Date : 4/8/2010 3:42:44 PM
From : GBennett@nalcorenergy.com
To : "Bown, Charles W."
Subject : Fw: Presentation
Attachment : Reservoir Preparation - Full vs partial Clearing Mach 2010.ppt;ATT75659.jpg;

FYI...

G

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---- Forwarded by Gilbert Bennett/NLHydro on 04/08/2010 03:42 PM ----

From: Marion E. Organ/NLHydro
To: Gilbert Bennett/NLHydro@NLHydro
Date: 04/05/2010 08:54 PM
Subject: Presentation

Gilbert

Please find attach the reservoir clearing presentation.

Marion

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Reservoir Preparation
Cost – Benefit Analysis

Boundless Energy

nalcor energy
LOWER CHURCHILL PROJECT

Safety Moment

Spring - home maintenance tips

- Inspect your smoke detectors.
- Check the light bulbs in all your fixtures to be sure that they are the correct wattage.
- Check your electrical outlets for potential fire hazards.
- Keep a multi-purpose fire extinguisher accessible that is filled and ready for operation.
- Check for damage to your roof, and clean gutters.
- Check your water heater for leaks and corrosion.
- Clean and/or replace your furnace filter.
- Clean the clothes dryer exhaust duct.

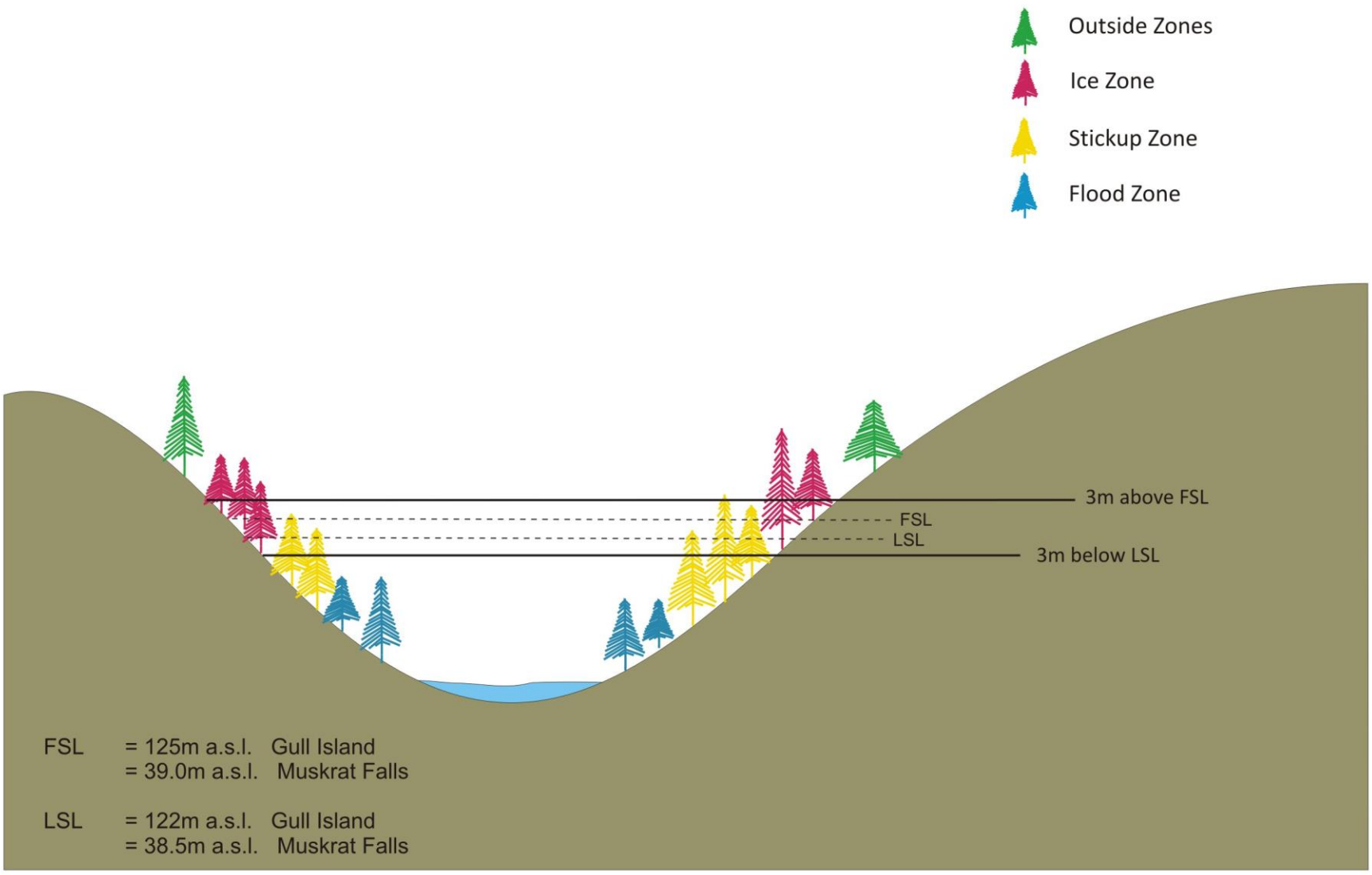
Outline

- Purpose
- Reservoir Zones
- Overall Clearing Strategies
- Cost Comparison (capital and Operations)
- Comparison of Volumes Full vs Partial
- Environmental Considerations
- Summary

Purpose

- Present the results of the cost benefit analysis.
- Achieve alignment on the reservoir preparation strategy.

Reservoir Zones



Overall Clearing Strategies

- No Clearing
- Partial Clearing (Ice + Stick-Up Zones)
- Full Clearing (Ice + Stick-Up + Flood Zones)

Cost

- The costs associated with clearing can be subdivided into three areas;
  - Clearing costs (capital cost)
  - Debris Management (operating cost)
  - Schedule premiums (the cost of delays to obtaining first power if additional time is required for reservoir clearing).

Cost of Clearing (Capital Cost)

Reservoir	Parameter	Partial[1]	Full[1]
Gull Island	Mobilizations	$1,616,000	$4,709,000
	Roads & Bridges	$23,863,000	$26,147,000
	Support Services	$62,089,000	$180,924,000
	Merchantable Clearing Cost	$14,123,000	$41,154,000
	Demobilization	$582,000	$1,696,000
	Decommissioning	$488,000	$1,422,000
	TOTAL	**$102,761,000**	**$256,052,000**
Muskrat Falls	Mobilizations	$1,789,000	$2,573,000
	Roads & Bridges	$13,363,000	$13,949,000
	Support Services	$58,354,000	$83,939,000
	Merchantable Clearing Cost	$34,286,000	$49,317,000
	Demobilization	$622,000	$895,000
	Decommissioning	$386,000	$555,000
	TOTAL	**$108,800,000**	**$151,228,000**

[1] Cost recovery for Nalcor Energy for merchantable timber or other biomass assumed to be zero.

Debris Management (operating cost)

- Primary benefit of clearing for Nalcor is to reduce the amount of material that will contribute to trash and debris at the generating facility.
- Timber remaining in the flood zone will contribute minimally to trash and debris generation.
- Regardless of the level of clearing selected, the same level of trash and debris handling equipment will be required.
- The actual difference in cost of debris management due to handling additional volumes has been estimated.

Debris Management (operating cost)

Reservoir	Clearing Option	Volume Remaining in Zone (1000 m^3)		Level of Debris Generated (1000 m^3)			Cost of Debris Management ($50/$m^3$) (millions of dollars)
		Ice and Stick Up	Flood	Ice and Stick Up	Flood	Total	
Gull Island	Partial	465	817	179-465	41	220-506	11.0-25.3
	Full	465	363	179-465	18	197-483	9.85-24.15
Muskrat Falls	Partial	112	171	43-112	8	51-120	2.55-6.0
	Full	112	26	43-112	1	44-113	2.2-5.65

- Cost savings for debris management negligible.

Schedule Costs

- Also a concern that a requirement for full clearing will delay Project completion.
- Lost revenue and IDC would be inevitably be incurred if full clearing results in a schedule delay.

Benefits

- Quantifiable
  - Recovery of merchantable timber
- Non-Quantifiable
  - Environmental Benefits

Recovery of Timber

Volume Summary for Full versus Partial Clearing

Reservoir	Clearing Option	Area Cleared (ha)	Additional Clearing (ha) [1]	Volume Cleared (1000 m^3)		
				Merchantable	Non Merchantable	Total
Gull Island	Partial	1000	400	258	33	291
	Full	3800	400	655	97	752
Muskrat Falls	Partial	1800	500	470	58	528
	Full	3300	500	601	75	676

[1] Limited additional clearing will occur outside reservoir zones, related to; habitat enhancement, access roads, and wood storage areas for both reservoirs. These activities are also reflected in volume cleared values.

Value of Timber

Reservoir	Clearing Option	Volume Recovered (1000 m^3)		Value[1]	Potential Cost Recovery (millions of dollars)
		Merchantable	Non Merchantable		
Gull Island	Partial	258	33	$5,160,000	$5.16
	Full	655	97	$13,100,000	$13
Muskrat Falls	Partial	470	58	$9,400,000	$9.4
	Full	601	75	$12,020,000	$12

[1] A base value of $20/$m^3$ at a storage site has been allocated based on uncertainty in the round wood market.

Environmental Considerations

Ecosystem Component	Comparison
Atmospheric (Air Quality and Climate)	Partial Preferred
Fish and Fish Habitat	Partial Preferred
Terrestrial Environment	Partial Preferred
Economy, Employment and Business	Full Preferred
Communities	Full Preferred
Cultural and Historic Resources	Neutral
Land and Resource Use	Neutral

Conclusion

- Full clearing extracts an additional 610,000 m^3 of timber.
- Cost of additional extraction is $197 million.
- Added value of timber is $10 million.
- No material operating benefit.
- No clear environmental benefit.

Summary

- Partial clearing makes 819,000 m^3 of timber available.
- 470,000 m^3 is merchantable and within proximity to HVGB.
- Catalyst for forestry sector in Central Labrador.
- However, additional investment in reservoir clearing not warranted at this time.

Thank-You! Questions and Comments