

Date : 8/25/2016 1:39:32 PM

From : "Harvey, Brian"

To : "Goebel, Martin" , "Cleary, Bas" , "Carter, Paul A."

Cc : "Gover, Aubrey" , "Appleby, Christopher"

Subject : Raw Notes - MeHg Meeting - HVGB.docx

Attachment : Raw Notes - MeHg Meeting - HVGB.docx;

Gents –

Further to this morning's meeting, please see the Raw Notes attached for your information.

Best,
Brian

AttendeesTable:

Wayne Thistle – Facilitator
 Brian Harvey – Notekeeper
 Paul Carter – NL Department of Environment and Conservation (ENVC)
 Martin Goebel – ENVC
 Geoff Mercer – Environment and Climate Change Canada (ECCC)
 Dr. Wolfgang Jansen – Innu Nation
 George Russell, NunatuKavut Community Council, Inc.
 Jim McCarthy – Nalcor
 Jackie Wells – Nalcor
 Rob Willis – Nalcor
 Peter Madden – Nalcor
 Jane Kirk – ECCC
 Greg Kaminski – Health Canada
 Colin Carroll – NL Forestry & Agrifoods Agency
 Bruce Pauli – ECCC
 Dr. Margo Wilson – Labrador-Grenfell Regional Health Authority (LGH)
 Diane Oliver-Scales – LGH
 Dr. David Allison – NL Department of Health and Community Services
 Rodd Laing – Nunatsiavut Government (NG)
 Carl McLean – NG
 Dr. Trevor Bell – Memorial University of Newfoundland

Telephone:

Dr. Elsie Sunderland – Harvard University
 Robin Anderson – Fisheries and Oceans Canada (DFO)
 Renee Patterson – ENVC
 David Haley – Nalcor
 Reed Harris – Nalcor

Seated:

Johannes Lampe – President, NG
 Darryl Shiwak – Minister, NG
 Greg Flower – Minister, NG
 Isabella Pain – NG
 Michelle Kinney – NG
 Loretta Michelin – NG
 Bert Pomeroy – NG
 Anastasia Qupee – Grand Chief, Innu Nation
 Richard Nuna – Innu Nation
 Donna Paddon – Innu Nation
 Paula Reid – Innu Nation
 Cathy Guirguis – Innu Nation
 Todd Russell – President, NCC
 Roberta Benefiel – Grand Riverkeepers
 Lisa Dempster – MHA, Deputy Speaker
 Randy Edmunds – MHA
 Minister Perry Trimper – ENVC
 Emily Timmins – ENVC
 Bonnie Learning – ENVC
 Michelle Watkins – NL Labrador and Aboriginal Affairs Office

[COMMENCEMENT OF WORKSHOP]**Wayne Thistle (WT):**

- Provided an introduction and background to today's discussions
- Referenced a letter from Premier Ball to Grand Chief Anastasia Qupee, which noted the Premier's commitment in Happy Valley – Goose Bay to hold a workshop on methylmercury ("MeHg") that must consider mitigation, whilst also considering the ecology of the reservoir, and whose objective would be to look at mitigation of potential MeHg impacts
- Referenced WT's mandate letter, from Martin Goebel, which noted the workshop would be a meeting of technical experts, Aboriginal groups and other stakeholders, to provide an opportunity to discuss mitigation measures
- Referenced November 2015 from NG Minister Shiwak, which noted the Inuit communities rely upon Lake Melville for hunting and fishing, and that the estuary is critical to the Inuit exercise and enjoyment of rights.
- Noted Facilitator's role was not one of decision-making, nor was it to include adjudication; rather, WT will prepare a report on the workshop, with a clear summary of discussion and findings.

Carl McLean (CM):

- Wondered what the regulators' objective is in attending this workshop. Noted the NG did not attend the March 2016 workshop because its work on the human health risk assessment aspect of the NG's study was not done. However, GNL went ahead with the NG, and then, in June, approved the HHRA Plan.
- So, are regulators here to reconsider the June decision? Or something else?

Martin Goebel (MG):

- Noted WT provided some background and context for today's workshop.
- Also noted specific objectives of the workshop included talking about the impacts of MeHg, how it is generated, and talking about mitigations to go forward.
- Noted the workshop was not a regulatory panel or decision-making body, but a forum for a discussion of scientific and technical expertise.
- GNL wants to discuss the facts of MeHg.

CM

- Will there be another workshop on the regulatory decision itself?

MG

- That depends on today's discussions and a review of the Facilitator's report.

CM

- Will the NG see draft of the report?

WT

- That has not yet been decided, and not certain it is the Facilitator's decision, but WT will suggest that it be shared prior to completion.

MG

- Presentation: MeHg Mitigation and Muskrat Falls
- Slide:
 - Project registered 01 December 06
 - Numerous agencies appointed to assessment committee
 - Joint Review Panel formed 08 January 09
 - Public hearings in 2011
 - JRP Report in August 2011; 83 recommendations
 - #4.5: full clearing of reservoir
 - #6.7: assessment of downstream effects
 - #13.9: possible requirement of consumption advisories
- Slide:
 - Federal Government and GNL responded on 15 March 2012
 - On #4.5, GNL agreed with the principle, but with limited opportunity for use of the timber, supported partial clearing
 - #6.7 was directed at DFO
 - On #13.9, GNL accepted the intent, and required Nalcor, if consumption advisories were required, to consult on mitigation and compensation measures

Dr. Trevor Bell (TB):

- Can you specify, when talking about clearing, whether talking about soil or timber?

MG

- Specified that in #4.5, GNL was thinking of the partial clearing of timber.
- Slide:
 - Project released on 15 March 2012, subject to a variety of conditions, such as an Environmental Protection Plan, Environmental Effects Monitoring Plan, and Human Health Risk Assessment Plan.
- Slide:
 - Simple graphic.
 - MeHg is a compound created by microorganisms which convert Hg into MeHg.
 - Mercury bioaccumulates up the food chain in the flesh of organisms
 - Final consumer = high-level mammals, man

Jane Kirk (JK):

- Increase is biomagnification, rather than bioaccumulation.

Dr. Elsie Sunderland (ES):

- Also important to note distinction between elemental Hg and inorganic Hg.
- It is inorganic Hg which is converted to MeHg.

MG

- Elemental Hg is what we call quicksilver
- Inorganic Hg has very different properties
- Slide: How does Project affect MeHg?
 - River reservoir will be dammed and flooded
 - Newly flooded soil will release inorganic Hg into the water, where it will be converted to MeHg
 - Several conditions were imposed on the Project related to MeHg
- Slide: Human Health Risk Assessment Plan
 - Submitted by Nalcor, to satisfy a condition of the Release Order
 - Includes monitoring plans for MeHg, country foods, and human health
 - Key components include a dietary survey
- Slide:
 - June 2016, HHRAP was approved, subject to the requirement that Nalcor consult local groups should monitoring indicate consumption advisories would be required
- Slide: Analysis and Key Considerations
 - Workshop held in March 2016
 - Findings noted that Harvard and Nalcor predicted similar results, but differed on how far downstream effects would be seen
 - Removing all the topsoil creates its own problems
 - The Harvard Study was highly credited
 - The recent NG Report confirms that regardless of mitigation, monitoring is required to protect human health
- Slide:
 - Health Canada determined the HHRAP was acceptable, and would monitor results
 - NL Department of Health and Community Services also determined the HHRAP was acceptable
 - Key Considerations:
 - CCME standard: 4ng/l, although it is notable that this is for aquatic life and is not necessarily reflective of the impacts of biomagnification or protective of higher trophic forms of life
 - NG research predicts up to 0.06ng/l, less than 66 times the CCME standard

TB

- Did all workshop members agree on 0.06 vs 4?

MG

- Those numbers were not specifically discussed at the workshop but rather went into the HHRAP assessment

ES

- The CCME standard is not protective of human health

MG

- Slide: Full Clearing Analysis
 - Full vs. partial assessment, would result in an only 10% difference in the amount of timber cleared

CM

- But the NG is asking for full clearing of timber and removal of soil and other organics

JK

- Was topsoil removal considered in GNL's assessment of full vs. partial

MG

- The GNL assessment considered only timber

Rodd Laing (RL):

- Are the numbers behind these analyses were publicly available.

MG

- In the Q&A section of the JRP Report

Peter Madden (PM):

- Also, in Nalcor's response to IR-146.

MG

- There were also concerns around the ability to fully clear timber, reiterating that "full clearing" would amount to clearing 85% of the timber, given at least 15% was inaccessible due to the steep slope of the reservoir, equipment and engineering considerations, and safety concerns.
- Slide: Soil Clearing
 - There were environmental concerns raised with respect to the proposed removal of soil from the reservoir, such as sedimentation and erosion impacts.
 - The loss of fish habitat was also noted, given the reservoir would effectively be sterilised

ES

- Is there any peer-reviewed science which studied the impacts of such sterility? It seems speculative to say a reservoir denuded of soil would destroy habitat and create sterility.

Dr. Wolfgang Jensen (WJ):

- Noted "sterilised" may be the wrong word, as his understanding was that the habitat would be re-established.

Jim McCarthy (JM):

- Agreed, although noted that it would take time for the river to re-establish soil and sediment

MG

- The amount of soil required to be removed would amount to 5M cubic metres of soil, which creates environmental problems on land, such as where to dispose of that soil so that it won't run back into the watershed

TB

- Why did Government conclude monitoring was necessary?

MG

- Because monitoring is the only way to prove or disprove predictions

TB

- The NG's scientific report and study concluded there is no safe threshold for MeHg, and that monitoring was always required

Paul Carter (PC):

- The NG report described low/medium/high scenarios, and that even in the low scenario, there is still some MeHg predicted. So GNL agrees that monitoring will always be required.

Dr. David Allison (DA):

- 5M m³ of soil has to be deposited somewhere; that would remain an unknown factor as to its potential to contribute to the production of MeHg

David Haley (DH):

- To blade-off 20 cm of soil would be very difficult
- The extant geotechnical stability of the reservoir's slopes would require cutting-back of the slopes
- To increase bowl stability, much more than 5M m³ would be required to be removed

WJ

- Why was 20cm used as an example?
- Would deploying heavy equipment on the soil itself contribute to increased MeHg production?

CM

- Was it being suggested that leaving soil in place would be better for MeHg purposes than removing it?
- MeHg is released shortly after flooding, not in dry conditions.

WJ

- Agree that if topsoil is removed, it would remove the potential for MeHg release
- But, it is probably not feasible to remove even half the soil in the reservoir
- Further, the process of removing soil could create its own MeHg source
- So, will likely be left with some soil left in the reservoir (to contribute to MeHg), as well as the impacts of removing the soil

ES

- Carbon is concentrated in the upper few centimetres of soil, so soil removal would not need to be to the bedrock
- That is why “full vs. partial clearing” is not effective in either case, because ultimately you are only removing timber, and not carbon-rich soil
- With respect to erosion concerns, MeHg production from particulate phase erosion is very different than its release from flooded soils

DH

- Scraping 2 cms off the top would be extremely difficult or impossible, but removing the top 20 cms is possible, subject to navigating the earlier noted geotechnical considerations and concerns

PC

- Timber that has been cut to-date has been moved out of the reservoir, beyond the high-water mark, but soil would have to be moved much further away, and would possibly create problems in another watershed

MG

- In respect of soil vs. topsoil vs. the organic layer, ENVC’s analysis focused on the organic layer.

WJ

- Wondered about peaty soils, which can be very deep

ES

- Research considered flooded peat lands and soil, but peat lands are already flooded, so the relative change from flooding is lower than flooding dry soil
- Ideally, removal would include all dry organics

MG

- Slide: Conclusion

RL

- Noted the Harvard study, and wondered whether Nalcor’s studies included modelling in Goose Bay, and in the riverine system?

Reed Harris (RH):

- Modelling was done in the reservoir, to model increases in water and in fish
- One was a simple regression model, whilst a more detailed model to predict impact on sediments and fish in the reservoir was also conducted.
- Nalcor’s results made very similar predictions to the Harvard study regarding production of MeHg in the reservoir

- Re: downstream, separate modelling was done in 2010-11 with a hydrodynamic model to determine how far downstream MeHg would reach

RL

- All downstream modelling was based on a dilution model?

RH

- In 2011, yes

Robin Anderson (RA):

- Evidence from longterm surveys, presented to the JRP, from the Smallwood Reservoir showed MeHg in Lake Melville
- Notes the Harvard study provides the mechanism for how that happened and a model for how upstream impacts can flow downstream

RH

- When information was presented to the JRP, it showed impacts into Goose Bay, but do not recall it showing impacts into Lake Melville

RA

- Agreed that most of the information was taken from Smelt, tom cod, sea trout from Goose Bay, but some sea trout came from Lake Melville
- Dilution and related hydrotechnical features would be factors in a well-mixed estuary
- But the Harvard study showed Lake Melville is not a well-mixed estuary, so dilution may have lesser beneficial impacts

TB

- Regarding a slide in MG's presentation which noted the "EA process examined MeHg extensively", wondered whether that statement included downstream as well?

MG

- Yes, downstream to the point that MeHg was not predicted to be detectable
- It was felt there would be no downstream impacts beyond Goose Bay

PM

- The extent to which MeHg would flow downstream was acknowledged in the EA and to the JRP as being uncertain; that is why DFO permit and the HHRAP acknowledge the uncertainty

PC

- When EA Division reviewed the Project, it reviewed the entire Project

PM

- In IR-166, there are elevated levels in Lake Melville; the Harvard Study showed MeHg may go further than thought, so Nalcor is making improvements to monitoring, including adding a third monitoring station

TB

- During the EA, it was felt that there would be no downstream impacts
- The precautionary principle requires the proponent to prove there will be no impacts

PM

- MeHg was considered, was known to be a possible impact, even if the extent of its reach was not certain

ES

- Asked whether there could be a large-group discussion of public health advisories, education, etc. as a mitigation tool, wondering whether advisories could be considered mitigation given the importance of country foods

WT

- Noted this subject was scheduled to be discussed later this afternoon

JK

- Wondered whether the proponent needed to expand on studies or monitoring in light of the new scientific information

PM

- Reiterated that Nalcor has always included MeHg in its assessments and studies, including in the Aquatic Environmental Effects Monitoring Plan
- Indeed, in wake of the Harvard study, Nalcor add a third, eastern station (20 mil East of Rigolet), and has consistently sampled well into Lake Melville

JM

- Noted sampling efforts include sampling the upper layer of the lake, as well as the snow layer and the saline layer
- Noted testing includes for the full suite of metals, chemicals, etcetera
- Materials tested also includes sediments

ES

- Wondered which labs were doing the testing

JM

- Flett for aquatic, UNB for the balance

PM

- Testing also includes assessing seals by taking liver, muscle samples from a local harvester; have data from 2009, heavily since 2011

JK

- Wondered about sampling off zooplankton?

JM

- Sampling since 2015, heavily in 2016

PM

- Notes all data is publicly released on the Project website

[END DISCUSSION ON MG PRESENTATION]**WT**

- There will now be an opportunity for all the different groups represented here to make a presentation or give some remarks. We will begin with ES and TB, following her, Geoff Mercer, Renee Patterson, JK, RH, and others

ES

- Presentation
- Slide:
 - The form of mercury determines its health impact
 - Inorganic: low absorption (0.01-7% average)
 - Methylmercury: high absorption (> 90%); primarily in central nervous system; half-life of 50-70 days; chelation not effective as a treatment

TB

- Notes the Harvard study had a lot of research partners, and funding partners included ArcticNet
- Harvard study is independent research
- Also looked at climate change and sea ice
- The Harvard study could inform Government strategy on all aspects, but for today, focus is on MeHg
- The study spent millions of dollars to get a full understanding of the Lake Melville ecosystem
- The study demonstrates that lake Melville is highly-stratified, and its dynamics are driven by large freshwater riverine inputs
- The stratification showed a flaw in Nalcor's report, which assumed Lake Melville to be a well-mixed estuary

ES

- The difference between inorganic Hg and MeHg is crucial
- MeHg crosses the brain/blood/placental interfaces
- MeHg stays in the system for a couple of months
- There is no known treatment for MeHg, other than limiting its intake and waiting it out
- Slide: MeHg bioaccumulation in the foodweb
- Slide:
 - Soils are the largest global reservoirs for Hg

- When you flood soils, you change the amount of Hg that is converted to MeHg
- Bacteria provide the substrate for MeHg conversion/creation
- Methylation takes place in flooded soil, and MeHg then diffused through the water
- MeHg is typically more highly concentrated at the bottom of a reservoir than at the surface waters, but the Harvard study assumed a well-mixed reservoir
- Slide: Components of Impacts Analysis
 1. Pulse of MeHg in flooded reservoir
 2. Transport and accumulation in Lake Melville/downstream
 3. Enrichment of MeHg in country foods
 4. Changes in Inuit exposure
- Slide: 3 Scenarios
 - Low – full clearing, including topsoil, high photochemical breakdown of MeHg downstream
 - Medium – partial clearing, moderate breakdown
 - High – partial clearing, low breakdown
- Slide:
 - Rapid increase of MeHg in surface waters of reservoir after 72 hours
 - The experiment ran for 5 days, and MeHg levels were still increasing exponentially on the fifth day
- Slide:
 - Mined literature to determine the difference between full vs. partial clearing in an effort to understand the impacts on the extent of the carbon reservoir in the reservoir
 - Research showed a linear relationship between organic carbon and MeHg production, further underlining the importance of soil removal

MG

- Did the research include reviewing data from other reservoirs where full clearing was done, including topsoil?

ES

- There is no literature on full clearing
- Instead, using data respecting the volume of carbon content, based on a global data set; clear indication that there is a strong linear relationship between the amount of Carbon available and the amount of MeHg produced

RA

- Did you consider temperature? There is a strong temperature relationship in sulfate reduction work

ES

- Agreed temperature could be important, but acknowledged it was not considered during the Harvard study
- Nevertheless, confident that the abundance and extent of Carbon trumps possible temperature factors

- Peatlands are also a factor – whether the soils are already flooded appears to have a greater impact on MeHg than temperature would do

RH

- Was the data used from the Experimental Lakes Area, and, in particular, the 1 wetland and 3 upland reservoirs in the ELA?

ES

- Yes, but added data from numerous other reservoirs; all basically showed the same relationship between Carbon and MeHg production. Also, a couple other studies underway

JM

- Were the reservoirs in the ELA flooded, and kept flooded?

RH

- In the 3 upland, there was no water there before
- Each year, water was drained, refilled the next year
- Water was drained via a weir, pumped back in the next season
- So in a given calendar year, water levels would go up and down – would this impact MeHg production?

JK

- Is ES in a position to share the other studies?

ES

- It is material that is under review, so hard to speak about it or know when it will be available, but qualitatively, it is data on boreal sites. There are four such sites in Canada (QC and Northern ON) and several Chinese sites

MG

- This slide talks about the relationship between Carbon and MeHg production
- However, no reservoir has ever been scraped of all soil, so there must remain some level of theorising

ES

- Yes, but the big picture message remains that the amount of Carbon is directly related to MeHg production
- Slide: Projected Increases in reservoir MeHg
 - Baseline
 - Low: 3x, to 0.067 ng/l (13%)
 - Medium: 10x, to 0.2 ng/l (80%)
 - High: 15x, to 0.3 ng/l (380%)
- Note, the Harvard study did not include rivers

- Nalcor overstated baseline levels because tested rivers
- Harvard study sampled 30 sites, from Goose Bay east to Groswater Bay

RH

- Notes the increases in MeHg production predicted by the Harvard study were not unlike the levels predicted by Nalcor

ES

- Lake Melville is highly stratified, with high salinity on the bottom and a freshwater layer on top, with very little mixing
- High Hg levels in freshwater layer
- Model shows high input of Hg and Dissolved Organic Carbon (DOC) to the Lake Melville estuary, a high level of methylation at the salt/fresh waters interface (“marine snow”)
- Creating extra trophic levels which leads to more biomagnification
- Plankton are opportunistic feeders
- Models point to medium or high scenarios, but we don’t know

RH

- Are these numbers and projections in the Harvard study?
- The signal will be stronger in reservoir, and carry down into the Lake; are the numbers an increase in loading (from the reservoir) or a system-wide/lake-wide increase?

ES

- The entire freshwater layer will be impacted; maybe higher near Goose Bay, lower near Rigolet
- But numbers are for the surface layer annual average, especially because there is so little mixing in the estuary
- Fish are not likely to stay just near Goose Bay, so probably fair to say there may be differences in their exposure throughout the lake-system

PM

- What is timeframe in which these increases are expected to be seen?

ES

- Probably within a few weeks of flooding

PM

- How long will enrichment last? How long will the peak last?

ES

- Peak is in the first 1-3 years; pulse in fish will last 10-30 years

RA

- These estimates are consistent with DFO evidence

RH

- Levels peak in water (1-3 years) sooner than they do in biota (3-4 years to 10-15 years)
- Difference between when peak happens, and when it will have run its course

WJ

- There is a lot of variability in terms of when peak in fish happens, and how long before levels return to baseline levels
- Likely to be a lot of variability in Lake Melville context, but peaks are estimated 15 years post-flooding

ES

- In dietary surveys, sampled people from Lake Melville region to establish baseline levels
- Approximately 70% of current MeHg exposure is from locally-caught foods
- Several methods were used to determine MeHg source for fish, such as isotopic testing
- Established baseline biomagnification data to determine MeHg change in country foods due to flooding
- Biomagnification in country foods will depend on which fish are exposed to MeHg in the freshwater layer, noting many fish stick to the saline layer
- Used measured factors to project biomagnification from baseline data

PM

- Study assumes freshwater species move throughout the lake system

JM

- Notes salmon can bioaccumulate as they move out to sea as part of normal seasonal migration

WJ

- Lake Melville has a hot spot of methylation, at the marine snow, where zooplankton concentrations are high. But baseline levels for fish appear to be low, or close to background noise.

ES

- Disagrees levels are low, noting the influence seen by the Harvard study shows biomagnification in plankton is a very strong factor

JK

- Notes that biomagnification in zooplankton from water is very high, higher than elsewhere; surmises zooplankton to fish biomagnification is likely comparable

ES

- Suggests levels in fish are about what researchers were expecting when seeking to establish baseline data

RA

- How do levels compare to Labrador as a whole? Are there discrepancies in levels depending on the size of the fish?

ES

- The Harvard study only sampled portions of fish/animals that people reported eating from locations where they were reported to be harvested

RA

- DFO data shows high levels in trout, low in landlocked salmon – almost the inverse of the Harvard study

Rob Willis (RW):

- This seems like a complex way to estimate exposure; how much uncertainty is there in these estimates?

ES

- This is as certain as possible; the Harvard study assessed people's diet in comparison with an assessment of the physical environment. Feel this is as close as can be achieved via measurements, and have produced a lot of baseline data

RH

- The issue of fish being wounded/killed/eaten is probably not a significant issue for Lake Melville, but in QC estimated such biomagnification impacts within 5 km of the reservoir

ES

- Using measured biomagnification factors to translate elevation in MeHg levels to elevation in fish species
- Communities impacted are HVGB, Northwest River, and Rigolet
- Notes people get country food from nearby their communities, but also from throughout Lake Melville region
- Dietary survey sampled 1,566 people; Rigolet: 87% response rate. HVGB: 32%. NW River: 44%. These response rates were much higher than Nalcor's (0%, 2%, 10%)
- Numerous NG employees working in communities to talk about diet and collect hair samples
- Right now, exposures are not that high, but took the baseline data to propagate future levels based on projected MeHg increase

- Levels in Rigolet are higher than in HVGB or NWR, because Rigolet residents eat more country food
- Levels higher in older, versus younger, age groups
- US standard for maximum exposure to MeHg is 1 ug/g (= 1 ppm); numerous individuals already above this level

Greg Kaminski (GK):

- Health Canada level is 2ppm

ES

- Most pronounced trend is seen in elevated levels in Rigolet, given their generally higher levels of consumption of country foods
- People who are older also tend to eat more fish
- But we're most concerned with children and women of child-bearing age
- Levels are higher for men vs women, old vs young, Rigolet vs NWR vs HVGB
- Current median is below any regulatory standard

DA

- Have any comparisons been done with other Inuit populations?

ES

- No, but it is likely that the higher north you go, the greater the baseline levels

Jackie Wells (JW):

- The data seems similar to that prepared by Nalcor

ES

- Nalcor's did not capture the diversity of the diet of respondents that was captured by the Harvard study, so unless Nalcor projects forward, it will not see potentially dangerous exposures
- Currently, there are 43 individuals above the Health Canada 1ppm standard, almost all in Rigolet
- But government guidelines are not necessarily reliable or understandable; for example, the US EPA is half of the Health Canada standard; why?
- Using the EPA guidelines, 150 individuals are already in excess of the 1ppm standard

GK

- Health Canada's 2ppm standard is for children and women of child-bearing age. For the general population, it is 4.7ppm

ES

- US EPA guidelines are predicated on the level necessary for neurotoxicity; lesser levels can still have health impairments, such as cardiovascular impairments
- Guidelines also do not consider lower-level neurological impairments, such as ADD
- EPA itself notes 1ppm standard is out of date and should be lower, and yet Health Canada is still double that

WJ

- 2ppm and 4.7ppm are recommended daily intakes; the data shows baseline levels, not daily intake
- 0.1ppm intake = 0.12 ug/g hair

ES

- Baseline levels are not a cause for alarm
- Important that we understand how exposure levels can change in the future
- Slide:
 - Country foods = 67% of MeHg intake (33% store-bought)
 - Considered 90 different food items
 - Propagate forward to show changes after flooding
- Slide: MeHg change due to flooding
 - Distinguished between landlocked and Atlantic salmon
- Slide: Highly exposed individuals disproportionately impacted
 - Based on the literature, cardiovascular and IQ impacts heightened for those most at risk
- Slide: Projected % above 2ppm standard
 - HVGB: 10% (high scenario), 5% (medium), 1% (low)
 - NWR: 25%, 7%, 2%
 - Rigolet: [didn't catch numbers, but higher than HVGB or NWR]
- Slide: Using 1ppm standard
 - HVGB: 25% (high scenario)
 - NWR: 50% (high)
 - Rigolet: 64% (high)
- Total # of people above the guidelines:
 - Health Canada Standard: 26 (low scenario); 104 (medium); 618 (high)
 - EPA Standard: 40; 252; 1,027
- Slide: Acute Toxicity Possible

Intake/day /	Low Scenario /	Medium /	High
1-3ppm	14	19	249
3-5	0	0	17
5+	0	0	16

- Given what they eat now, a lot of people are at risk
- Slide: Comparison of HHRAs
 - Harvard: > 1,000 participants, all Inuit or family member
 - Nalcor: 293 participants, 196 of whom were Aboriginal
 - Harvard: conducted over 3 seasons
 - Nalcor: Winter only
 - Harvard: concludes reservoir clearing will reduce Inuit exposure by 2/3rds
 - Nalcor: no conclusions can be made about Inuit-specific future exposure or those most vulnerable

RW

- Nalcor is doing more work on the HHRA

RL

- Will regulators consider that further information?

MG and PC

- Absolutely

RW

- Extra work on HHRA will also inform Nalcor's monitoring post-impoundment

CM

- The HHRA is incomplete if you are still collected data; yet, GNL and Health Canada approved it. How could they approve an incomplete plan?

MG

- GNL approved the HHRA Plan, not the HHRA itself

JK

- Harvard study's conclusion included that MeHg production is highest in the stratified surface water
- Do you know if production in the estuary will increase? How much water-column methylation will there be?

ES

- Uncertain; DOC may increase because of loading, but uncertain how much water-column methylation will occur
- Treating the estuary as if methylation happens post-flooding exactly as it is happening now
- Hard to quantify water-column methylation, so didn't include it

JK

- So are the estimates conservative?

ES

- Yes, likely on the lower bound
- What will be transported down the Churchill River is the Hg-rich surface waters
- Modelling also included demethylation, but actual findings do not suggest much demethylation

RH

- In terms of methylation in the reservoir, the Harvard study projected the inflow of DOC could have impacts, but did not seem to consider that if there is already methylation occurring in the estuary, what is coming down the river may not have a great additive impact
- Production in estuary could be greater than imagined, thereby lessening impact or importance of riverine input

ES

- True, although not much demethylation seen
- Riverine inputs are small – water-column methylation is definitely the biggest source of MeHg right now
- After impoundment? Not clear that will still be the case

MG

- Diagram show inflow of Hg and DOC; where is the Hg coming from?
- Was there any analysis done on the amount of Hg available in the system? Could MeHg production “max out”?

ES

- Hg comes in dissolved and particulate forms
- DOCs also contribute to methylation in the water column
- There is enough Hg to fuel production; in the water column, methylation is consuming just a fraction of the Hg in the environment
- Also, soil is a significant source of Hg

RL

- Regarding the HHRA Plan, its objective was to ensure there were no human health impacts. Until Nalcor’s further work is completed, how can you allow Nalcor to flood?

PM

- During the EA, the MeHg pathway to humans was considered; it is not dependant on the HHRA
- The project was approved as proposed, so best thing to do is focus on post-flooding mitigations

RL

- But “knowing” there will be impacts, how can you proceed?

MG

- HHRA will look at all information on balance, can inform mitigation and monitoring program
- As new information becomes available, it will be incorporated

CM

- But downstream environment was not considered during the EA
- Now that new information has come to light, governments need to reconsider the decisions that have been taken

PM

- Main issue is that the new information does not alter the projected mitigations

CM

- But it does – it shows full clearing will mitigate

PM

- No – what we have seen today is pathways to methylation
- It is also notable that full clearing as proposed by the NG is unprecedented

CM

- Unprecedented doesn't mean it shouldn't be done

Geoff Mercer (GM):

- Environment and Climate Change Canada is a science-based regulatory department
- ECCC establishes and enforces clear standards
- S. 36(3) of the *Fisheries Act* discusses deleterious substances
- For specified toxic substances, it is against the law to release such substance(s) into the environment
- MeHg is not a specified toxic substance
- But we are here because we are a scientific department
- Site C in BC: 6,500 hectare reservoir, project in the works for ~ 30 years
- The science we are developing is important to the country
- GM will report back so scientists can consider this information in their future decision-making

- Notes Government of Canada is undertaking comprehensive review of EA system; that process is ongoing, with Terms of Reference being finalised – general encouragement to participate in the review process
- ECCC also interested in constant renewal, review of processes
- Notes Project's EA was conducted under federal legislation which preceded CEEA 2012, via a JRP (under the old legislation, only way to assess a project was via JRP or Comprehensive Study, both highest level of scrutiny)
- 7 years later, we have new science coming in, world-class science, and new information on what MeHg does to and in the environment, how it acts in the environment
- This Project has been worked for decades, and the government of the day approved the Project
- The proponent and the Province are clearly receptive to new science
- Importance on including Indigenous perspectives in EA processes is to ensure not just western science, but also traditional Ecological Knowledge is shared
- Also noted this is a “clean energy” project; but what does “clean” mean, especially in an electricity-dependant society like ours? There are many ways to generate electricity. ECCC believes this is a clean energy project and approved it to proceed.
- But not at any cost or to any extent – so how do we bridge that gap?

RL

- JRP is the highest-level of scrutiny, and now 2 of the 3 Panel members are calling for full clearing
- Listening is not the same as receptive, unless action is taken in response
- Inclusion of Indigenous people also requires incorporating what they say
- “clean”? The UN is moving away from saying hydro is clean

GM

- If hydro is not clean, where are we getting our electricity?
- In the 1990s, only energy source was oil, diesel
- Economic development opportunities are also limited by a lack of reliable power
- Interestingly, similar conversations are being had around the cleanliness of tidal and solar power – but clearly the focus is on renewable energy
- How do we want to get to a low-carbon energy source?

- Do we want to keep relying on burning oil shipped in from other countries with potentially lax environmental or human rights requirements
- We are an electricity-dependant society

RL

- Clean energy shouldn't come at the expense of Indigenous people

CM

- Glad ECCC attended; too bad First Nations Inuit Health Branch of Health Canada is not here, or that DFO is only on the phone
- How will Health Canada and DFO transmit info learned today back to decision-makers? Because we think DFO can amend their authority based on the new science, they can do that based on their regulations
- Was anything reported back after the first workshop?

GK

- HC doesn't give authorisations
- HC had extensive comments on the HHRA Plan; those were taken into account, so HC was satisfied
- Re: HHRA vs HHRA Plan, the HHRA will use real data, but first need to have a good Plan to make sure you collect the right data that can prove or disprove the predictions made
- You could do a HHRA based on the Nalcor and Harvard studies, but that would still just be predictions

RL

- So, you're experimenting with Inuit health?

GK

- No – not experimenting
- Everyone understands that there will be an increase, but there is a high range of uncertainty regarding the extent, scope, etc. of the impacts
- Whether consumption advisories can be effective as a mitigation does not consider cultural impacts – how do you mitigate so it can be acceptable to the Inuit?
- FNIHB advises HC on the importance of country foods
- FNIHB participated in the HHRA Plan review
- FNIHB mandate ends there

- There are FNIHB programs available to enhance knowledge, but otherwise, HC's advisory role ends there – it does not include going to GNL or the proponent and telling them you must do X.

CM

- How will the Harvard study be communicated to FNIHB?

GK

- FNIHB is well aware of the science; how do you want FNIHB to be briefed?

CM

- Via direct briefing or by giving them a copy of the report

GK

- Ok

RA

- DFO is responsible for fish habitat protection
- DFO's Senior Manager was at the March workshop
- RA will report back to the Senior Manager, as well as providing the report and the new studies mentioned earlier by ES
- When the Harvard study was released, it was reviewed by DFO to determine if prior DFO conclusions needed to be altered. That process led to DFO issuing new recommendations for monitoring and mitigation measures
- DFO tries to work closely with Labrador Aboriginal groups, and integrate them and their views in DFO's decision making

RL

- Has anyone briefed DFO's Central and Arctic Division – that group has a lot of expertise in MeHg, whereas the NL Division only focuses on fish

RA

- Unfortunately much of the C&A expertise has moved on – focus has moved from in-house expertise to reliance on external experts
- RA's expertise is movement of MeHg through foodchain, just not ultimate transfer to man

[END ES PRESENTATION; COMMENCE REMARKS/PRESENTATIONS FROM OTHER REPRESENTATIVES]

JK

- Harvard study is based on sound science, sound methodologies
- Increase of MeHg is unquestioned
- Levels of MeHg in fish will lead to long increases in these levels in fish flesh

- Important to consider characteristics of the ecosystem, including carbon storage, and the estuary itself, which is unique

RH

- Harvard study is high quality
- People accepting as fact that there will be high impacts – but there are data and predictions involved in making that leap
- Nalcor's 2010 predictions very similar to those of the Harvard study
- But, notes that in reservoirs across Canada, 15 sites, fish mercury increases have been seen at 50-100% for some species, higher for others. People today are suggesting levels in Lake Melville would be much higher than that – how?
- If we are predicting reservoir increases of 2-7x, how are we predicting increases of 14x in Lake Melville?

Greg Flowers (GF):

- NG is a government, has an open dialogue with the Prime Minister
- Here at the workshop to listen
- Our scientists proved that our people eat everything that comes out of Lake Melville
- GNL and federal government are here listening, but they should also know we are not going away
- If it is only 1% of the project budget to clear the reservoir, clear it
- We're not going to take it, we want full clearing

Todd Russell (TR):

- NunatuKavut Community Council has about 1,200 members in this area
- People need to realise lands being impacted are the lands and waters we live on and use
- We can't see MeHg
- Traditional knowledge can inform, but we depend on western science to understand anthropogenic impacts
- Need to understand where, how we live
- The Harvard study assessed what, where, how we harvest country food – invaluable information given this ecosystem
- If things proceed as is, there will be elevated risk to human health. Some may say that risk is acceptable. I am telling you that risk is unacceptable. How do your plans account for that?

- When people talk mitigation, they talk about risks to the project – they should be talking about risks to health
- This workshop must concern itself with human health impacts – how do we mitigate the risks to our health? The project is secondary
- There seems to be a conclusion that mitigation measures will help human health. An advisory may lessen impacts on health, but it doesn't lessen impacts on Indigenous rights
- If you tell us not to eat what we've always ate, that's an impact. And a human health risk too, because it requires altering our way of life.
- How do you mitigate all the impacts?
- What are the pre-flooding mitigation options, and let's discuss them fully

Johannes Lampe (JL):

- To the scientific and the research community, thanks for working on this issue of importance to the Labrador Inuit
- Important to assess risks to Inuit children and Elders now, and in the future
- We don't want to see a situation where we have to tell the kids that their food is not safe, and that they can't practice their culture anymore – we will have failed them,
- 04 August 2016 will be a historic date, we have an opportunity to protect our health and culture

ES

- Regarding when the two further studies will be ready, repeats that she is not sure, they are under review. The first paper took 9 months, which was long. Hopeful for this Fall, but hard to say

CM

- Notes that further discussion on pre-inundation mitigation is required after the lunch break

[LUNCH]

Renee Patterson (RP):

- Presentation: Water Monitoring
 - Do not test for MeHg, do not sample biota
 - Do test for Hg, and water quality
 - 3 methods of monitoring on Churchill River and in Lake Melville: RealTime Water Quality Monitoring; RealTime Water Quantity Monitoring; and, Ambient (grab sampling)
 - 5 monitoring stations between Muskrat Falls and Lake Melville
 - Hourly data, during ice-free months, on water temperature, pH, specific conductivity, dissolved O₂, and turbidity, providing a fingerprint of water quality
 - Data is available on ENVC's website within 2 hours

- There are some limitations, including that only monitors certain parameters; hence, monitoring is supplemented with grab samples
- 4-5 grab samples collected at each station during the annual ice-free months, sampled for total Hg
- Grab Samples done annually since 2009-10, when stations were installed
- Under NL-federal agreement, select grab samples also done at sites on various tributaries to the Churchill River
- This data all allows ENVC to establish baseline info so as to monitor post-impoundment changes and impacts

CM

- Returning to this morning's discussion of pre-flooding mitigations, this morning included a good discussion on the science.
- The NG report included pre-flood mitigation measures, which are a critical area of discussion. Are we prepared to discuss pre-flood mitigation?
- For example, everyone knows the NG is requesting full clearing; it is the only thing that will reduce impacts on the Inuit. But we have heard concerns about full clearing and its impact on fish habitat. Is it as simple as that – fish habitat upstream versus human health upstream?

ES

- May be worthwhile to discuss all possible mitigations pre-flood
- Has consideration been given to nitrate additions or oxygenation to suppress MeHg?

RH

- Adding nitrates worked in a contaminated lake in New York (Onondaga Lake)
- Added nitrate to water – nitrate shifted activity of bacteria, so methylating bacteria less active, nitrating bacteria very active
- Not a one-time addition – once/year for several years
- Not guaranteed to work, may work best where water loses oxygen
- So nitrates may not work in the Project reservoir
- Oxygenation may also work given methylating bacteria thrive in anaerobic conditions
- However, Nalcor has concluded the reservoir is not predicted to be stratified or deoxygenated
- But both methods would be worth considering

ES

- Iron and manganese oxidants can also act as a cap for MeHg

WJ

- Do you know what concentrations would be required, or where? The reservoir water turns over every 10 days

RH

- No, but would be easy to determine, and would be easy to determine if it works in oxygenated water
- Freshwater systems are phosphorus-limited, so adding nitrates won't affect algal production
- But if the system is nitrogen-limited, adding nitrates could lead to algal blooms
- It only works as long as you're adding nitrates on a regular basis. Need to determine how feasible it would be to do it on a recurring basis
- Would probably need to pilot the methods

ES

- Methylation is very season-dependant, so might not need to be added year-round
- When Nalcor modelled the reservoir, where was the anoxic layer?

RW

- There is no anoxic layer predicted

RH

- Nitrates work best in solution, and in anaerobic contexts
- But if MeHg is happening in soil, and not water, would adding something to the water even help?

ES

- In New York, they used Iron and Manganese hydroxides, which acted as a cap. Such an approach may be effective.

CM

- Does this need to be done prior to flooding?

ES

- Need to test it prior to flooding, if you're planning to rely on it post-flooding

RH

- Oxygenation could help, but only if the water column is deoxygenated

JK

- Will it reduce soil production? Is there any anoxia in the water column?

RH

- Methylation happens wherever it is anaerobic; hard to say if it would work in sediments

JM

- No anoxia; the reservoir is part of the river, so there is constant mixing

MG

- If methylation thrives in anaerobic environment, wouldn't an always oxygenated river/reservoir depress MeHg production in the reservoir?

ES

- Yes, but there could still be sediment production
- Be careful in assuming that oxic = no methylation

RH

- Agreed
- But it is worth exploring nitrates and oxygenation

DA

- Is there any value in assessing the Hg in the soil?

RH

- Hg in the soil is a factor, but it is more the carbon and the microbes it supplies or feeds

CM

- How would this impact the downstream?

RH

- If adding nitrates to the reservoir, it would result in less MeHg going from the reservoir to Lake Melville, but not sure what would be the impact on methylation in Lake Melville

MG

- Generally, this is a flow-through reservoir, not a storage reservoir, so doesn't Hg have to come from the reservoir?

WJ

- Care should be taken when considering the impacts of adding nitrates

RH

- Agreed; the risks of algal production could be counterproductive

CM

- Let's return to full vs partial clearing, and the concerns about impacts on fish habitat

PM

- The major issue in discussing full clearing is human health and safety
- There is a tremendous amount of uncertainty and risk on all sides
- But including a mitigation measure such as full clearing is unprecedented, would require a massive undertaking and research

- Also notes there are post-flood mitigation measures available

RW

- Regarding post-flood measures, notes consumption advisories can be more than just “Do Not Eat X”
- Nalcor is envisioning education and engagement campaigns which would also include discussion of cooking practices which could help reduce Hg intake, as could changing dietary practices, such as pairing specific drinks with specific foods
- Notes several, 12-15 papers on potential of cooking practices, focusing on the changing of proteins in the cooking process; given MeHg attaches to protein in the tissue, altering the protein provides an opportunity to reduce Hg ingestion
- Selenium could also be considered as an option to reducing Hg ingestion

ES

- Asks for references to these studies, so they can be considered
- The benefits of country foods may also be diminished by such alterations
- Cautions against assuming selenium is a magic bullet

JW

- The message is that it would be worthwhile to work together on designing such mitigation measures

CM

- There is equipment available that could do the job of fully clearing the reservoir
- When NG says “full clearing”, it knows Nalcor can’t get all the 100% of organics. But have got to do better than 75% of timber.
- The last workshop concluded partial clearing was ok; we want to return to the question of full vs. partial
- Does it affect fish habitat?

JM

- It wasn’t a decision point at the workshop, and we aren’t placing fish over human health
- Rather it was a discussion on what would be the impacts of fully clearing
- The reservoir is oligotrophic, plankton production is from the Smallwood Reservoir
- Full clearing will affect fish that would otherwise feed on that plankton, so there will be dead and distressed fish

CM

- How long to rehabilitate the habitat after full clearing?

JM

- 3-5 years?

CM

- Versus 40 for MeHg levels to return to baseline?

WJ

- There seems to be uncertainty around the feasibility of full clearing. Perhaps a feasibility study is required?

ES

- The Harvard study removed the top 1-2cm of organics of the core samples in its experiments
- Further experiments could be done comparing core samples with and without topsoil

RH

- The problem is core samples are not always realistic – maybe a mesocosm?

ES

- Good idea; new core samples could be tested in a couple weeks. A mesocosm would take a couple of months.

CM

- Can we pause the start of flooding until this work is done?

GK

- There is still a flaw – even if you fully clear the reservoir, there will remain an influx of organics from upriver, from the sides of the reservoir. So after a year or two, there will be the same buildup of organic material as was there before

RH

- Agreed, but when you create a new reservoir, there is a big pulse from leaves, organic litter at the outset. This pulse is greater than what you would normally get from just water running through organic materials
- So yes, after a couple years, the production of MeHg from organics in the reservoir would likely be the same as if you had never cleared. But the pulse would be lessened.

MG

- Can you burn it?

RH

- This was tried in the ELA; burning got rid of organic carbon, reducing the carbon coming out of the flooded area

- But, it didn't result in lowered amounts in fish b because MeHg was able to more effectively biomagnify up the foodchain in the absence of DOCs.
- A mesocosm study would use enclosures with different types of contents right in the reservoir itself

ES

- A mesocosm can be suboptimal because of organic growth on the walls of the enclosures
- The set-up of the experiment may not be effective as a result – the “enclosure effect”

JW

- How did Harvard simulate throughput in the core samples?

ES

- Stirred water regularly, replaced water daily

WT

- Are these studies ones that could be done in a short period of time?

PM

- Such studies would not likely answer all the questions

MG

- Suggests mesocosm study as a possible action coming out of the workshop

ES

- Also suggests nitrates and oxygenation be action items

CM

- Suggests the province could fund these studies

MG

- The regulator will consider whether these might be options for adding to the Release Order, or the EEMP or other Plan

CM

- The NG wants a total pause on activity. Don't flow any water until this work is done, or else it's a waste of time

DH

- The scope of work for full clearing should not be lost on us
- It would be one of the largest civil jobs in the country
- We can do it, but it would be a massive undertaking, and would require quite a bit of planning

CM

- The NG estimated full clearing as 1% of total project cost

- That is nothing compared to the costs the Project will have for the Inuit

RL

- Stripping 15cm would cost \$178M
- Stripping 20cm would cost \$230M

WJ

- Would an undertaking like full clearing require a new EA?

ALL

- Almost certainly

DH

- Because of the slopes, a lot more work would be required
- Plus, need geotechnical assessment before it can even start to make sure the equipment could operate safely
- Would also need to pile soil somewhere outside the watershed, but can only transport 3km before it becomes a huge challenge

WJ

- Where is soil going to go? Is there potential for methylation within the piles?

DH

- Piles of soil could also create fire risk
- Scientists would need to tell the engineers how far away the soil needed to go

PM

- What do these considerations do to the costs of the Project? Likely to be much higher than the NG estimates

CM

- Cost is secondary to Inuit health

Colin Carroll (CC):

- Are there any options we are not considering, besides full clearing, nitrates, oxygenation, etc.?

RH

- Clearing is the only option that has really been implemented, and usually not for MeHg issues
- Burning, adding fish, etc.: none of these have proven effective

GK

- Is there a limit on MeHg production?

RH

- Not sure; ES's graph showed the higher the Carbon present, the higher the MeHg, without plateau
- There is a point in natural systems where MeHg levels off, or plateaus
- Probably some peak at some point, but not sure there is a cap or a maximum

TB

- Maybe what is required is a direct action plan so decision-makers have evidence
- Perhaps a working group could be formed, comprising the federal government, GNL officials, ES and TB?

GM

- ECCC needs to reflect on this workshop prior to making such a commitment
- This discussion has been excellent, but before we can commit to future activity, we need to bring it back

CM

- TB's idea is a good one, but only if the Project is paused until the working group's work is done
- It would be nice to get a sense from the Province as to whether it will pause the Project

MG

- This workshop was tasked to discuss the science, not to commit to specific action or pause or stop the project

CM

- Still did not get a good answer on the concerns about impacts on fish habitat from fully clearing the reservoir, as discussed at the first workshop

JM

- Fish habitat was not a trump card, just a factor

WT

- Provides a summary of discussion to this point, noting:
 - There had been fulsome discussion of the Harvard study and the potential growth in MeHg production
 - There had been discussion of full vs. partial clearing
 - It was noted that full vs. partial clearing would only be a reduction in 10% of the timber removed, as concluded at the March workshop
 - There was discussion on the sterility of the reservoir and impacts on fish habitat if full clearing, including soil, was done
 - There was discussion on the challenges of full clearing, including soil, such as the slopes of the reservoir

- There was discussion on pre-flood mitigations, including oxygenation, nitrates, and a mesocosm study
- There was discussion on whether consumption advisories are ever an acceptable mitigation
- There was a strong request to take all measures available to reduce impacts on human health

RH

- Noted his numbers were used to conclude that current plans for clearing would remove 10% of organics
- If we can reduce 10% of easily-degraded Carbon, the reduction in MeHg in fish is estimated at 10%
- The more Carbon that can be removed, the more MeHg production will be reduced

ES

- Agreed; it is basically a linear relationship

RH

- Although we weren't talking about all that today

CM

- The NG released its report in April 2015, and travelled to HVGB, NWR and Rigolet to explain its findings to community residents
- The NG also prepared a policymakers report, with 4 requests:
 1. Full clearing
 2. Impact Management Agreement with the Inuit, negotiated before flooding:
 - It needs to address how regulators will deal with impacts, how consumption advisories will be handled if they are required, as it needs to be more than just issue an advisory once an indicator hits a specified level.
 - This Agreement is not simply compensation. It would also detail alternate food sources in the event of advisories, and ultimately, address how impacts will be addressed once they happen.
 - There will be impacts; the extent is uncertain.
 3. Independent Expert Advisory Committee:
 - There is a lot of expertise on these issues; it needs to be harnessed to advise on downstream monitoring
 - Monitoring needs to be designed to address Inuit concerns, and should include people around this table
 4. Joint decision-making on downstream environmental monitoring and management

RL

- Regarding #3, politicians have said they don't understand the science well enough; this underlines the need for independent experts

GM

- That is an interesting idea. First of all, this idea should be proposed to EA Modernisation. EAs are highly complex; it is always a challenge for decision-makers to understand the science and to explain it to the public.
- Secondly, as part of ECCC's role, it can convene and chair an expert science table, which brings together representative from across government to discuss issues. Such a table guided ECCC action in respect of the *Manolis L.*

[END DISCUSSION ON PRE-MITIGATION MEASURES]**[COMMENCE DISCUSSION ON POST-MITIGATION MEASURES]****RW**

- There are various measures, as noted earlier, but the whole approach to post-mitigation measures needs to be designed in consultation with the communities, and needs to include a strong education piece
- The concept at this time is somewhat precedent-setting, as in most places, the action is to just issue a consumption advisory

PM

- Nalcor understands consumption advisories are not to be desired

DA

- The consumption advisory process is something for which the Province does not have the resources; it typically depends upon others
- The idea of an advisory committee is a good one, so there are no surprises to anyone

CM

- Any post-flooding mitigation measure is suboptimal
- The primary mitigation is full clearing. Everything else is secondary.

GK

- Health Canada has two programs – the First Nations Food, Nutrition and Environment Study and the First Nations Environmental Contaminants Program. These programs can provide funding and technical support to study diet, impacts on MeHg, changes in country foods, to help fully understand impacts of the changes.

CM

- Are land claim organisations able to access these?

GK

- Maybe; just build a case for why you want to access the program
- It is an annual program, there is no reason the NG could not access it

- If there are any concerns about Nalcor-led work, this could be an option to secure independent research

RL

- But those programs won't affect mitigation, or won't affect mitigation of consumption advisories

MG

- Is there a food source that retains country food benefits without Hg?

ES

- You can shift diet, but that is harder to do where food insecurity already exists
- There may be a need or opportunity to involve nutrition experts in these discussions

GK

- Health Canada does consider food security, so could bring FNIHB nutritionists to bear

ES

- Is Health Canada working with Nalcor?

GK

- Not yet

JW

- Nalcor is still gearing up

GK

- Also, Health Canada has no experts on the cultural aspect

WJ

- How will consumption advisories be created?

CM

- The process is to be determined; work remains to be done to establish that process
- An impact management agreement should and would speak to that process, such as who needed to be involved, etc.
- In the past, consumption advisories were just posted. This was not effective. The NG worked with the Province, and agreed that information would be provided in the communities before posting the signs. This has been a more effective approach.

MG

- As noted this morning, Minister Trimper committed Nalcor to consult affected communities in the event consumption advisories were required; that seems to be what CM is requesting

CM

- We don't want to be "consulted" or "Consulted" – we want to negotiate an agreement, not merely to be consulted

- Government consults, gets comments from the NG, and moves ahead with a decision without any explanation to the NG. That is not what we want.

MG

- “consult” is also not just putting up a sign

RL

- Consumption advisories are a last resort
- People in this room have authority to make decisions
- We need decisions before flooding
- The NG’s proposed mitigations are all pre-flood mitigations

CM

- Maybe a group of 3-5 people could be directed to look at full, including soil, vs. partial clearing. All that matters is impacts on Inuit health.

PM

- Is the NG suggesting that risks to finances, human safety, ecology are all trumped by the potential for impacts on Inuit health?

CM

- Safety is important; the rest is secondary
- How can you put a cost on health, culture?
- What would it cost to compensate for those impacts?
- For us, human health trumps all

[END DISCUSSION ON POST-FLOOD MITIGATIONS]**WT**

- Invites representatives to make any closing remarks.

JL

- As leader of the Labrador Inuit, Inuit health and our way of life and food security for our children and grandchildren are all very important
- Protecting that is the responsibility of the NG
- Full clearing is a priority for the NG

Anastasia Qupee (AQ):

- Thanks to all for the workshop
- Realise there are still a lot of questions surrounding the project

- Innu are concerned about MeHg, it impacts Innu in many ways, not just food, it impacts on the environment more than just food
- Any impacts on animals or fish impacts Innu as traditional knowledge must be passed down. But if we cannot practice our culture, it is harder to pass down.
- The Innu position is that we want to discuss these issues further, and consider the science to ensure we minimise impacts and have effective monitoring and mitigation if there are changes.
- We still live off the land, our language is in the animals. We are facing challenges now with the caribou, we don't want to face it on fish too.

TR

- We have talked about impacts. But consider who is being impacted. We are the community. You are asking us to bear the impacts, maybe for multiple generations
- It is interesting that the people who want pre-mitigation measures are the people who live here, and the people who say post-mitigation measures are fine do not live here. That hurts me deeply.
- There are impacts locally whilst it is being built, we are seeing that now. And now there will be impacts locally even after it is built.
- I don't speak Innu-aimun or Inuktitut. But it still affects my language, affects how we transfer our culture
- There is serious work to be done, but never forget who is being impacted.
- It is funny – our authenticity gets questioned because of loss of culture. And now the same people are taking action to diminish our culture.

Perry Trimper (PT):

- Expressed thanks to all participants for such a robust discussion of the issues, and the options that are and may be available
- Looking forward to receiving the report from WT, which he will consider in determining what future actions would be appropriate

[END OF WORKSHOP]