

# Project Update

Oversight Committee

September 16, 2015

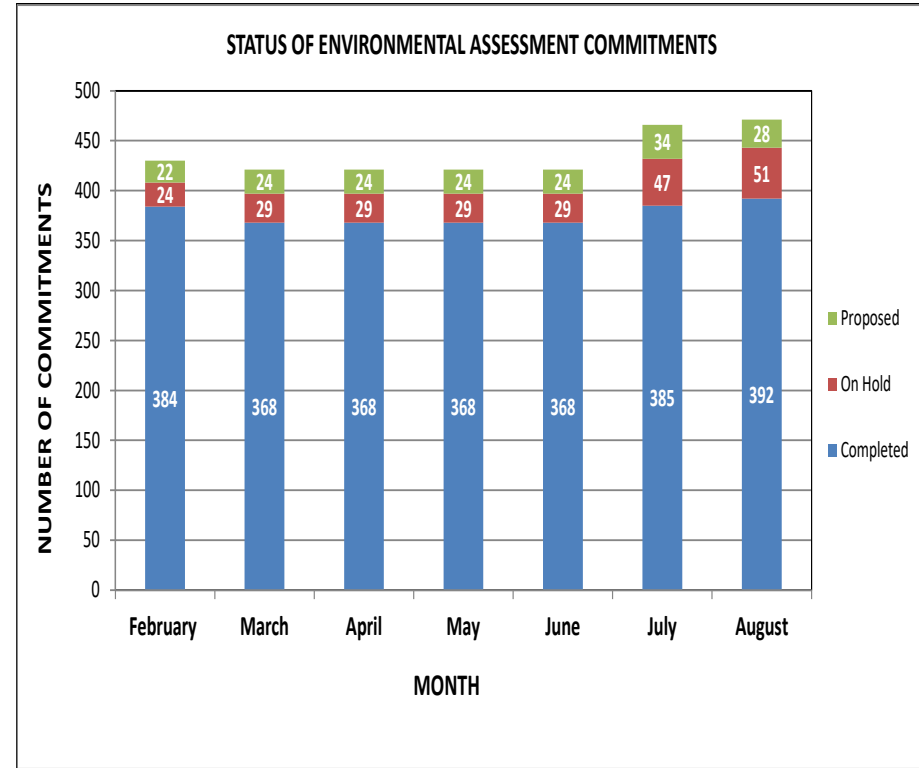
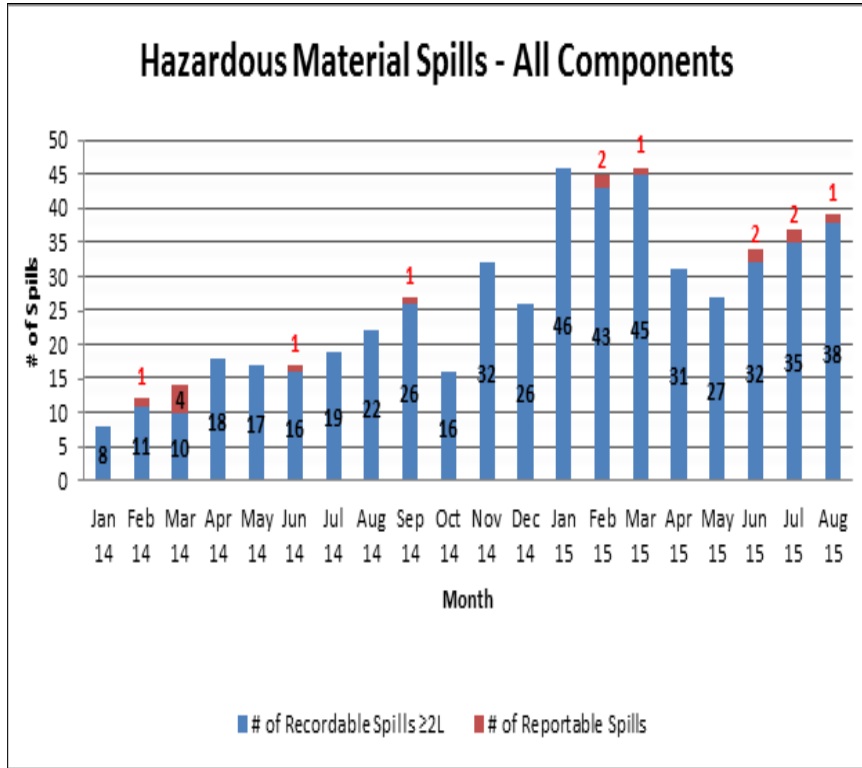
Boundless Energy



# HEALTH, SAFETY & ENVIRONMENT

Description	Month	Year to Date	Total to Date	Comments
Hours Worked	980,795	5,282,569	15,437,911	August Estimate
Lost Time Injuries (LTI)	0	2	6	
Medical Aids	3	24	49	
TRIFR	2.65	4.43	2.03	Target=1.0
LTIFR	0.00	0.08	0.08	Target=0.0
AIFR	0.61	0.98	0.71	Target=1.0
<b>Note 1: Total to Date: From January 2008 to present.</b>				

# HEALTH, SAFETY & ENVIRONMENT

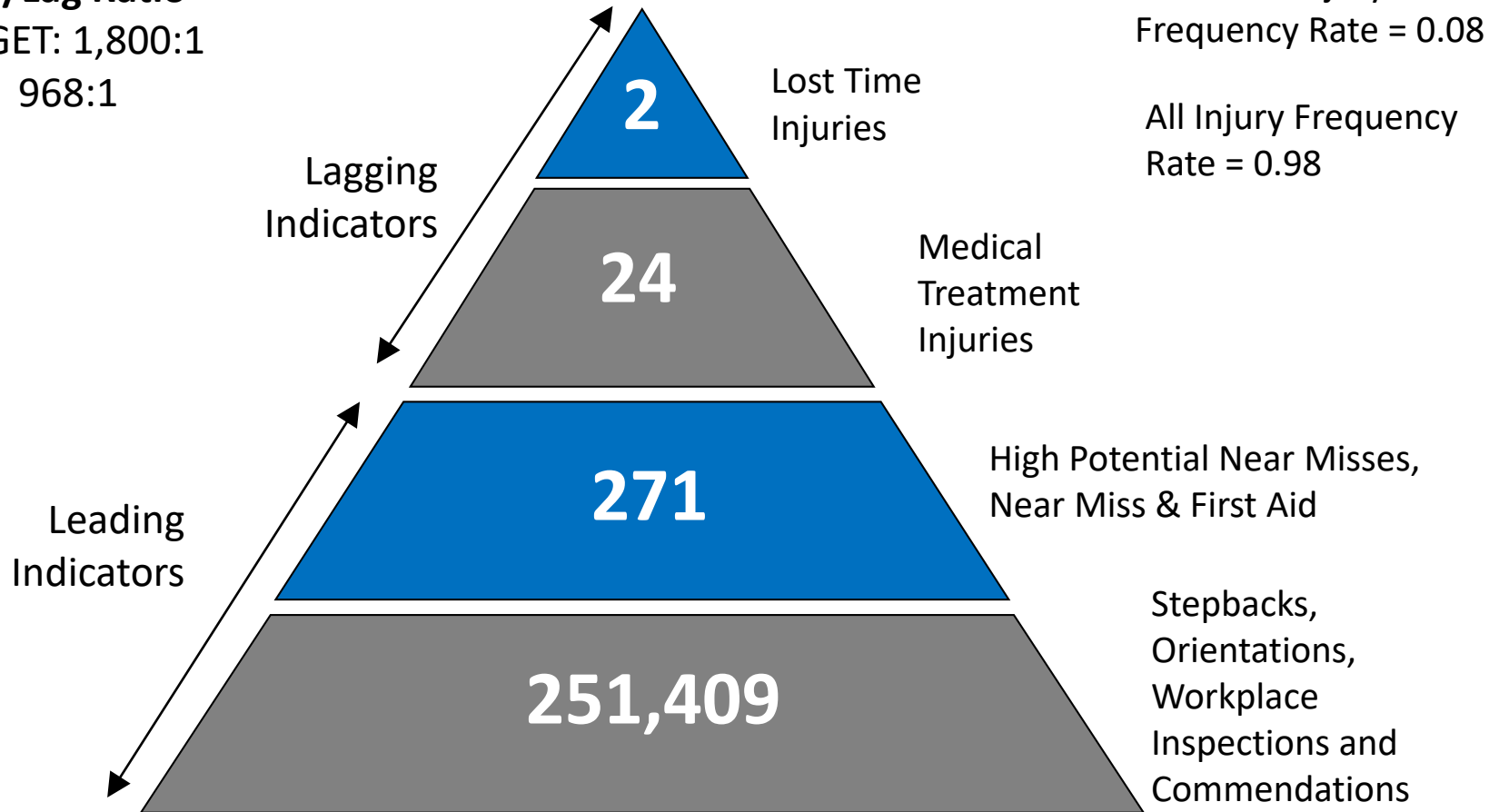


# 2015 – LCP LEADING & LAGGING SAFETY TRIANGLES YTD 2015



# Safety Performance YTD to 28-Aug-2015

**Lead/Lag Ratio**  
 TARGET: 1,800:1  
 YTD: 968:1



# Safety Performance

- Issue:
  - In August, Project experienced 2 new Medical Aids (MA)
  - Total 2 LTI's and 24 MA's YTD
  - This has resulted in missed targets for:
    - Lead/Lag Ratio: Actual = 968:1 vs Target 1,800:1
    - AIFR: Actual 1.009 vs Target 0.4
    - LTIF: Actual 0.078 vs Target 0
- Analysis:
  - Given the effort invested in preventative measures (leading indicators) there has been a slight improvement month-to-month in the Lead/Lag ratio and AIFR.
  - It remains possible (but not probable) to meet target Lead/Lag and AIFR. Not possible now to meet zero tolerance LTIF target this year.

# Safety Performance

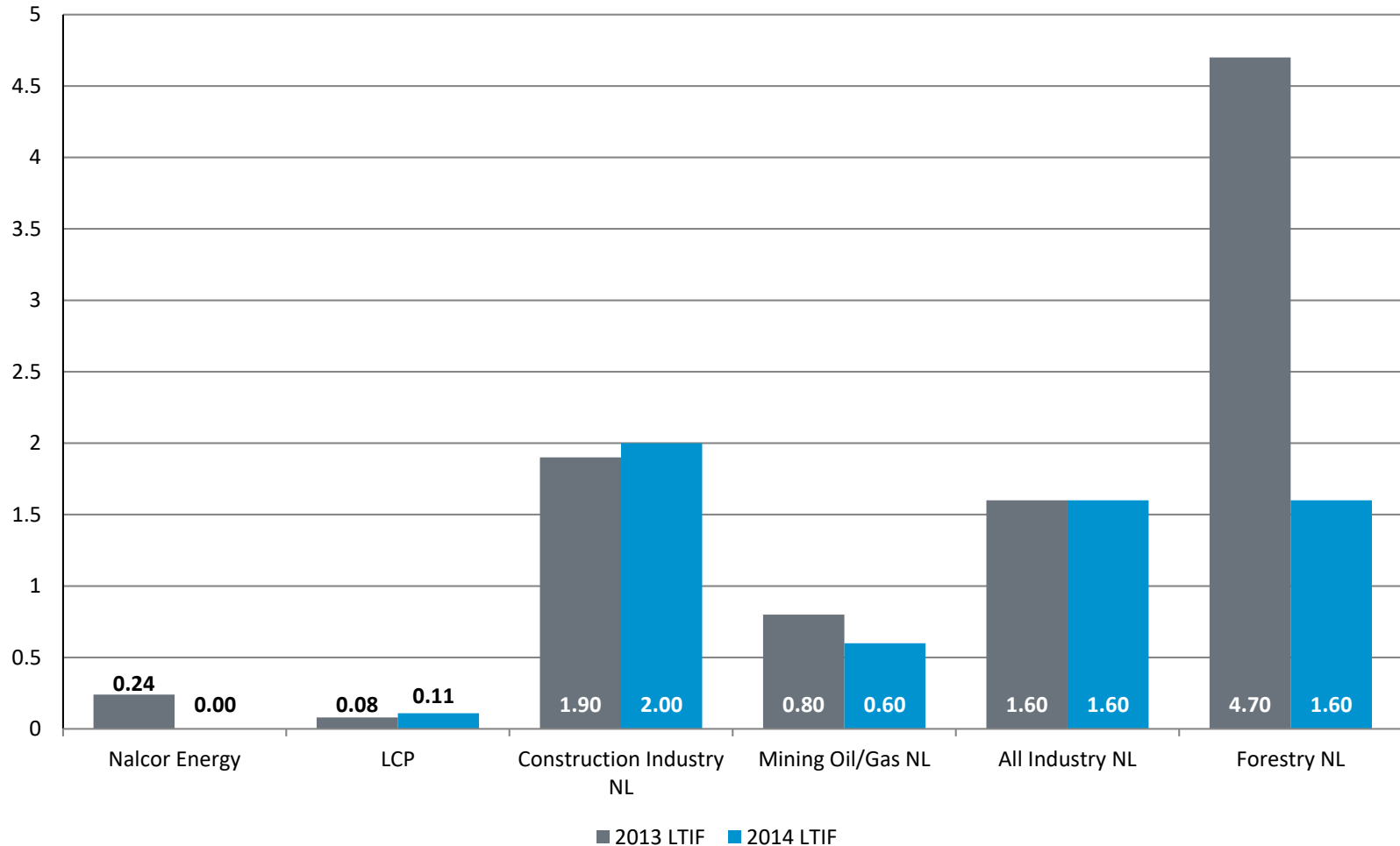
- Issue:

- In July, Project experienced 1 new Lost Time Incident (LTI) at MF and 2 new Medical Aids (MA), 1 each at MF and a Transmission Line site
- Total 2 LTI's and 21 MA's YTD
- This has resulted in missed targets for:
  - Lead/Lag Ratio: Actual = 900:1 vs Target 1,800:1
  - AIFR: Actual 1.060 vs Target 0.4
  - LTIF: Actual 0.092 vs Target 0

- Analysis:

- Given the effort invested in preventative measures (leading indicators) there has been a slight improvement month-to-month in the Lead/Lag ratio and AIFR. However, the LTIF has increased.
- Improvement remains possible to meet target Lead/Lag and AIFR. Not possible now to meet zero tolerance LTIF target this year.

# LTIF Comparison – Lower Churchill



# Safety Performance

## Muskrat Falls

- Areas of concern remain consistent with:
  - Hazard Recognition
  - Slips, trips and falls
  - Pinch Points/Crush Points
- New area of concern
  - Dropped Objects
- Progress made in the areas of Crane rigging and lifting and Electrical contact

## Transmission Lines

- Areas of concern remain consistent with:
  - Hazard recognition
  - Slips, trips and falls
  - Pinch Points/Crush Points
  - Equipment and vehicle safety (traffic controls)

# Mitigation: All Components

- LCP Stepback (*Field Level Risk Assessment*) Card revised to reflect lessons learned from both Leading and Lagging indicators on hazard recognition
- New initiative rolled out to all components to improve accuracy of incident classification
- Health and Safety targets under review to align performance measurements with incident classification and reporting
- A new concept for safety recognition has been introduced to leverage positive safety behaviors

# Mitigation: Muskrat Falls Site

- Ongoing analysis of observational data completed resulting in specific communications plans on Slips, Trips and Falls – i.e., “Three Point Contact” sticker and awareness package
- “Focus on Hand Safety” package developed and distributed to all contractors including toolbox talk guidelines for daily morning field meetings
- Results of above have been positive with Slips, Trips and Falls incidents down ~10% and Hand incidents down by about half (July v. June) – close monitoring is ongoing
- Extensive review of “Working at Heights” and “Control of Dropped Objects” procedures. A “Stop the Drop” campaign was initiated.

# Mitigation: Transmission Lines

- Safety bulletins issued on Slips, Trips, and Falls followed up with intensive coaching at toolbox meetings and walkabouts requiring greater detail in hazard recognition.
- The “Three Point Contact” sticker program has been rolled out on transmission work sites as well
- Success with weekly Management Walkabouts and monthly general contractor Leadership Walkabouts engaging management with all work crews
- Traffic Control Plan developed in consultation with NL Gov T&W – implementation, monitoring and evaluation underway



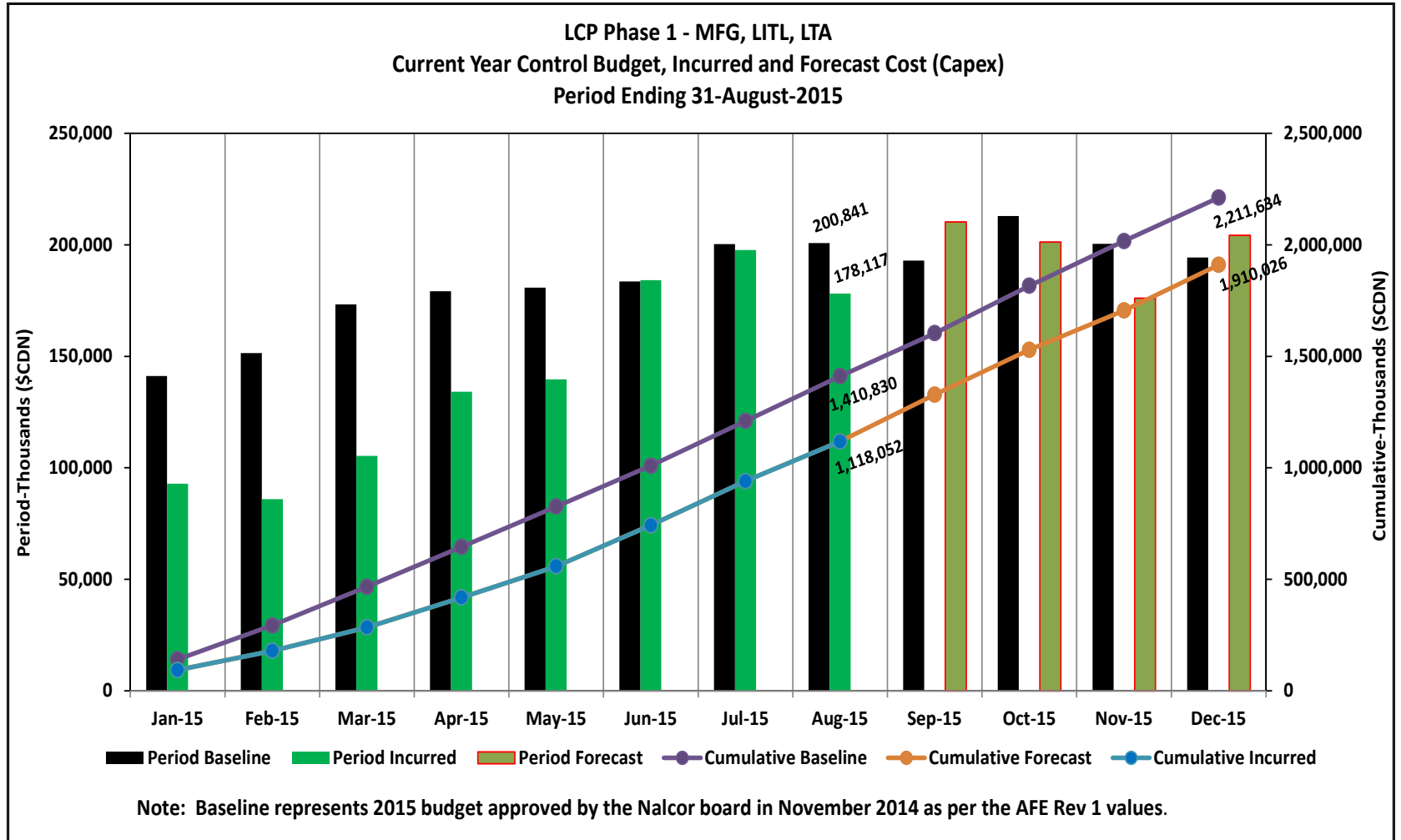
# COST SUMMARY REPORT (Millions CAD)

Asset	Baseline DG3	Approved Changes	Current Control Budget (CCB)	Incurred Costs		Final Forecast Cost (FFC)	Variance from CCB
				Current Period	Project-to-Date		
Muskrat Falls Generation	\$2,674	\$609	\$3,284	\$76	\$1,726	\$3,276	-\$8
Labrador Island Transmission Link (LITL)	\$2,523	\$218	\$2,741	\$93	\$1,047	\$2,747	\$6
Labrador Transmission Asset (LTA)	\$637	\$171	\$808	\$9	\$488	\$811	\$2
<b>Pre-Contingency Capital</b>	<b>\$5,835</b>	<b>\$998</b>	<b>\$6,833</b>	<b>\$178</b>	<b>\$3,261</b>	<b>\$6,833</b>	<b>(\$0)</b>
<b>Contingency</b>	<b>\$368</b>	<b>(\$211)</b>	<b>\$157</b>	<b>\$0</b>	<b>\$0</b>	<b>\$157</b>	<b>\$0</b>
<b>Total Capital</b>	<b>\$6,202</b>	<b>\$788</b>	<b>\$6,990<sup>1</sup></b>	<b>\$178</b>	<b>\$3,261</b>	<b>\$6,990<sup>1</sup></b>	<b>(\$0)</b>

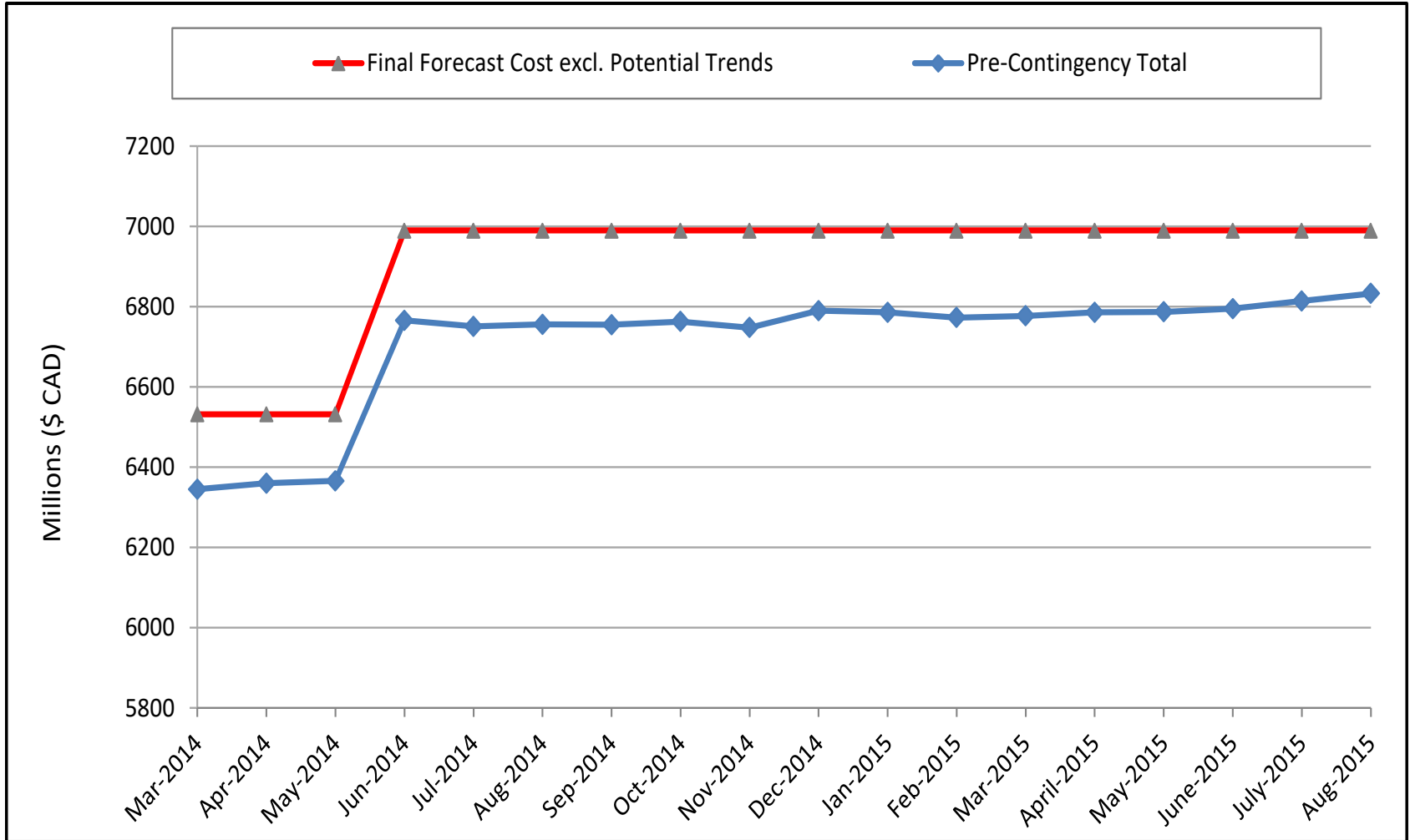
<sup>1</sup> Values are within the Authorization for Expenditure (AFE) approved June 2014.

Note: Financing and currency impact costs are reported corporately and excluded from all tables and curves.

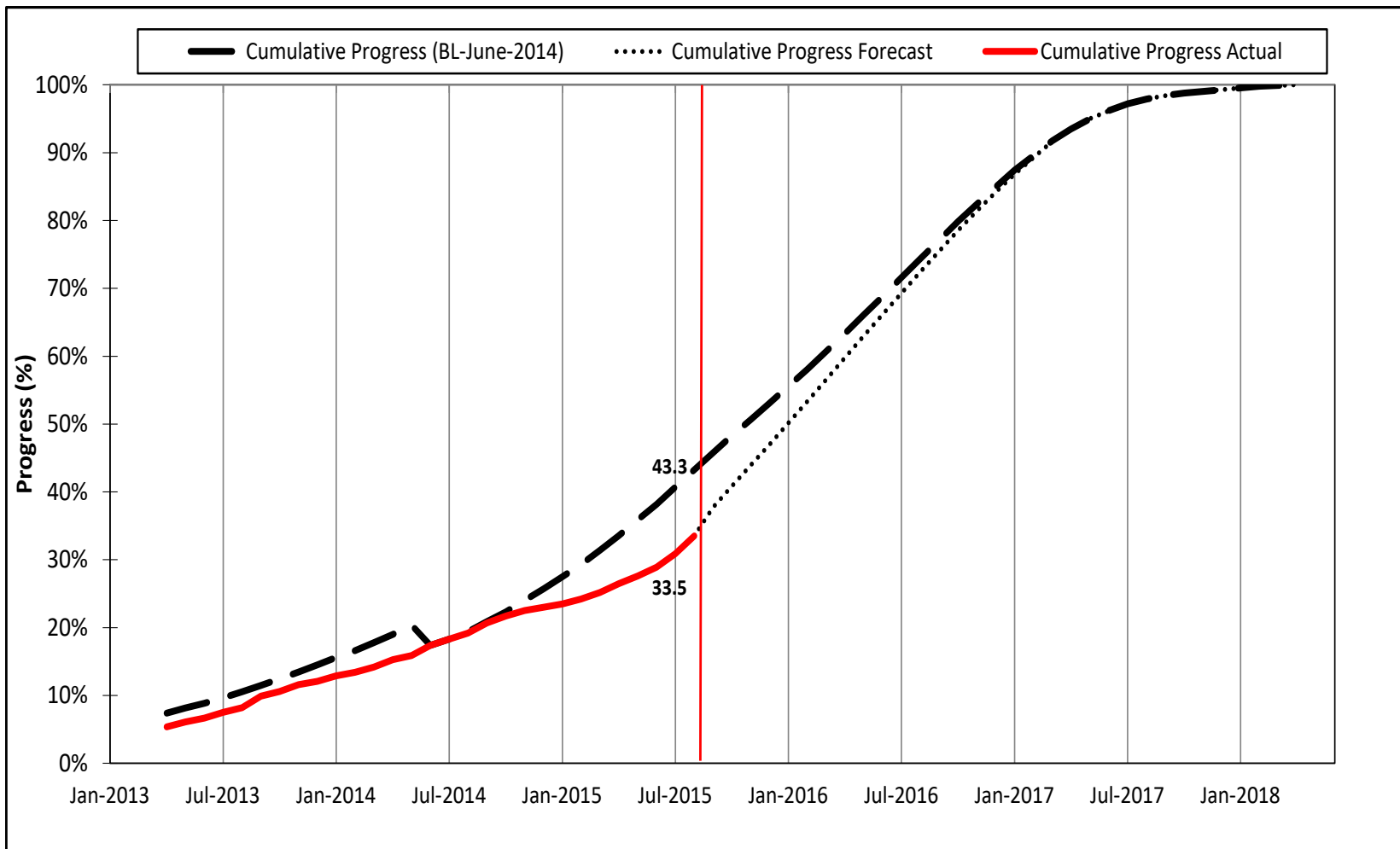
# 2015 ANNUAL COST CURVE



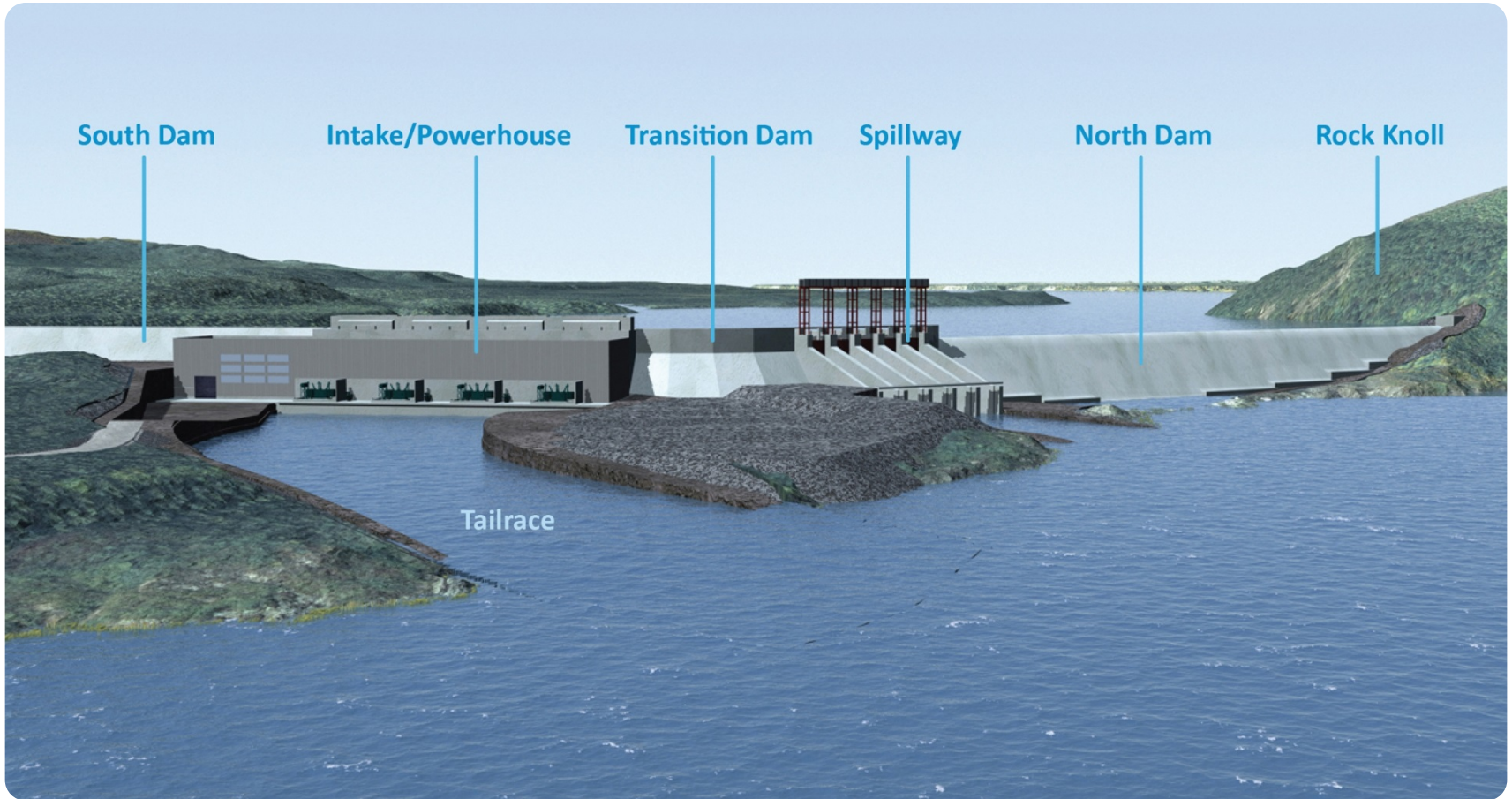
# FINAL FORECAST COST SUMMARY



# OVERALL CONSTRUCTION PROGRESS CURVE



# Muskrat Falls Plant







# Muskrat Falls – Recent Activities

- Astaldi:
  - Work is returning to normal following protests – both shifts in full operation
  - Concrete production for July = 24,400 m<sup>3</sup>, estimate for August ~ 20,000m<sup>3</sup>
  - Powerhouse – focus on draft tube formwork and concrete work. All concrete work under turbines is complete
  - Spillway – focus is completion of final lifts for piers and installation of permanent and temporary bridge. Handover expected in early September
  - Continuing construction of transition dams, separation wall
  - Examining options for removal of ICS

# Muskrat Falls – Recent Activities

- Andritz:
  - Preparing to mobilize to MF
  - Equipment continues to arrive at Goose Bay from China
- Earth stabilization program continuing on North Spur
  - Continuing to reduce slope on river banks
  - Commenced construction on first cut-off wall
- Issued LNTP to Barnard Pennecon For North and South Dams package
- Manufacturing continuing on Turbines and Generators



# Powerhouse Intake





# Powerhouse Intake





# Powerhouse





# Powerhouse





# Powerhouse





# Spillway





# Spillway





# Spillway





# Spillway





# Spillway





# Separation Wall





# Centre Transition Dam



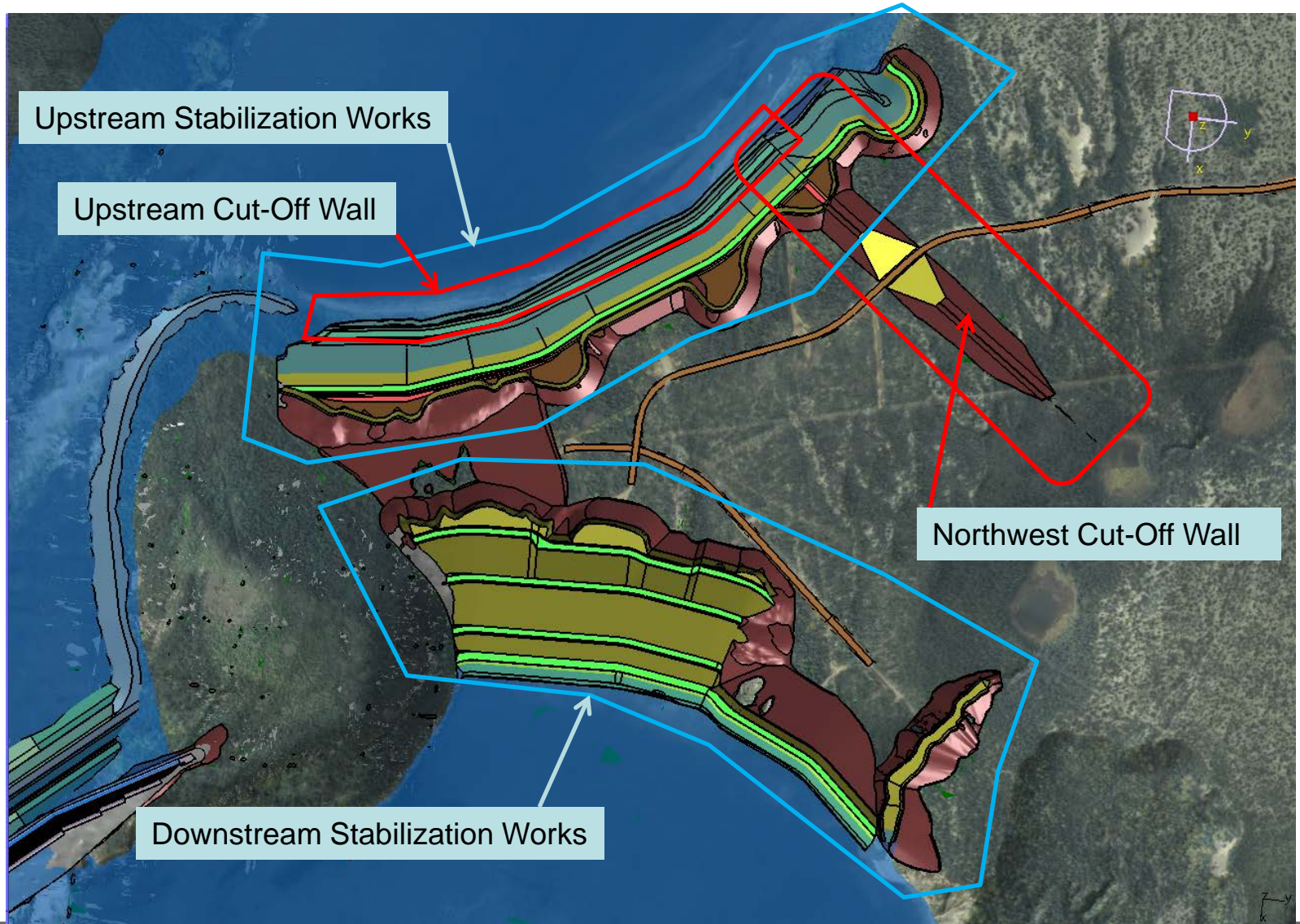


# North Transition Dam





# Layout of North Spur Stabilization Works





# North Spur

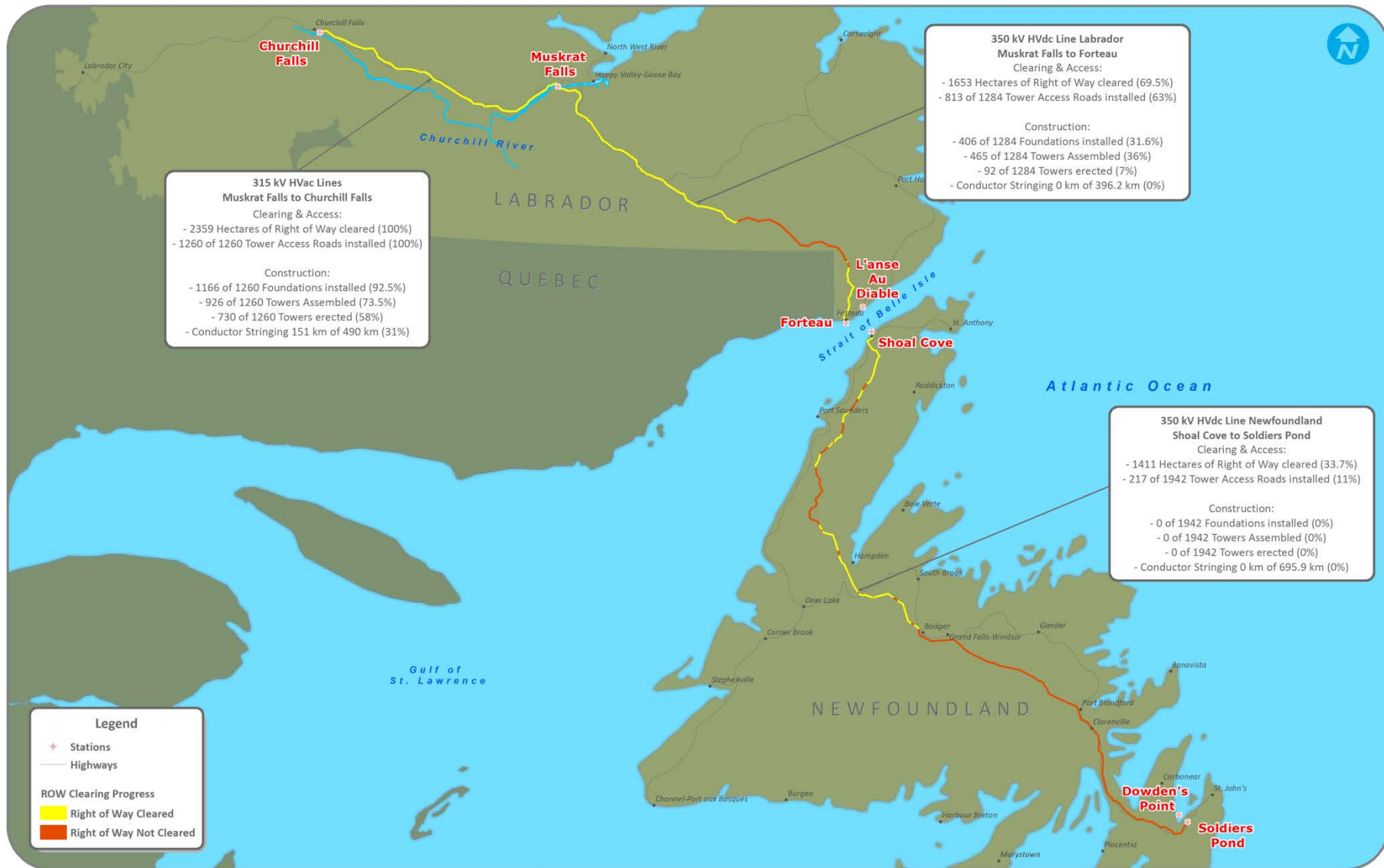




# North Spur







LCP - HVac and HVdc Transmission Line Construction Progress 15-AUG-2015

nalcor Lower Churchill Project - S. ROBERTS - 15-AUG-2015

# L-ITL Recent Activities

- HVdc construction:
  - 92 towers erected
  - 406 foundations installed
  - 465 towers assembled
  - 175 anchors installed
- Grounding stations:
  - installation of all 80 wells is complete in the Dowden's Point breakwater. Well installation continues at L'Anse au Diable
- Soldiers Pond Synch Condensers:
  - Excavation, piling, form work assembly, and rebar fabrication ongoing

# L-ITL Recent Activities

- Converter Stations and Transition Compounds:
  - Detailed engineering and equipment procurement ongoing
  - Contractors mobilized and civil works construction (excavation, footings and foundation work) underway at Soldiers Pond and Muskrat Fall
- AC Substations
  - Detailed engineering and equipment procurement ongoing.
  - Contractors mobilized and civil works construction (excavation, footings and foundation work) underway at Soldiers Pond, Churchill Falls, and Muskrat Falls

# L-ITL Recent Activities

- SOBI
  - Land cable has arrived in Halifax; awaiting shipment to NL
  - Nexans preparing to mobilize to site to commence land cable installation
  - Preparing to installation final crib for rock quay at Forteau

# L-ITL Foundation Installation



# L-ITL Tower Erection



# L-ITL – Tower Erection





# L-ITL – Tower Erection





# L-ITL – Tower Erection



# L-ITL Access Road Construction



# Soldiers Pond – Synch Condenser





# Soldiers Pond – Synch Condenser



# Soldiers Pond – Converter Yard



# Soldiers Pond – Converter yard





# Soldiers Pond – AC Substation



# Muskrat Falls – AC Substation





# Muskrat Falls – Converter Yard



# Churchill Falls – AC Substation





# Churchill Falls – AC Substation





# Dowden's Point



# Dowden's Point



# L'Anse au Diable

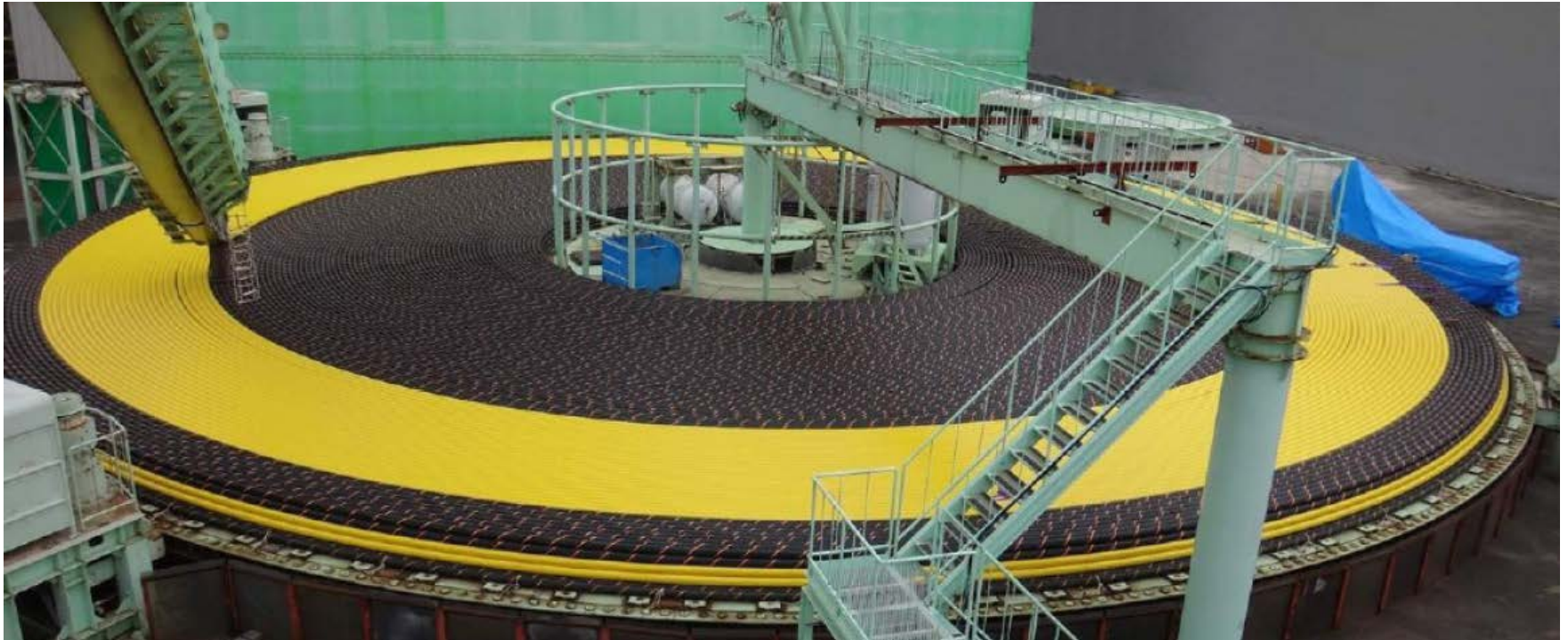




# L'Anse au Diable



# Batch #1 & #2 Complete





# Batch 3 - Lead Sheathing, FO Integration and PE Jacket Extrusion





# SOBI – Land Cable Loadout



# Land Cable Transport – Japan Loadout





# Land Cable Transport – Halifax Arrival

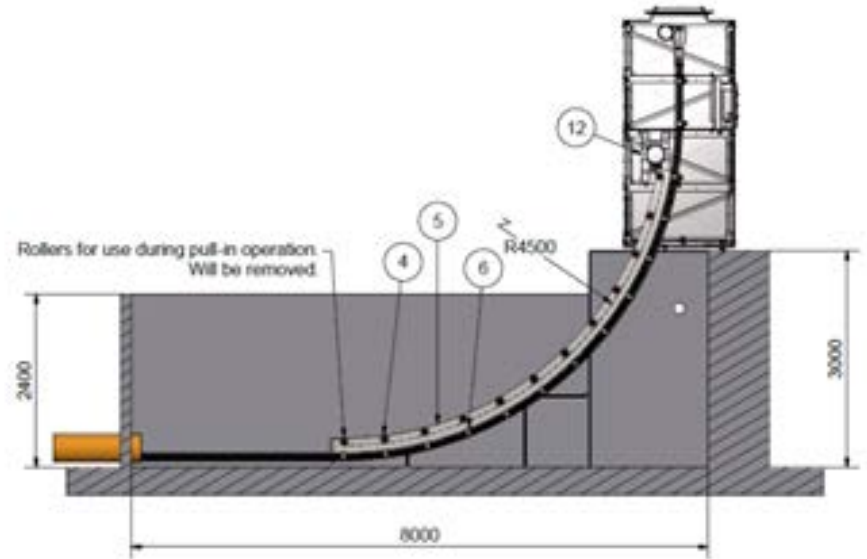
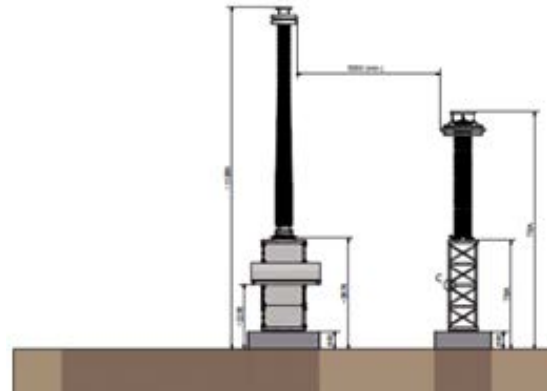
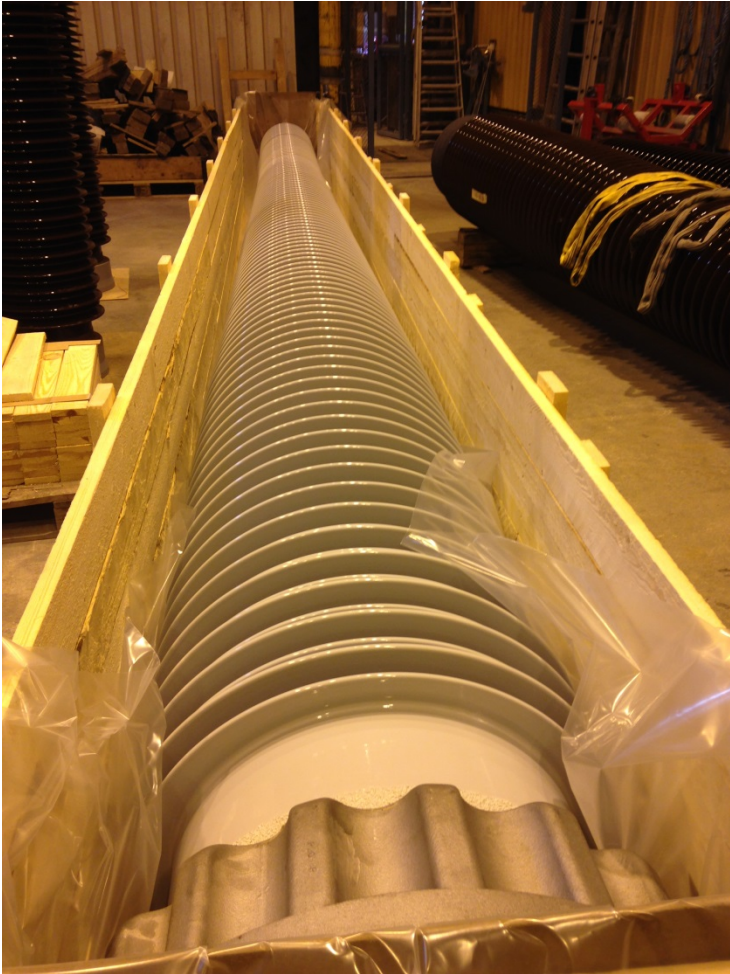




# Accessory Manufacturing - Complete



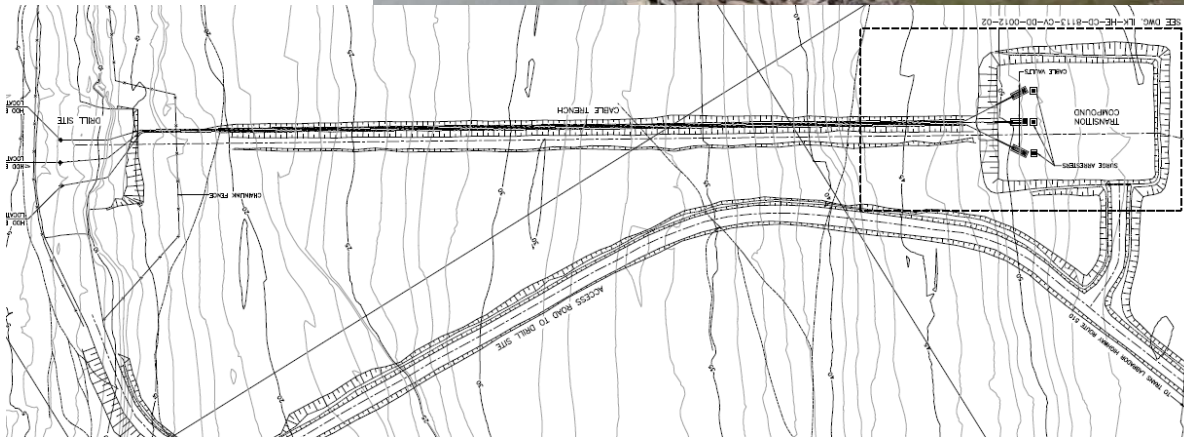
# SOBI – Cable Termination





# Forteau Point

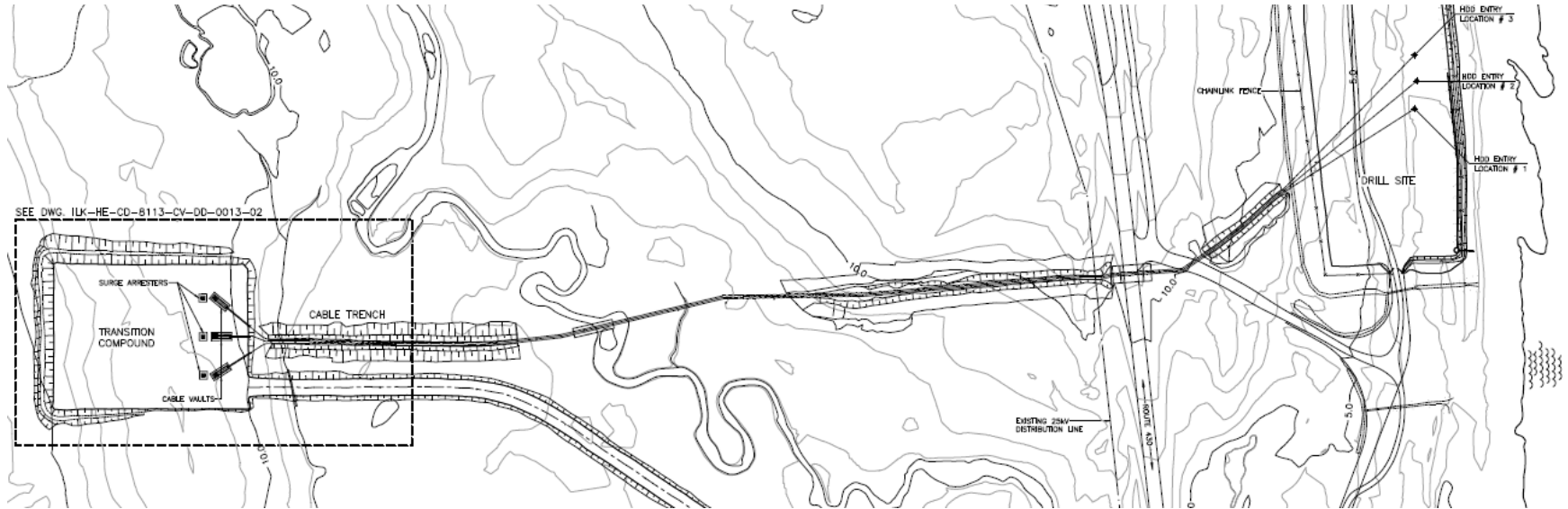
- Land Cable Trench and Ramps





# Shoal Cove

- Land Cable Trench and Ramps



# Scaffolding Erecting – Shoal Cove



# Termination Placement in Scaffolding





# Quarry and Quayside - Forteau



# Quay Construction – Forteau Point





# Labrador Transmission Assets (LTA)





# LTA - Recent Activities

- HVac construction continuing:
  - 730 towers erected
  - 926 towers assembled
  - 1166 foundations installed
  - 981 anchors installed
- Continued conductor stringing operations

# LTA – Tower Assembly



# LTA – Tower Assembly

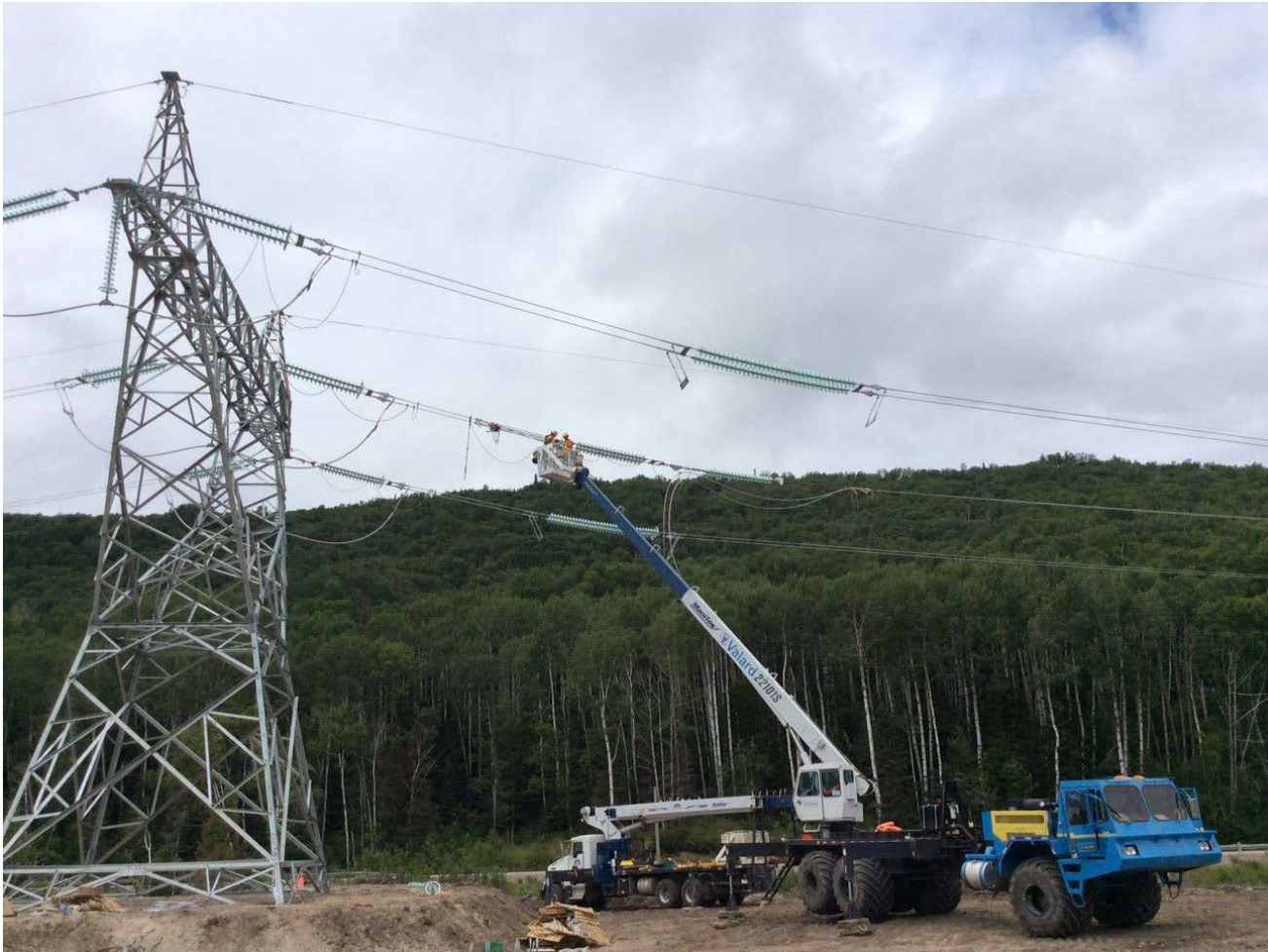




# LTA – Tower Erection



# LTA – Stringing Operations



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