

Lower Churchill

Project Update
4 September 2015

Boundless Energy



2015 Lower Churchill Plan Highlights

GOAL	LOWER CHURCHILL PROJECT (Phase 1)		
1. SAFETY	Lead/Lag Ratio 1,800:1	All Injury Frequency (AIF) = 0.4	Lost Time Injury Frequency (LTIR) = 0
2. ENVIRONMENT	Successful completion of 2015 Environmental Management Targets Support construction with environmental engineering expertise; implement and maintain appropriate Environmental Effects Management and Monitoring programs Manage regulatory review and permit approval process		
3. BUSINESS EXCELLENCE			
Finance	Maintain reporting structures to ensure compliance with reporting obligations LCP Capital Expenditures = \$2.354B		
Project Execution	Deliver First Power from Muskrat Falls to the Island as per the approved Master Project Schedule and within approved AFE Support Emera with ML Schedule		
Integration	Effectively Manage all interfaces between Project, corporate, and third parties Ensure Transition to Operations actions and progress are in accordance with the RFO , RFI, RFCI, and BTPO integrated plan and all key milestones are met		
4. PEOPLE	Continued implementation of enhanced organizational effectiveness programs Ensure proper execution of Project Agreements, Gender Equity and Diversity Plan, & IBA		
5. COMMUNITY	Execute 2015 activities outlined in communications and community relations plan		

Safety Performance

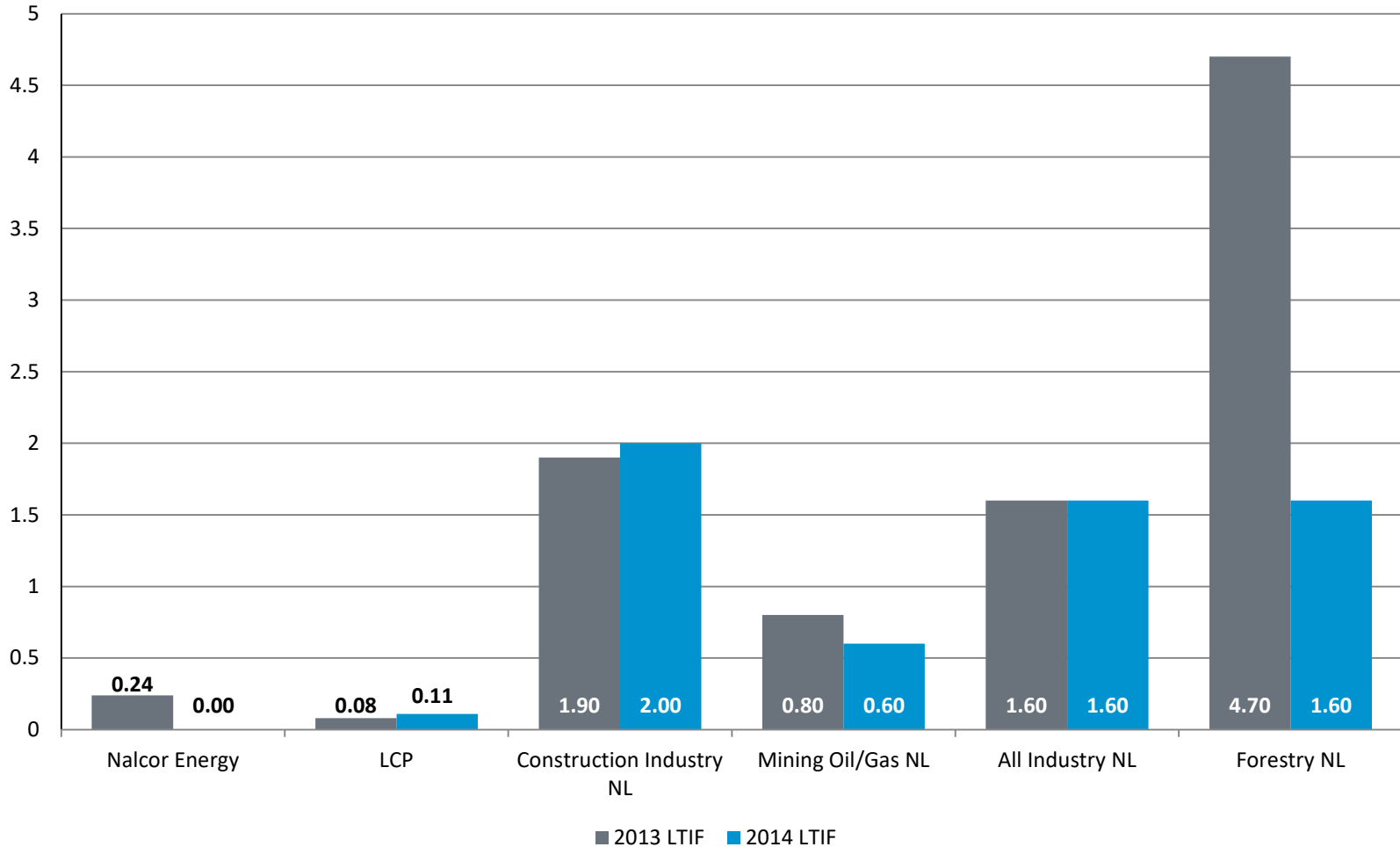
- Issue:

- 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 0.102 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.
- It remains possible (but not probable) 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.

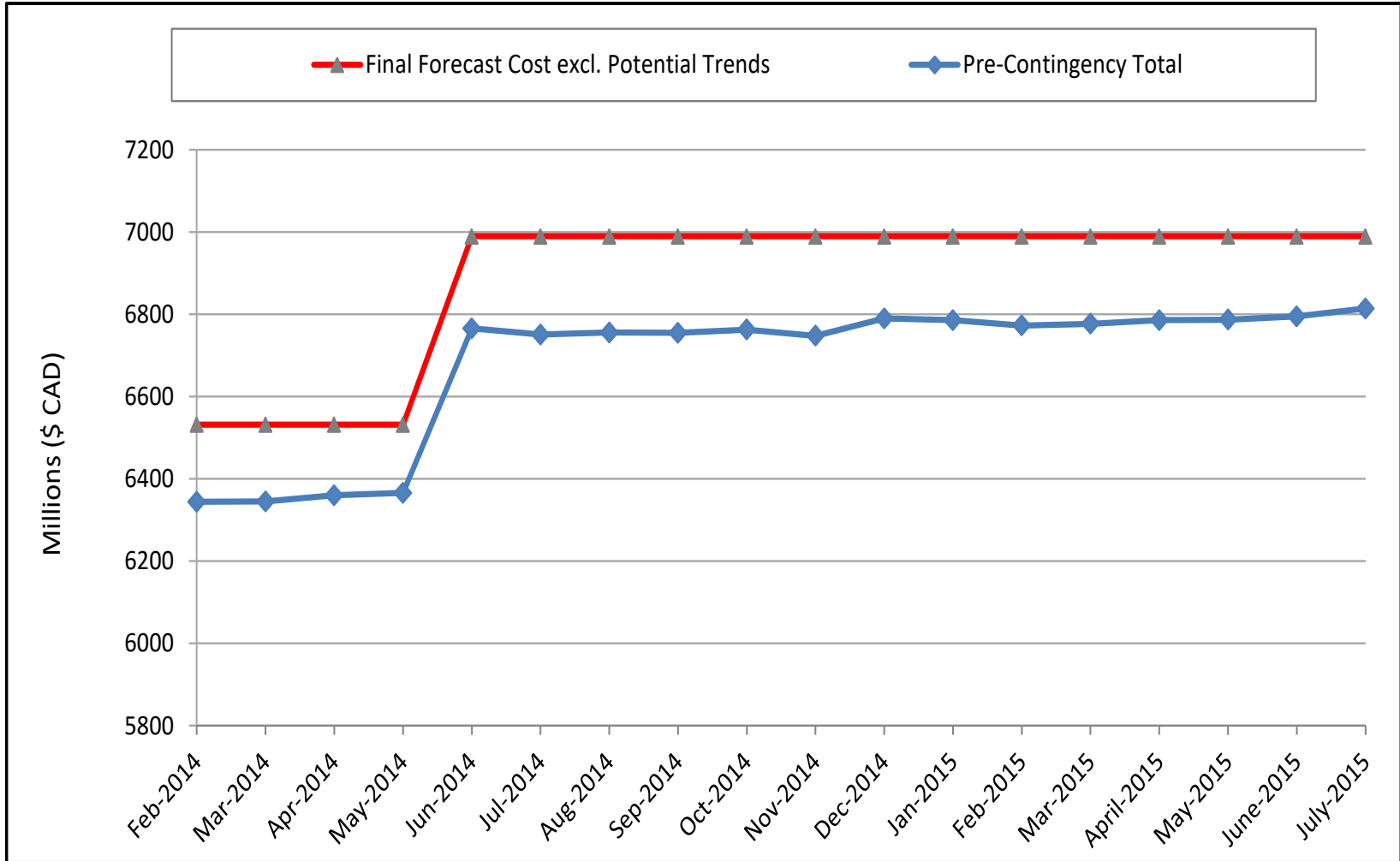
Mitigation: Transmission Lines

- 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

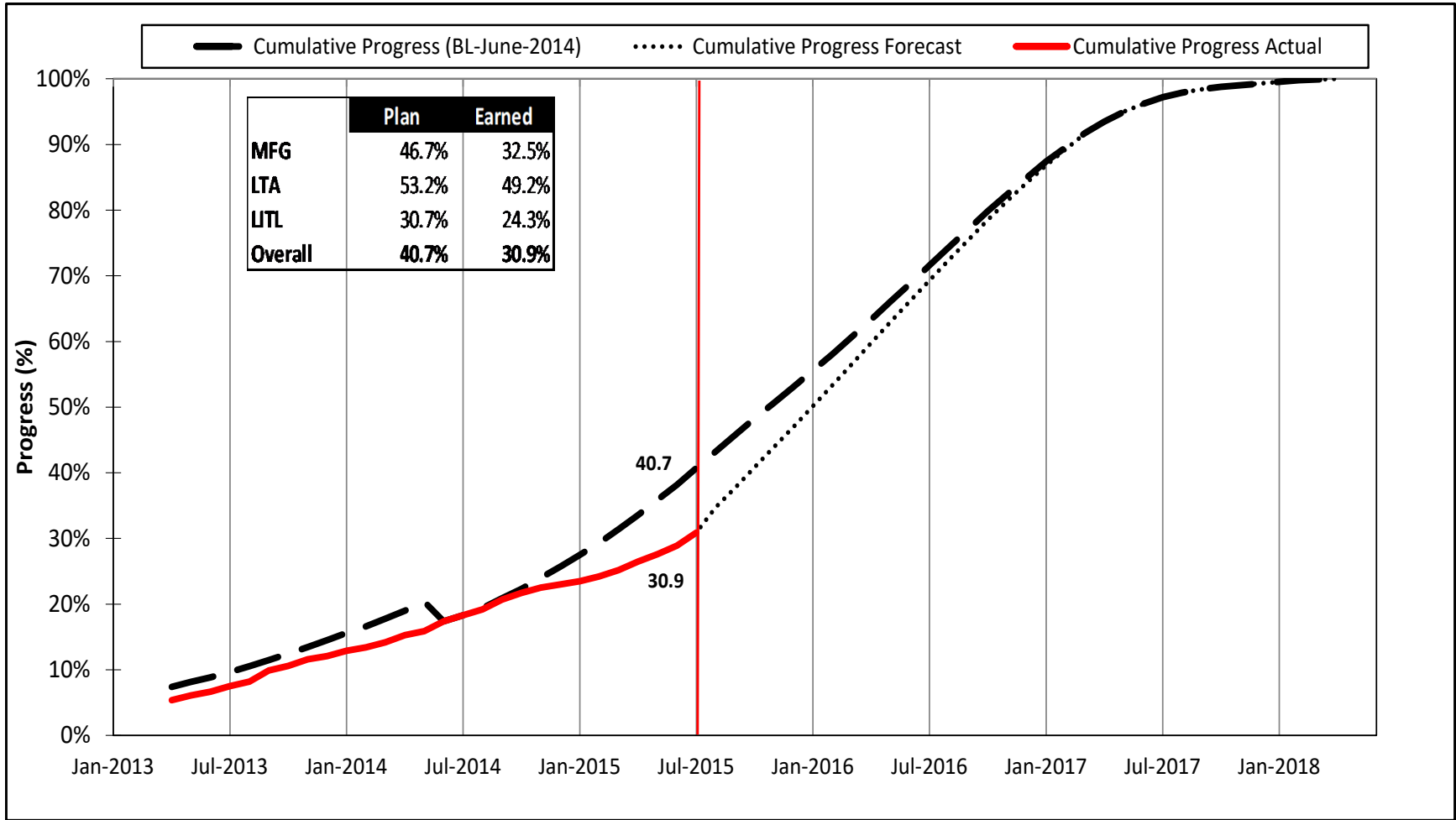
KEY PROJECT ISSUES

Description	Impact	Mitigation Action
CH0007 Contractor Performance	Cost/Schedule	Contractor production, while making significant improvements, continues to trend well behind plan. A review of the C1 workplan is underway, and implementation of an updated C1 schedule will remain on hold pending acceptance of agreed actions and mitigations plan.
Potential Other Contractor Performance	Cost/Schedule	Strong management focus is being applied to resolve issues experienced by contractors to limit potential future exposure.
Market Prices for Construction Works	Cost	LCP team continues to seek opportunities to mitigate cost exposure throughout the project with the remaining contracts to be placed.
Increase in Lagging Frequencies	Health & Safety	Development of a three point contact sticker and awareness package to increase awareness and reduce slip, trip and fall exposures.
High Potential Incidents	Health & Safety	Incident classification scale has been developed and is being field tested amongst all components.

FINAL FORECAST COST SUMMARY



OVERALL CONSTRUCTION PROGRESS CURVE



MILESTONE KEY DATE SUMMARY

Milestone/Key Date	Baseline (June-2014)	Actual	Forecast	Commentary
MFG - MF Access Road - Ready for Use	30-Nov-2012	30-Nov-2012		
MFG - Bulk Excavation Contractor Mob.	13-Jan-2013	13-Jan-2013		
LITL - EA Release (Provincial)	21-Jun-2013	21-Jun-2013		Federal Release issued November 2013.
LTA - HVac TL ROW Clearing - Start	12-Aug-2013	12-Aug-2013		
LITL - HVdc TL ROW Clearing - Start	16-Jun-2014	16-Jun-2014		
LITL - SOBI Landfall (HDD) - Start	19-Nov-2013	19-Nov-2013		
MFG - North Spur Works - Start	01-Sep-2014	14-Mar-2015		
MFG - South Dam-Start	18-Apr-2016		18-Apr-2016	
LTA - HVac TL Construction - Complete	03-Oct-2016		28-Sep-2016	
LTA - Ready for Power Transmission	04-Jul-2017		04-Jul-2017	
LITL - SOBI Cable Systems Ready	24-Nov-2016		11-Oct-2016	
MFG - River Diverted	05-Aug-2016		05-Aug-2016	
MFG - Reservoir - Winter Head Pond (EL 25m)	09-Nov-2016		09-Nov-2016	
LITL - Ready for Sustainable Power Transfer Labrador to Newfoundland	11-Nov-2017		11-Nov-2017	
MFG - North RCC Dam Complete	03-Nov-2017		03-Nov-2017	
MFG - First Power from Muskrat Falls	10-Dec-2017		10-Dec-2017	On hold pending review
MFG - Full Power from Muskrat Falls	06-Apr-2018		06-Apr-2018	On hold pending review

Muskrat Falls – Recent Activities

- Astaldi:
 - Concrete production for August = 18,000 m³, estimate for September ~ 2m³
 - Powerhouse – focus on draft tube formwork and concrete work
 - Spillway – focus is completion of final lifts for piers. Work is expected to be complete by end of September
 - Continuing construction of transition dams, separation wall
 - Continuing to examining options for removal of ICS later this fall

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
 - Continued construction of first cut-off wall
- Issued LNTP to Barnard Pennecon for North and South Dams package; contractor mobilizing to site in October
- Manufacturing continuing on Turbines and Generators, and Gates

Muskrat Falls – Upcoming Activities

- Andritz expected to commence work in upstream area of the spillway in September
- Continue concrete work in powerhouse area
- Continue planning for winterization program and preparations for winter construction
- Continue North Spur stabilization activity
- Turbine and Generator manufacturing continuing
- Gates manufacturing continuing

Powerhouse Intake



Powerhouse Intake



Powerhouse Intake



Powerhouse



Powerhouse



Powerhouse



Powerhouse



Spillway



Spillway



Spillway



Spillway



Spillway



Separation Wall



Centre Transition Dam



North Transition Dam

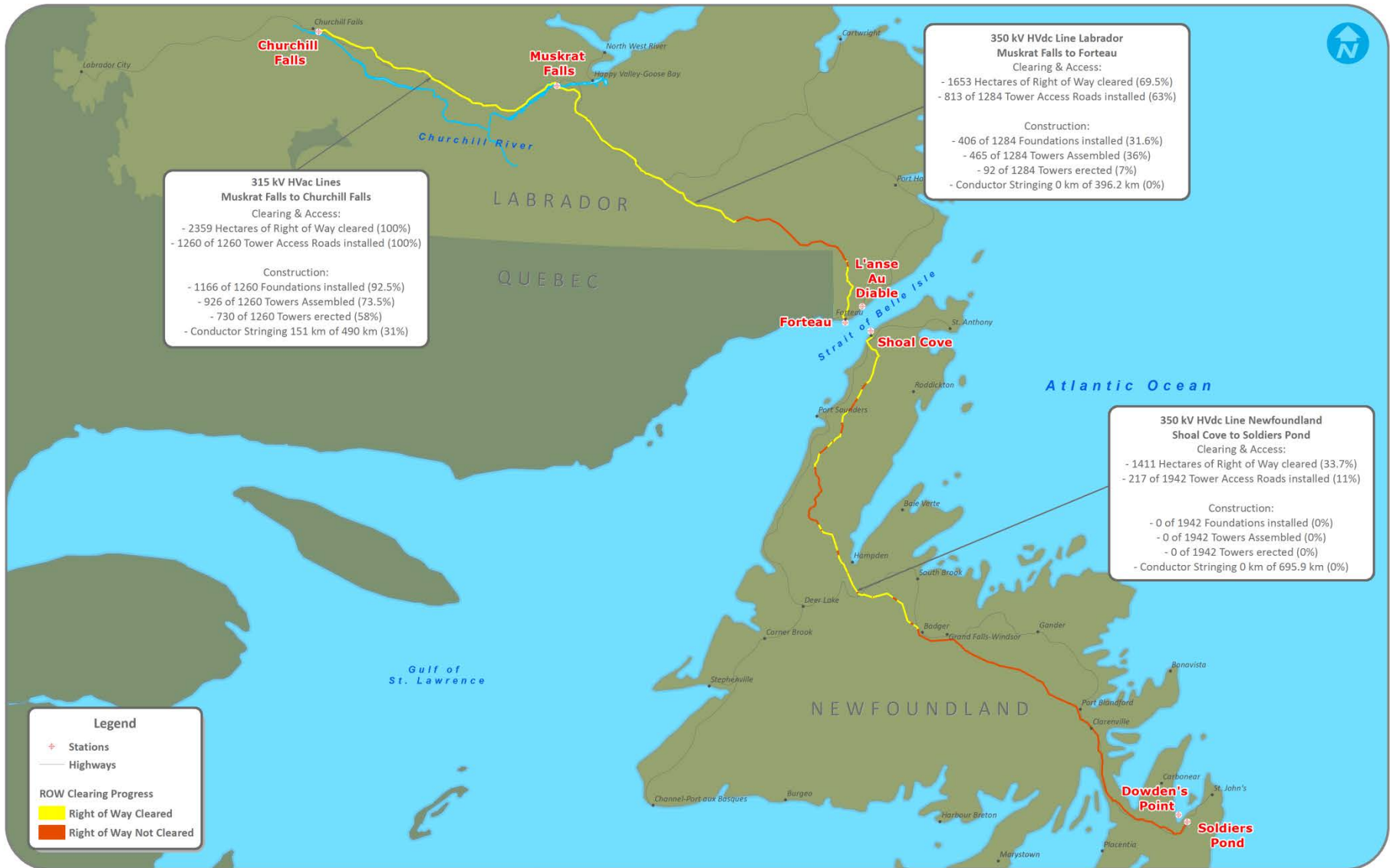


North Spur



North Spur Batch Plant





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:
 - 111 towers erected
 - 469 foundations installed
 - 478 towers assembled
 - 191 anchors installed
- Grounding stations:
 - Completing installation of remaining armor stone at Dowden's Point. All wells installed at L'Anse au Diable, installing armor stone
- Soldiers Pond Synch Condensers:
 - Piling complete. Formwork continuing for piers

L-ITL Recent Activities

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

L-ITL Recent Activities

- SOBI
 - Nexans preparing to mobilize to site to commence land cable installation
 - Installation final crib for rock quay at Forteau

L-ITL Upcoming Activities

- Continue ROW clearing, Transmission Construction
- Civil works to support converter stations, transition compounds and AC substations continue at SP, MF, CF. Commence steel erection for buildings at SP
- Complete Dowdens Point program late Sept/early Oct; complete L'Anse au Diable program mid/late Oct
- Commence installation of SOBI land cable in Sept and continue to late October/November

L-ITL Foundation Installation



L-ITL Tower Assembly



L-ITL – Tower Erection



L-ITL – Tower Erection



L-ITL Access Road Construction



Soldiers Pond – AC Substation



Soldiers Pond – Converter Yard



Muskrat Falls – Converter Yard



Muskrat Falls – Switchyard



Muskrat Falls – AC Substation



Churchill Falls – AC Substation



Dowden's Point



Dowden's Point



L'Anse au Diable



L'Anse au Diable



LTA - Recent Activities

- HVac construction continuing:
 - 799 towers erected
 - 957 towers assembled
 - 1172 foundations installed
 - 990 anchors installed
- Continued conductor stringing operations

LTA – Upcoming Activities

- Continue tower assembly and erection
- Continue stringing operations

LTA – Tower Assembly



LTA – Tower Assembly



LTA – Tower Erection



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