to affect methyl mercury generation and transport.

3.0 HEADPOND FORMATION

As stated above, sampling began on October 14 and included a total of three baseline sampling rounds before any flooding of the initial headpond (Oct 14, 16, and Nov 5). Initial headpond formation began on November 7 and water levels steadily rose from approximately 16m elevation at the Muskrat Falls hydrometric station (Churchill River Mid Pool – Station Number 03OE015; additional water elevation data provided by Nalcor) to approximately 21.5m asl by November 14. On November 18, the headpond was de-watered and water levels were returned to approximately 14.5m. Headpond formation was initiated again in early February 2017, with the first set of impoundment samples being collected February 6, 2017. Water levels are currently around 21.5m elevation.

4.0 SUMMARY RESULTS

Sampling has continued throughout, and beyond, recent headpond activity to document any potential changes in natural, background methyl mercury in water and any potential changes due to flooding (Table 1). Each sample location is currently sampled on a weekly basis.

Table 1: Total number of samples collected from each sample site, as of February 28, 2017

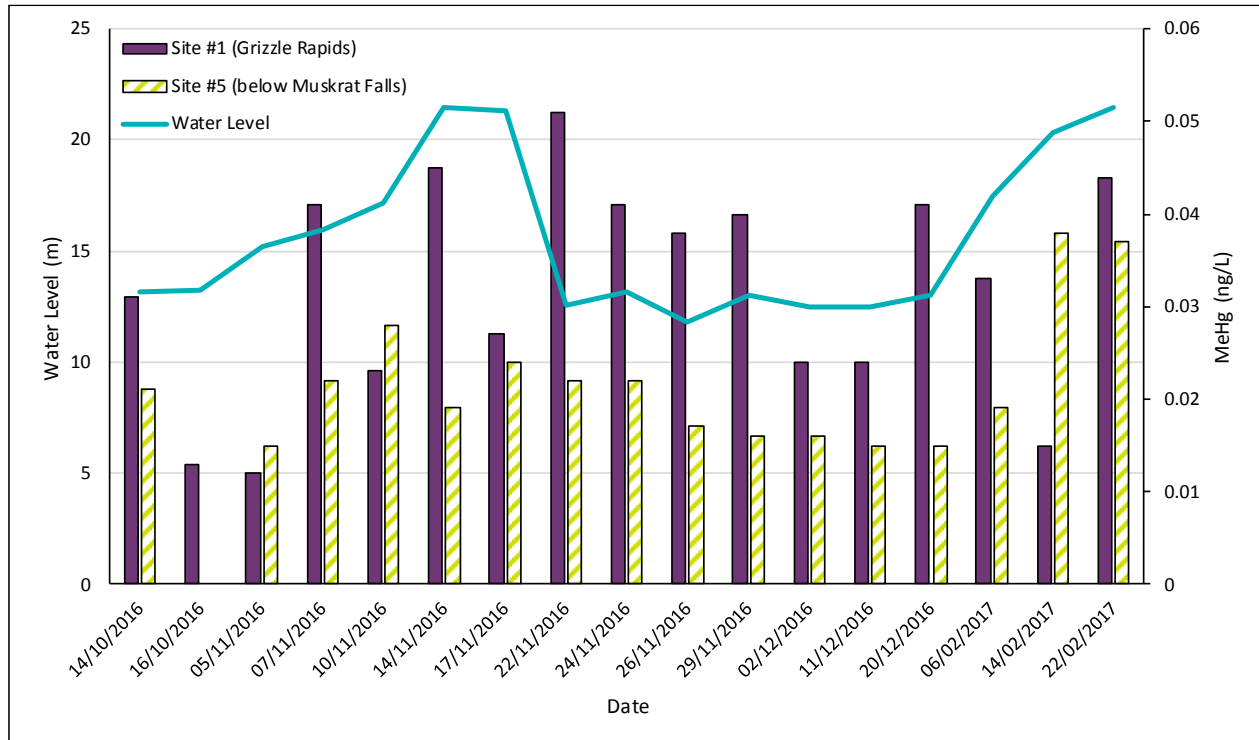
Sample ID (ongoing)	Sample ID (from original plan)	Date of First Sample Collection	Number of Samples Collected
N1	1	Oct. 14, 2016	17
N2 ¹	2	Oct. 14, 2016	2
N3 ¹	3	Oct. 14, 2016	2
N4	4	Oct. 14, 2016	17
N5	5	Oct. 14, 2016	17
N6	-	Dec 20, 2016	5
N7	7	Oct. 14, 2016	12
N8	-	Dec 20, 2016	5
N9	8	Oct. 14, 2016	12
N10	-	Dec 20, 2016	5
N11	10	Oct. 14, 2016	12
N12	-	Dec 20, 2016	5
N13	11	Oct. 14, 2016	12

¹ Sample sites located above headpond elevation will be completed upon reservoir formation

Sampling has continued to date with the last series of samples collected on March 27, 2017 (the results of which are pending from the analytical laboratory). A summary of all existing results from the sample site directly below the headpond is provided in Figure 2 below; this location would be directly downstream of Muskrat Falls and would be anticipated to be the first to show any indication of downstream increases in methyl mercury due to flooding. Also shown are the results for the upriver control site (Grizzle Rapids). As

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shown, there does not appear to be any increase in methyl mercury concentrations due to initial inundation and flushing of headpond. All concentrations of methyl mercury measured directly below Muskrat Falls, remained very low between 0.015 and 0.038 ng/L; the lab's accredited detection limit for total methyl mercury is 0.010 ng/l. A single sample was below MDL (October 16, 2016). All results to date for all parameters tested have been provided to Nalcor and government and are available. As sampling continues, further statistical analysis of all sites will be conducted.



Note: Water elevation data from October 14-November 18 has been provided by Environment Canada (Station Number 030E015). Data post November 18 has been provided by Nalcor. Missing dates have been estimated based on data provided by Nalcor.

Figure 2: Total methyl mercury concentration (ng/L) at Site N5, below Muskrat Falls and control site (Site N1; Grizzle Rapids)

Increases in methyl mercury throughout the food chain remain a serious concern for all stakeholders, including government and Nalcor, particularly with respect to potential bioaccumulation and biomagnification through the food chain. At this time, the collected data directly below Muskrat Falls showed no substantial increase in methyl mercury during initial headpond formation activity. For comparison, the Canadian Drinking Water Quality Guidelines for mercury consumption is 1,000 ng/L (which applies to all forms of mercury; see government website http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/sum_guide-res_recom/index-eng.php). Monitoring will continue on a weekly basis.

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If you have any questions, or require any further information, please feel free to contact me at your convenience.

Yours sincerely,


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