

## **Mar 2015 Briefing on costs leading to AFE rev 2 given to CEO , VP and Finance team**

There are two decks included Mar 5 and Mar 8 along with some associated emails and meeting calls

The briefing deck of Mar 5 identified an amount of ~\$7.5M which was required in order to award the Contract for the North and South Dams and remaining HVdc line Clearing Contracts.

Also included was a very high level view on costs and consequences of project abandonment – the cost to ratepayer to abandon and maintain Holyrood until 2021 was estimated at \$11.5B

The Mar 5 deck was work in progress and led to the Mar 8 meeting and deck which considered the changing risk profile from tactical risks to strategic risks.

The amount being considered for AFE 2 at that time was ~\$7.5B ( AFE 2 was approved at \$7.65B later that year).

The costs increases reflected the tactical risk of Contractors with a risk aversion for Labrador based on the productivity being experienced in the province generally. The ~\$527M cost increase between AFE rev1 and Rev 2 was driven by a combination of Market conditions and Contractor pricing of \$395M, Design enhancements and system reliability improvements \$99M and Contractor performance requiring an increased owner site team with associated costs.

It was clear from this deck that the AFE 2 increase would take the Project to the end of Q2 2016 and would not be the final project cost.

Re: Can we meet with you this Sunday at 3pm at Torbay Rd?

Gilbert Bennett

to:

Paul Harrington

03/06/2015 05:16 PM

Cc:

Ed Martin

Hide Details

From: Gilbert Bennett/NLHydro

To: Paul Harrington/NLHydro@nlhydro

Cc: Ed Martin/NLHydro@nlhydro

I'll either join by phone or will drop in...

G

**Gilbert J. Bennett, P. Eng., FCAE**

**Vice President**

**Lower Churchill Management Corporation**

709-737-1836 [gbennett@nalcoreenergy.com](mailto:gbennett@nalcoreenergy.com)

On Mar 6, 2015, at 15:00, Paul Harrington <[PHarrington@lowerchurchillproject.ca](mailto:PHarrington@lowerchurchillproject.ca)> wrote:

Ok Ed see you at Torbay Rd at 3pm

Gilbert

Can we tie you in by phone at 3pm?

Paul

Sent from my iPad

> On Mar 6, 2015, at 2:13 PM, Ed Martin <[EMartin@nalcoreenergy.com](mailto:EMartin@nalcoreenergy.com)> wrote:

>

> We should dial in Gilbert

>

> Sent from my iPhone

>

>> On Mar 6, 2015, at 2:00 PM, Paul Harrington <[PHarrington@lowerchurchillproject.ca](mailto:PHarrington@lowerchurchillproject.ca)> wrote:

>>

>>

>>

>>

>>

>> Sent from my iPad



**Re: Meeting over the weekend**  
**Jason Kean** to: Paul Harrington

03/07/2015 12:37 PM

History:

This message has been replied to.

Are we still on for 2pm?

Jason R. Kean, P. Eng., MBA, PMP  
Deputy General Project Manager, LCP  
Consultant to Lower Churchill Management Corporation  
Ph. (709) 727-9129

Sent from my iPhone

> On Mar 6, 2015, at 10:30 AM, "Paul Harrington" <PHarrington@lowerchurchillproject.ca> wrote:

>

> I spoke to Ed and he wanted to be in a position to discuss a project cost update with senior GNL

> Folk next week. This is a follow up to the Friday 13th meeting. Ed would prefer to meet Sunday pm so I was hoping that some of us could meet Saturday Pm to review the deck that Steve and George were asked to develop which would track the costs from June 2014 to the current status, the same three buckets of reliability, market and productivity, with the emphasis on the market drivers and productivity concerns that we are experiencing from the contractors on the latest contracts.

> So I am requesting that you make an effort to join in person or phone in to run through this. I do not wish to have the deck sent around by email. Hard copy drafts only will be handed out, collected and shredded because this is scenarios based and preliminary data.

> Pls let me know if you can meet or phone in at 2pm Saturday and 3pm Sunday for an hour

> Regards Paul

> Sent from my iPad



**Update**  
**Paul Harrington** to: Ron Power

03/09/2015 09:38 AM

Ron

I decided not to bother you with the AFE update, given the Funeral and out of respect and concern for you . We had a meeting with Ed Martin on Sunday and we went through the risks that we face and the recent contract bids and the cost impact. We also explained that it is the Market Conditions and the Contractors view that NL is a risky place to work which is driving up the bids

He is totally supportive of everything we are doing and knows we are leaving no stone unturned to get best value.

We talked about Astaldi and explained the situation to him , in a frank and honest way. no candy coated version. We said that June/July will tell us a story on where the efforts we have put in should start to show

We have the OK from Ed to prepare the AFE and we will keep this under wraps until we get the AFE approved in June.

Hope you are arrived at Site- I briefed Ed Bush and Anthony Embury

Paul

**Paul Harrington**

**Project Director**

**PROJECT DELIVERY TEAM**

**Lower Churchill Project**

t. 709 737-1907 c. 709 682-1460 f. 709 737-1985

e. [PHarrington@lowerchurchillproject.ca](mailto:PHarrington@lowerchurchillproject.ca)

w. [muskratfalls.nalcorenergy.com](http://muskratfalls.nalcorenergy.com)

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This one  
wbu  
td/cb/jm  
PH/CC/JC/BC

# Muskrat Falls Project AFE 2

NO  
MEETING  
CALL

5-Mar-2014

Boundless Energy



\$7.5B

Confidential and Commercially Sensitive



This one  
w/lu  
td/UB/JM/BC  
PH/UC/JC/BC

# Muskrat Falls Project AFE 2

NO  
MEETING  
CALL

5-Mar-2014

Boundless Energy



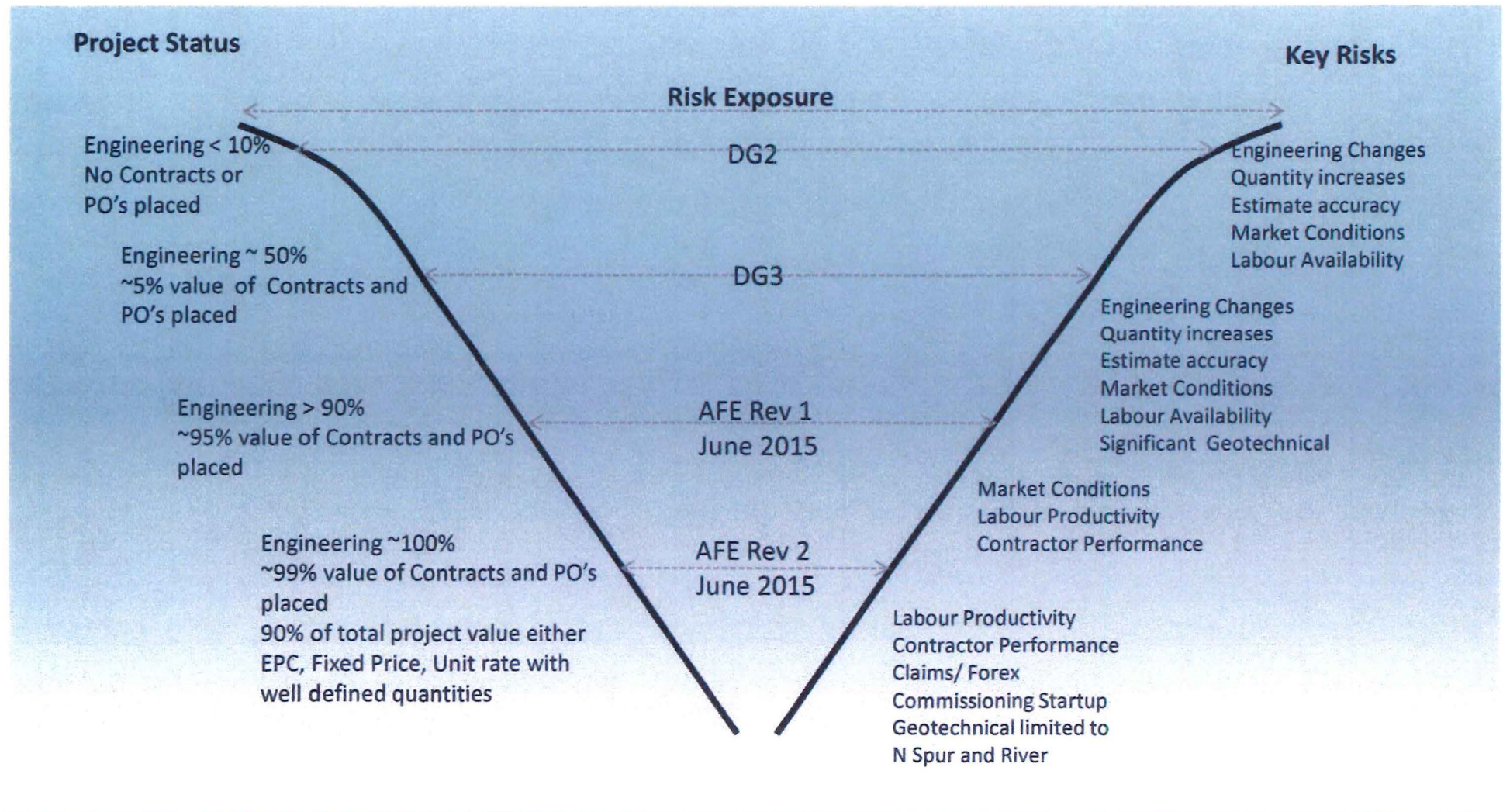
\$75B

Confidential and Commercially Sensitive





# Project Risk Profile



## Risks post AFE Rev 2

- With all PO and Contract costs covered there will be no further Market Risk
- Risks will shift to execution and key risks will be:
  - Labour Productivity of Time and Material type contracts
  - Key Contractor performance
  - Key Contractor failure
  - Claims
  - Union unrest – specifically RDTC
  - Aboriginal unrest
  - Geotechnical risk of N Spur and North Dam construction
  - Forex
  - Commissioning and Startup



## AFE Rev 2

- A revision to the AFE for MF, LTA and LIL will be required in order to award the North and South Dam Contract and remaining Clearing Contracts
  - Timing – AFE revision required in June 2015 to award contract- LNTP will be needed April 2015 to maintain schedule. AFE's to be prepared in March/April 2015 submitted to Boards in June 2015 Board meetings
  - Amount - \$7.499M

# Capital Cost Drivers and Forecast



*update*

# Capital Cost Drivers and Forecast

Asset	Construction productivity and Contractors performance	Market Conditions related to higher construction risks	Design Enhancement to improve quality and system reliability	Total
MF	\$ 33 M	\$ 307 M	-	\$ 340 M
LIL	-	\$ 82 M	\$ 72 M	\$ 154 M
LTA	-	\$ 6 M	\$ 27 M	\$ 33 M
LCP	\$ 33 M	\$ 395 M	\$ 99 M	\$ 527 M



## AFE Rev 2 Assumptions

- Currency impact of \$41M not included in AFE Rev 2
- GWF Bond of \$15M to be recovered from bonding company
- Astaldi recover schedule and increase production in 2015
- HVGB line pre build costs of \$15M recovered from Hydro
- Construction Power Assets transferred to Hydro at actual cost of ~ \$15M
- TL 240 line reroute costs not included and will be a Hydro cost



# Primary Cost Increase driver

## Market Conditions - MF

- MF FFC Increased by \$340M caused by:
  - N Spur, North and South Dams and Balance of Plant contractor bids came in 1.5 to 2.0 times budget
    - The Contractors view NL as a high risk environment for labour productivity and are applying an NL productivity factor to the base estimated hours. These factors are based on actual productivity achieved at Long Harbour, Hebron and Labrador projects using RDTC labour agreements. The impact of the inflated direct labour hours combined with the associated indirect hours have driven the recent contract bid costs up 1.5 to 2.0 times
  - Actual productivity being achieved at MF by Astaldi

# Primary Cost Drivers

## Market Conditions - LIL

- LIL FFC Increased by \$154 M primarily caused by:
  - Actual clearing costs per hectare are higher than previously estimated, because of weather, terrain, access. These actual costs are also being applied to clearing sections we are in the process of awarding resulting in an additional \$82M
    - Contractors to date have not been adding risk premiums on LIL work governed by the wall to wall IBEW Labour Agreement
  - Design enhancements of \$72M:
    - filter design at the converters to increase overall system reliability
    - Access routes, bridges and culverts in Labrador to enable tower repair in case of a tower failure
    - Foundations and tower steel

# Primary Cost Drivers

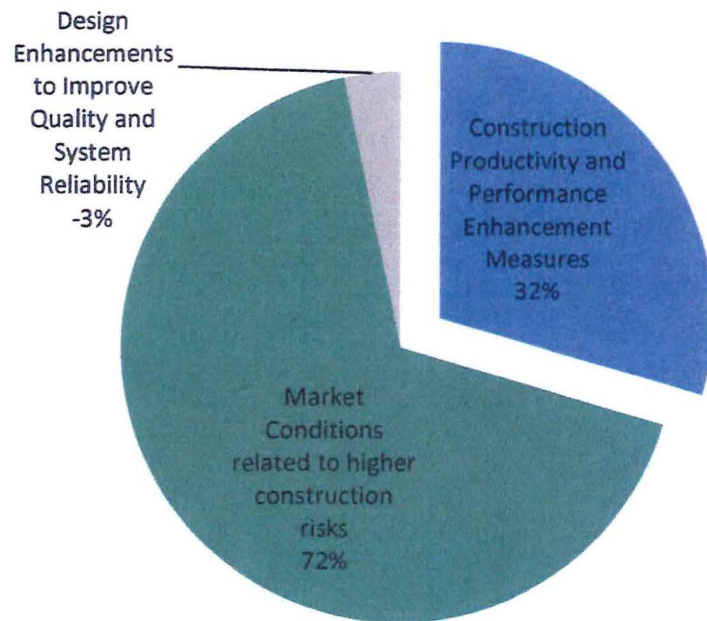
## - LTA

- LIL FFC Increased by \$33 M primarily caused by:
  - Foundations and anchor design to enhance reliability
  - Additional Nalcor management resources required

Save UP

## MF: Construction Productivity and Contractors performance

Total growth of \$ 33 M includes:

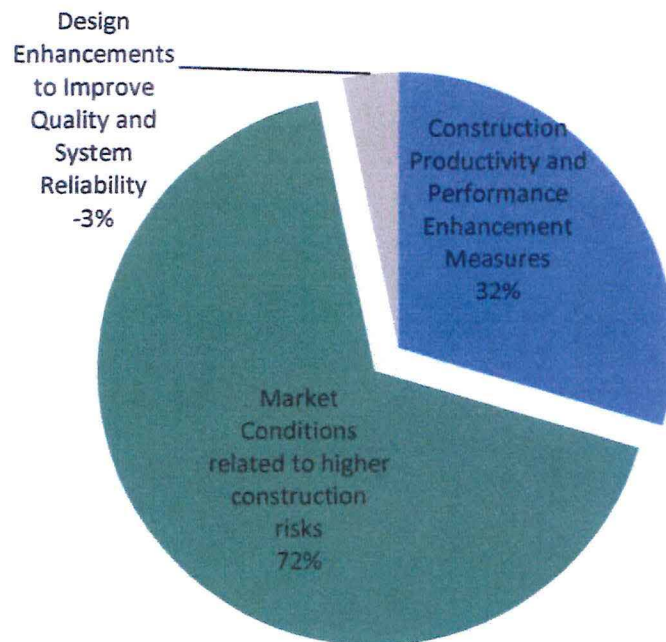


- Additional security and medical cost at the North Spur site: \$ 3M
- Increase in owner's cost due to additional contractor management above and beyond that which was reasonable assumed: \$ 18 M
- Increase in scope of services at MF to accommodate the additional manpower requested by contractors to perform their scope of work: \$ 12 M



## MF: Market Conditions related to higher construction risks

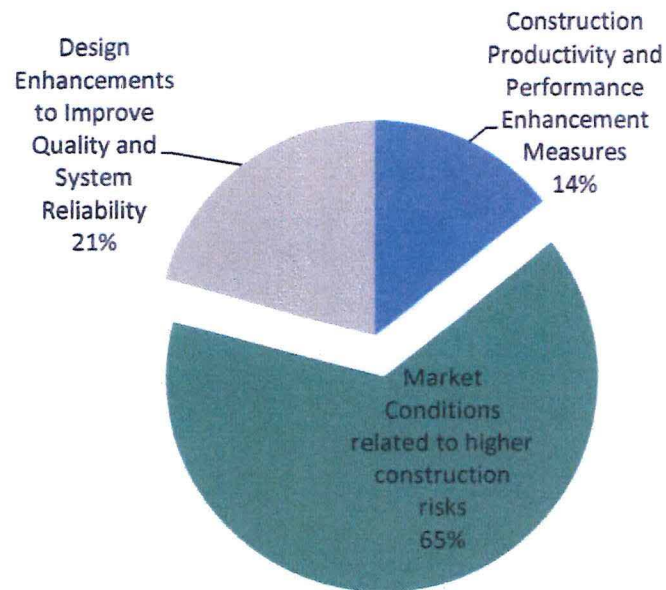
Total growth of \$ 307 M includes:



- Higher cost for several contracts caused by market reaction to risk concerning labor productivity and construction risks, affecting the following contracts:
  - North Spur: \$ 58 M
  - North and South Dams: \$ 158 M
  - Mechanical and Electrical Auxiliaries: \$ 70 M
- Adjustment in Contingency due to lower risk on un awarded contracts and decrease in the asset FTC value: (\$ 43 M)
- Use of the LMAX value in Astaldi's contract due to productivity constraints: \$ 64 M

## LIL: Market Conditions related to higher construction risks

Total growth of \$ 82 M includes:



- Clearing and Accesses at the DC line: The difficult and the unknown topography of the terrain forced to adopt a T&M type of contracts for this scope creating substantial risks on the Owner and keeping the project under the mercy of weather conditions and contractors productivity: \$ 60 M
- Increase in scope of services at MF to accommodate the additional manpower requested by Alstom to perform the MF converter station: \$ 8 M
- Adjustment in Contingency mostly related to the remaining risk on the DC line: \$ 14 M

# Summary

	MF	LIL	LTA	LCP
Initial Forecast	3,617	2,854	828	7,299
Bond recuperation for AC clearing	0	0	-15	-15
Recoupment for the HVGB line	0	0	-13	-13
MFL shortage	18	0	45	63
Total FFC	3,635	2,854	845	7,334
Contingency (4.2% of FTC)	78	86	20	184
AFE rev2	3,712	2,941	865	7,517
AFE rev1	3,372	2,786	832	6,990
<b>AFE increase to take us to end of Q2 2016 (Excluding FX Impact)</b>	<b>340</b>	<b>154</b>	<b>33</b>	<b>527</b>
FX Impact	9	32	1	42
<b>AFE increase to take us to end of Q2 2016 (Including FX Impact)</b>	<b>349</b>	<b>155</b>	<b>64</b>	<b>569</b>
FTC (Excluding Astaldi Labor)	1,850	2,055	473	4,378



# Remarks

- Currency impact is not included in the AFE ( Refer to “Summary” slide); an estimated value of \$ 41 M needs to be considered outside of this AFE value
- A value of (\$15) M was considered in the AFE as a recoupment related to the GWF bond for the AC line clearing ( Refer to “Summary” slide)
- A value of (\$ 13) M was considered in the AFE as recoupment related to the cost of the HVGB line ( Refer to “Summary” slide)
- Any cost increase resulting of schedule delays, acceleration or change in milestones dates for any of the contractors is not included in the AFE revision
- Any cost increase for the Astaldi contract resulting of acceleration or change in LMAX value or other changes in the contract terms is not included in the AFE revision
- The MFL shortage is calculated based on 100% of the requirements until end of Q2 2016 and 50% of the requirements from Q3 2016 thru the end of the project

Sharing our ideas in an open and supportive manner to achieve excellence.

## Teamwork

## Open Communication

Fostering an environment where information moves freely in a timely manner.

## Honesty and Trust

Being sincere in everything we say and do.

Relentless commitment to protecting ourselves, our colleagues, and our community.

## Safety

## Respect and Dignity

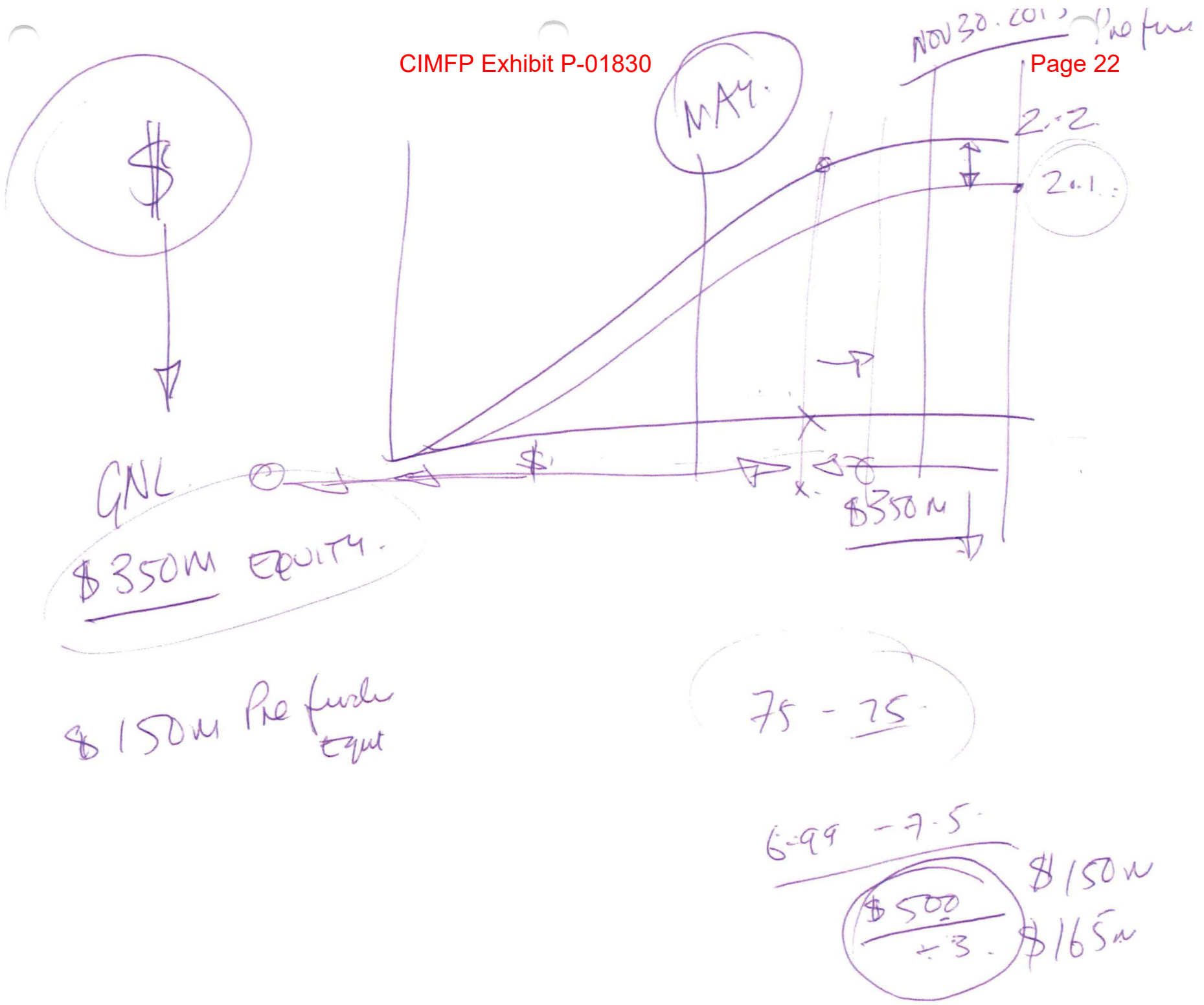
Appreciating the individuality of others by our words and actions.

## Leadership

Empowering individuals to help, guide and inspire others.

Holding ourselves responsible for our actions and performance.

## Accountability





# Muskrat Falls Project AFE Rev 2

8 March, 2015

Boundless Energy



*Presented to Ed w/Stone, Brian, Paul  
Gibbert + Tim Henry*

**Confidential and Commercially Sensitive**



## Risks Post AFE Rev 2

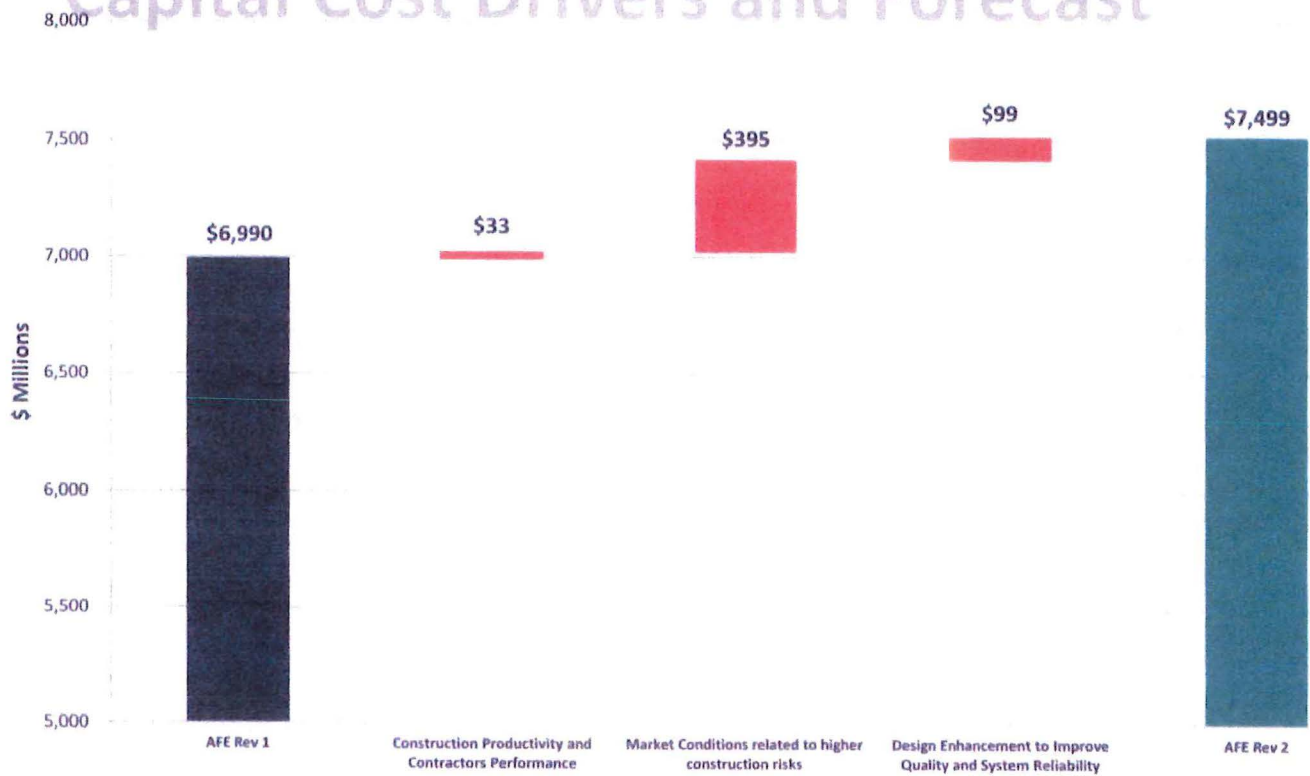
- With all PO and Contract costs covered there will be no further Market Risk
- Risk exposure will be narrower and will shift to execution and key risks will be:
  - Labour Productivity of Time and Material type contracts
  - Key Contractor performance
  - Key Contractor failure
  - Claims
  - Union unrest – specifically RDTC
  - Aboriginal unrest
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## Capital Cost Drivers and Forecast

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## Cost and Consequences of Project Abandonment

- Project Capital Cost
  - Current incurred cost is ~\$2.2B
  - Current Committed Cost is ~\$5.4B
  - FFC as per AFE rev 2 is \$7.5B
  - Estimated cost to Cancel PO's and Contracts is ~ \$4.5B expect claims of a further \$1B for a total of \$5.5B sunk cost
- Cost/Schedule To Replace Holyrood (2015\$)
  - Schedule of 5 years following EA approval – earliest 2021 assuming decision made mid 2015
  - Assume \$5B Capital Cost ( includes necessary replacements and repairs in the interim) plus additional 4 years operating and maintenance costs for Holyrood @ ~\$250M/year = \$1B for a total of \$6B
- Cost to ratepayer to abandon LCP operate and maintain Holyrood until 2021 until replaced ( in 2015\$)- Impact on rates ?
  - \$5.5B LCP sunk cost + \$6B Holyrood cost to Operate/Maintain and then replace = \$11.5B
- The \$11.5B cost does not include lost profits from sales of excess power,  
Default of ML agreement or Default of FLG

## Primary Cost Increase driver Market Conditions - MF

- MF FFC Increased by \$340M caused by:
  - N Spur, North and South Dams and Balance of Plant contractor bids came in 1.5 to 2.0 times budget
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## Primary Cost Drivers

### Market Conditions - LIL

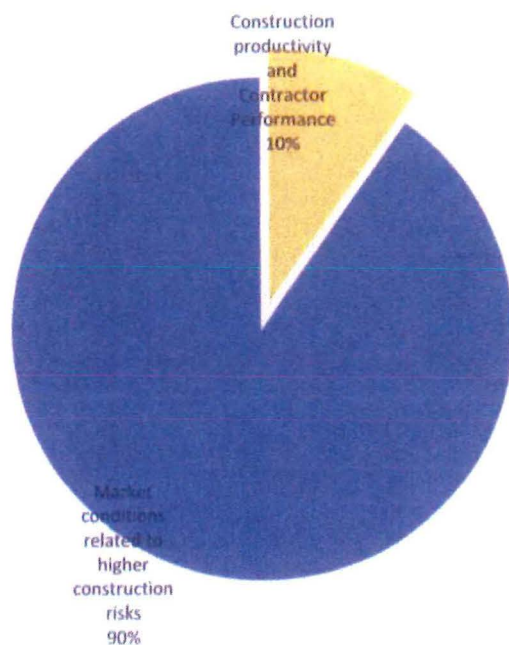
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  - Design enhancements of \$72M:
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    - Access routes, bridges and culverts in Labrador to enable tower repair in case of a tower failure
    - Foundations and tower steel



## Primary Cost Drivers - LTA

- LIL FFC Increased by \$33 M primarily caused by:
  - Foundations and anchor design to enhance reliability
  - Additional Nalcor management resources required

## MF: Construction Productivity and Contractor Performance

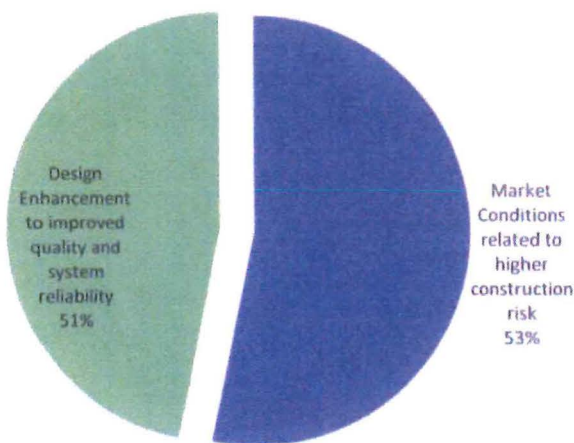


Total growth of \$ 33 M includes:

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- Increase in owner's cost due to additional contractor management above and beyond that which was reasonably assumed: \$ 18 M
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## LIL: Market Conditions Related to Higher Construction Risks

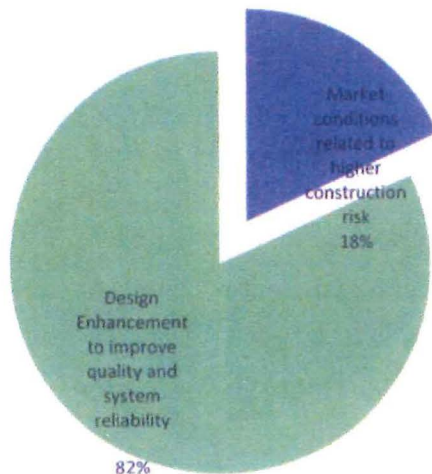
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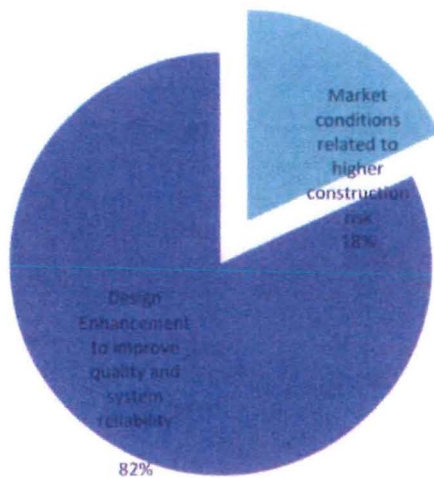
## LTA: Market Conditions Related to Higher Construction Risks



Total growth of \$ 6 M includes:

- Increase in scope of services at MF to accommodate the additional manpower requested by Alstom to perform the MF Switchyard: \$ 7 M
- Recovery of the bond value related to the terminated contract of GWF for the clearing of the AC line: (\$15M)
- Adjustment in Contingency due to lower risk on un awarded contracts and decrease in the asset FTC value: (\$ 11 M)
- Increase in owner's cost due to additional contractor management above and beyond that which was reasonably assumed: \$ 25 M

## LTA: Design Enhancements to Improve Quality and System Reliability



Total growth of \$ 27 M includes:

- Savings related to the GIS system: (\$ 6 M)
- Additional foundations and increase in anchors length at the AC line: \$ 13 M
- Increase in owner's cost due to additional contractor management above and beyond that which was reasonably assumed: \$ 20 M

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<b>AFE increase to take us to end of Q2 2016 (Excluding FX Impact)</b>	<b>333</b>	<b>145</b>	<b>31</b>	<b>509</b>
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<b>AFE increase to take us to end of Q2 2016 (Including FX Impact)</b>	<b>342</b>	<b>177</b>	<b>32</b>	<b>551</b>
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## Remarks

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