

Overland Transmission Update

Presentation to IE & MF Oversight Committee

29-Nov-2016

Boundless Energy



Presented to IE and MF Oversight Committee on 29-Nov-2016 by J. Kean at Torbay Road (11:30AM to 1PM).



Take a
MOMENT
for Safety

Overview

- Provide update on the status of Overland Transmission component of the LCP
- Review plan for completion by end of 2017

Key Messages

- 1** We have made significant progress aligning with Valard on the plan to completion

- 2** Strong progress has been made on key work scopes since late summer

- 3** We have and will continue to implement measures to further de-risk the plan

- 4** HVdc Conductor installation has recommenced; on target for November 2017 completion

- 5** Focus remains on key enablers of the Plan

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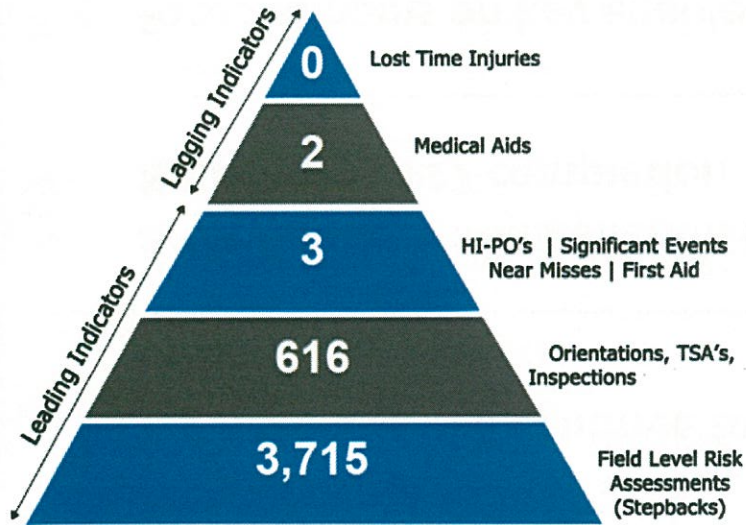
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1 H&S Performance



	FREQUENCIES	
	YEAR TO DATE	PROJECT TO DATE
MEDICAL AID FREQUENCY	0.97	0.96
LTI FREQUENCY	0.06	0.13
RECORDABLE INCIDENT FREQUENCY	2.00	2.45

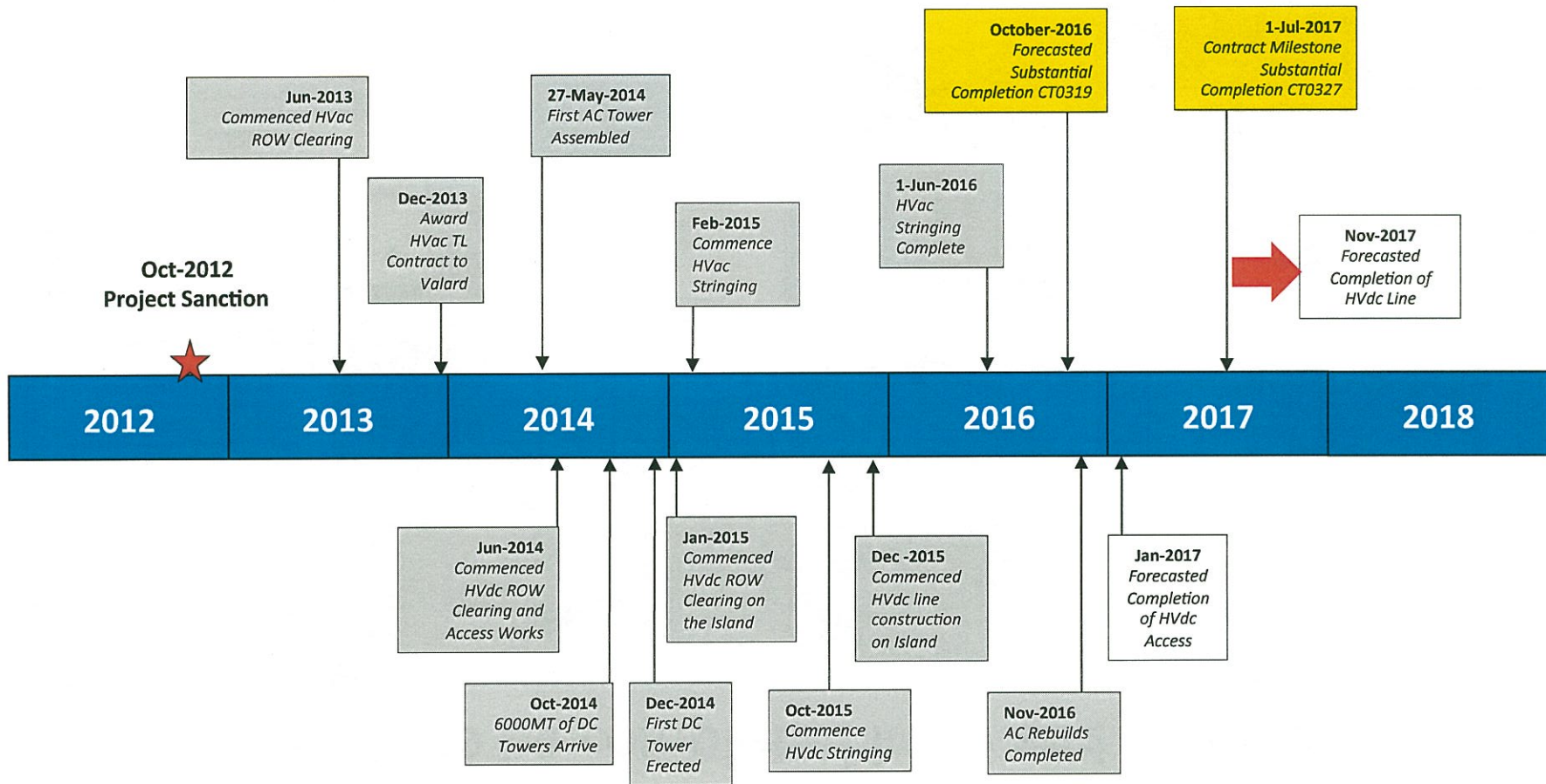
2 Medical Aids during period 06-NOV to 19-NOV-2016

10-Nov: Valard hand fracture. 11-Nov: MKS slip and fall on snow.

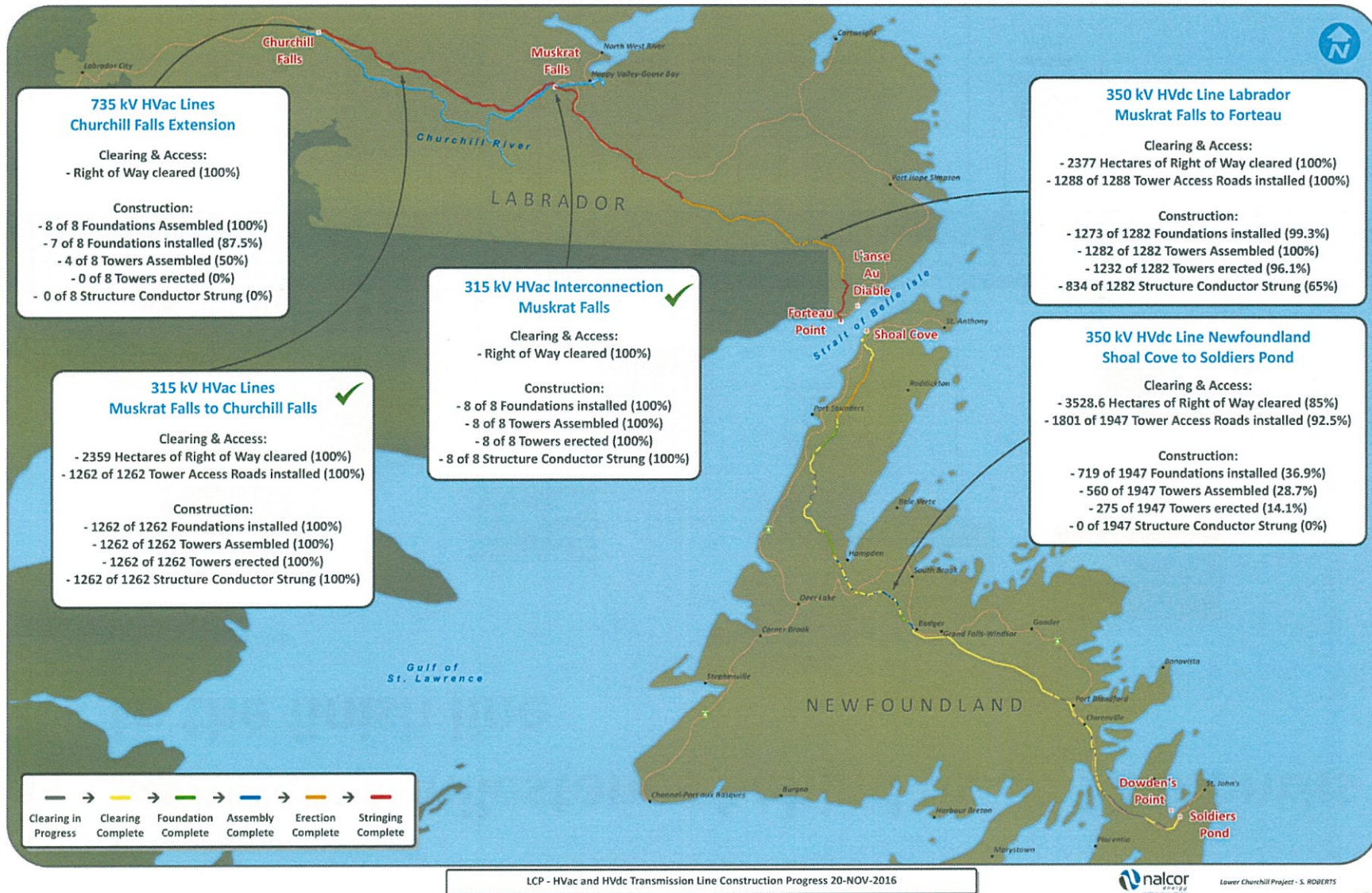
Key Focus Areas	Status
H&S leadership and resources at Valard	Written Action Plan received and currently under implementation review
Resolution of OHS Directives	Awaiting affirmations from OHS for closure of corrective actions to date, and other orders have received extension dates
Valard competency due diligence checks	New Hire mentoring has been assured, and LCP are investigating the effectiveness of excavation safe work compliance

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Significant milestones behind us ... 12 months to the finish line



1 Excluding Stringing, all works in Labrador forecasted to be completed in by end of 2016

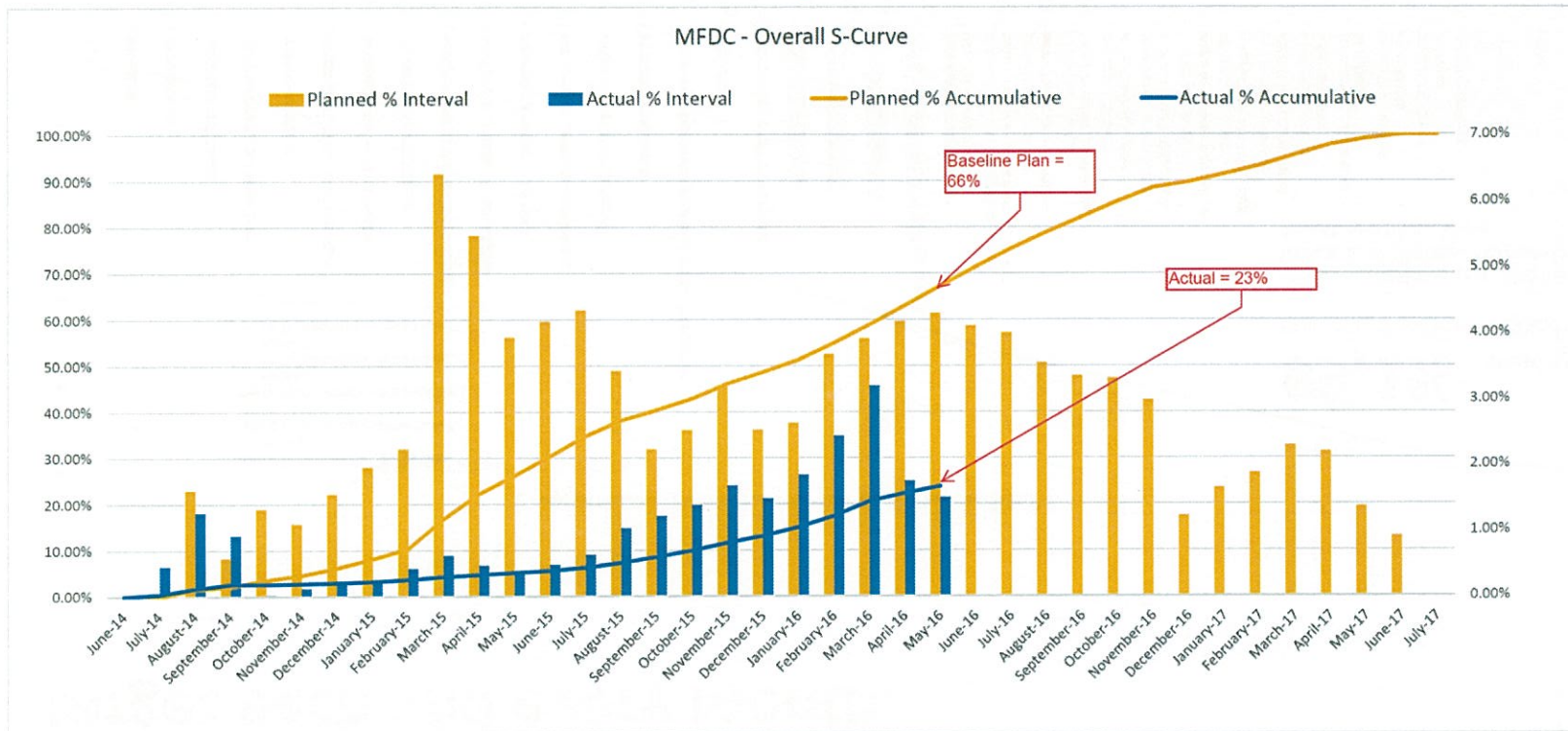


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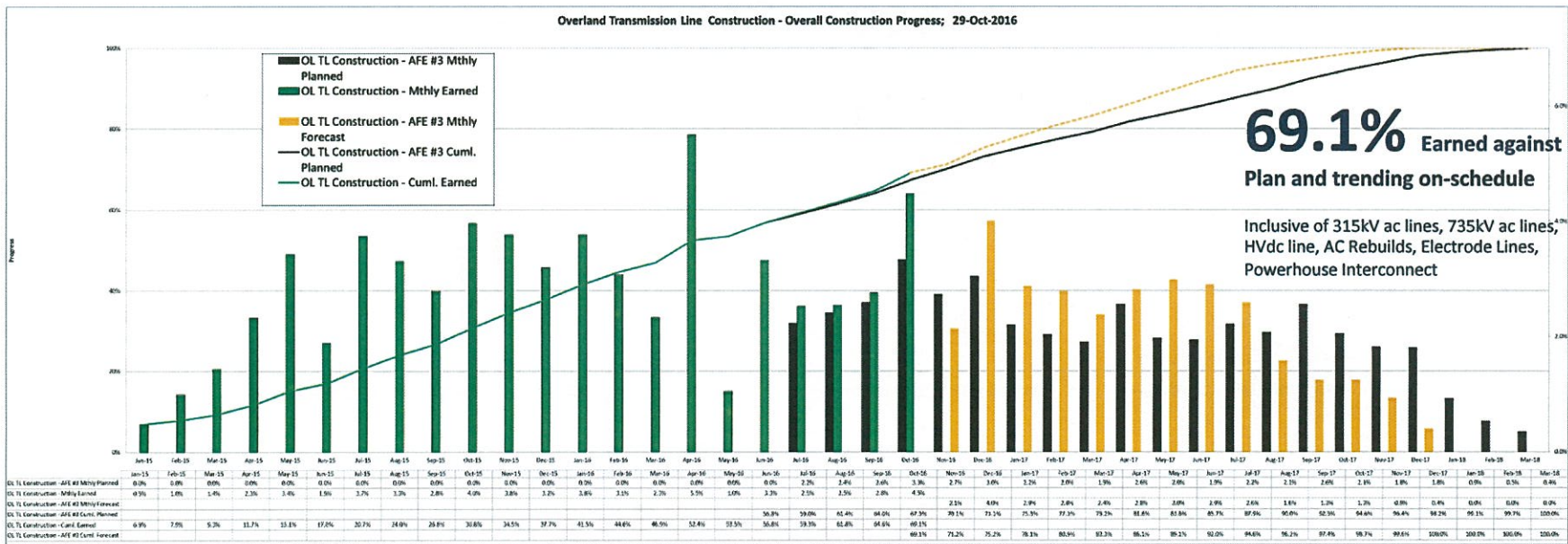
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Going into the summer, we had little confidence that we would complete the HVdc scope in 2017, but rather slip until to Q2-2018. However, through the summer and fall positive actions have resulted in building momentum.

Circa May 2016



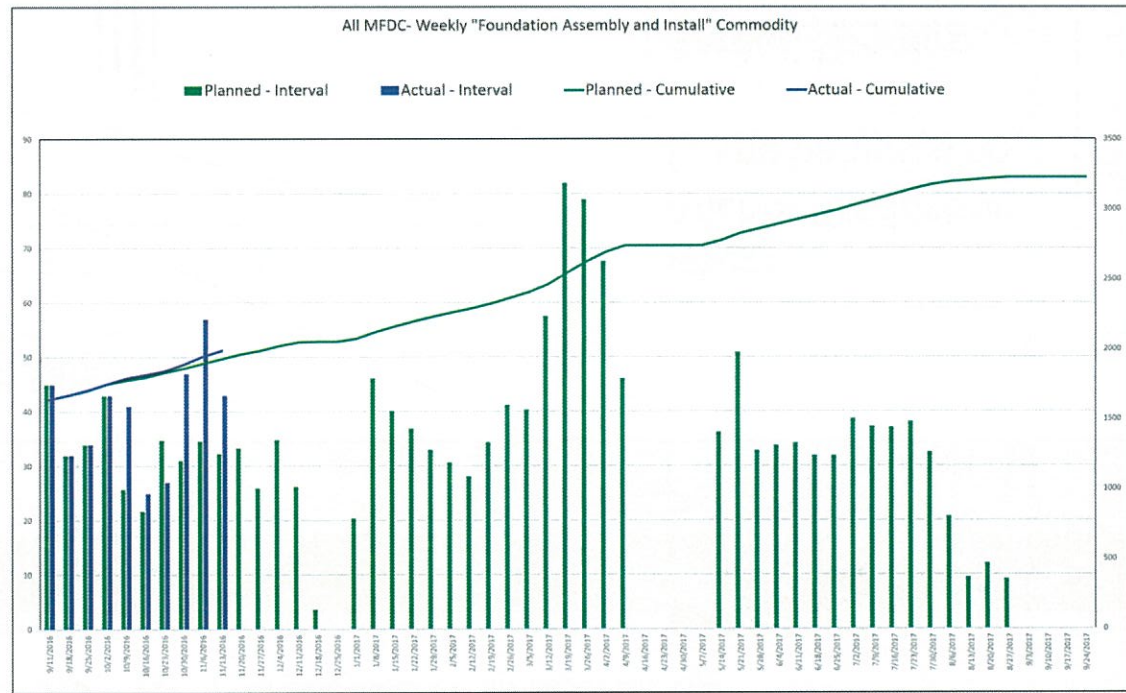
1 Progress since July has exceeded “our” AFE Rev 3 target each and every month.



1 Foundation installation has been the leading indicator of Valard’s performance. Affirmative actions have resulted in a positive trend.

Focus areas include:

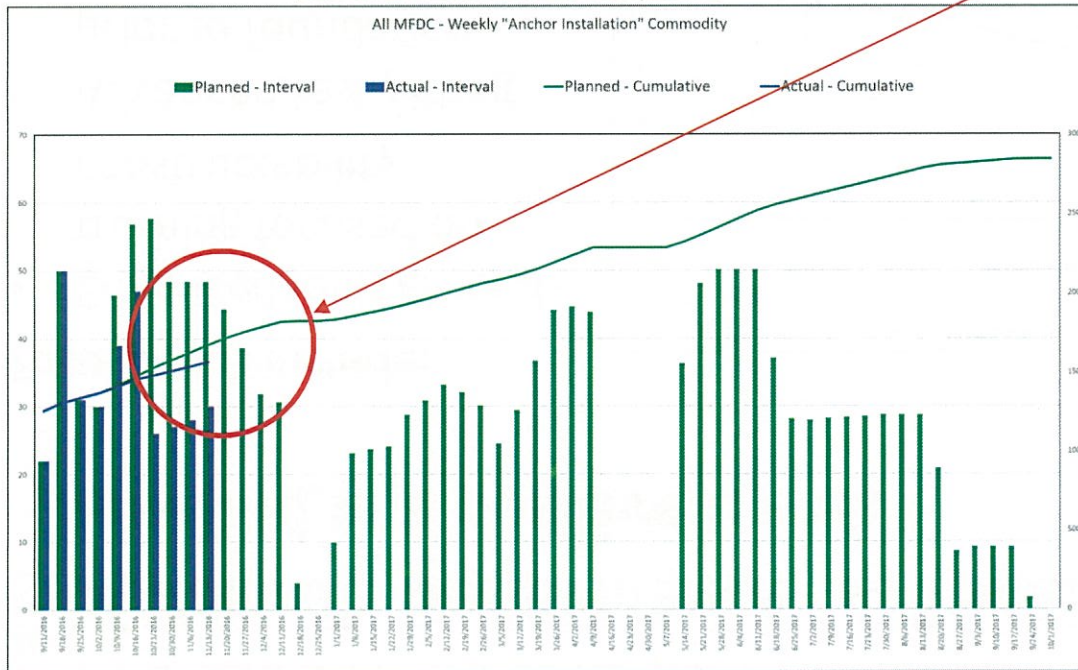
- Enhanced joint ground-truthing focused on constructability
- Advanced test pitting prior to foundation installation
- On-going geotechnical borehole program
- Accelerated and optimized foundation selection program for suspect locations



1 Finally we have a Plan supported by detailed commodity curves for production tracking

Activity Type	Budgeted Units (Str)	Last period: Nov/06/16-Nov/12/16				This period: Nov/13/16-Nov/19/16				To Date				% Complete					
		Plan (Str)	Construction Completions (Str)	MBOS Completions (Str)	Delta from Plan	Plan (Str)	Construction Completions (Str)	MBOS Completions (Str)	Delta from Plan	Plan (Str)	Construction Completions (Str)	MBOS Completions (Str)	Delta from Plan	To Go (Str)	Plan	Construction	MBOS	Construction Progress Indicator	MBOS Progress Indicator
Foundation Assembly and Install	3229	35	57	32	22	32	43	15	11	1932	1992	1758	60	1237	59.8%	61.7%	54.4%	1.8%	-5.4%
Anchor Installation	2847	48	28	15	(20)	48	30	19	(18)	1678	1569	1311	(109)	1278	58.9%	55.1%	46.0%	-3.8%	-12.9%
Assembly	3229	45	29	20	(16)	44	18	8	(26)	1957	1842	1781	(215)	1387	60.6%	57.0%	55.2%	-3.6%	-5.4%
Erection	3229	42	26	17	(16)	65	32	15	(33)	1534	1507	1448	(27)	1722	47.5%	46.7%	44.8%	-0.8%	-2.7%
Division Stringing	3229	25	30	0	5	26	0	0	(26)	845	834	512	(11)	2395	26.2%	-0.3%	15.9%	26.5%	10.3%

Anchor Production Rates



Issue:
Anchor Production falling behind plan

Agreed Solution
1 additional anchor crew being mobilized through LEG

1 Realistic and achievable Plan for Nov 2017 finish in-place

- Plan predicated upon:
 - Logical work sequencing
 - Viable production rates per month
 - As-observed favorable geotechnical conditions on Island
 - Historical productivities achieved over the past 4 months
 - Increase in grillage and rock foundation crews by 11 crews (34 in total)
 - Associated increase in assembly, erection and anchor crews
 - Supplemental CM resources

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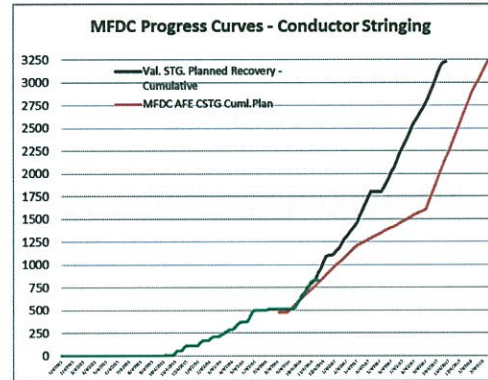
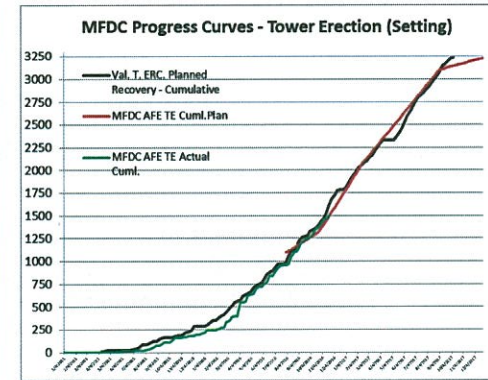
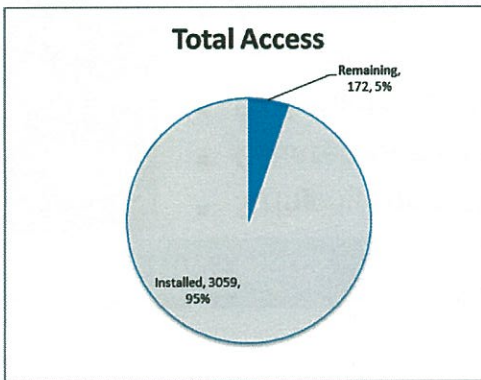
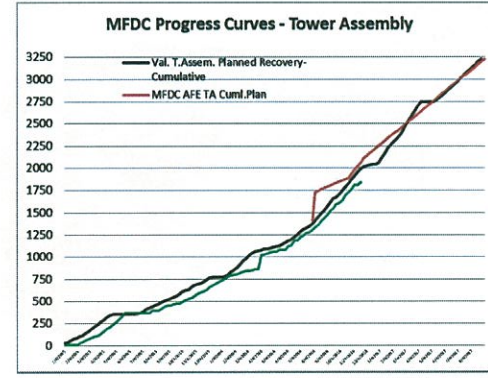
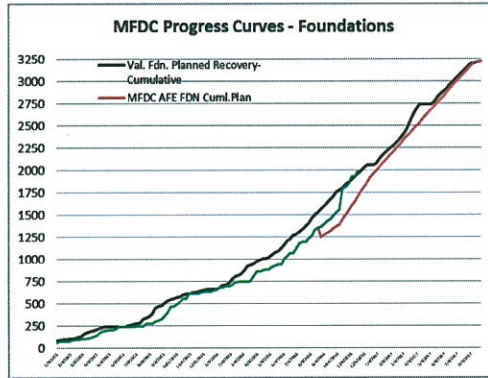
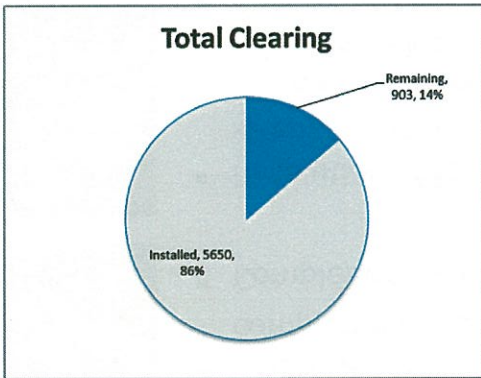
3 We have and will continue to implement measures to further de-risk the plan

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2 HVdc Progress: A deeper look

100 tower foundations installed during 2 week period.



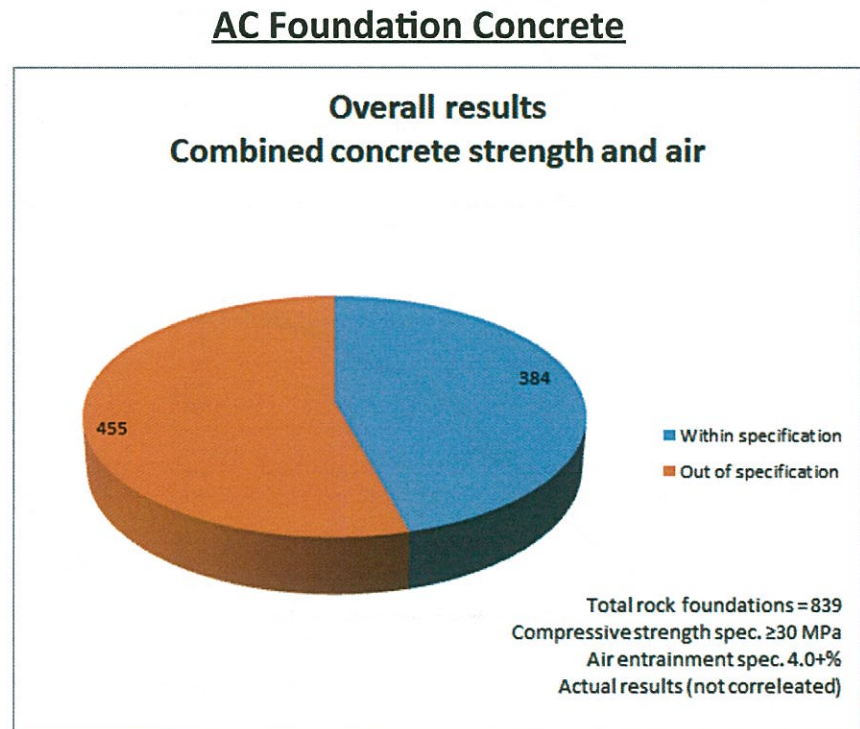
Notes:

- Total structures = 3,229
- Based on Valard's Weekly report Construction Completions for the period up to 13-Nov-2016

2 315kV HVac Lines – Final Remediation Underway

315kV HVac Lines Status

<p>Progress</p>	<ul style="list-style-type: none"> ▪ Stringing complete ▪ Counterpoise complete ▪ Reclamation underway – will not conclude until summer 2017 ▪ All camps demobilized ▪ Valard submitted substantial completion, rejected by LCMC ▪ Completion walk-downs finished
<p>Current Priorities & Focus Areas</p>	<ul style="list-style-type: none"> ▪ Resolution of foundation concrete strength and air entrainment issues <ul style="list-style-type: none"> – Intensive phase 2 coring program commencing ▪ Closure of open punch list from walk-downs ▪ Confirmation of reclamation plan for balance of scope



2 735kV Interconnect progressing; targeting completion in Q1-2017

735kV Interconnect

Scope and Progress

- 2 parallel lines ~ 1km; encompasses 8 self-support towers
- 7 of 8 foundations installed; 1 micro-pile being implemented (Structure B5-4)
- Tower assembly and erection ongoing concurrently
- 315kV & 735kV gantries erected by GE

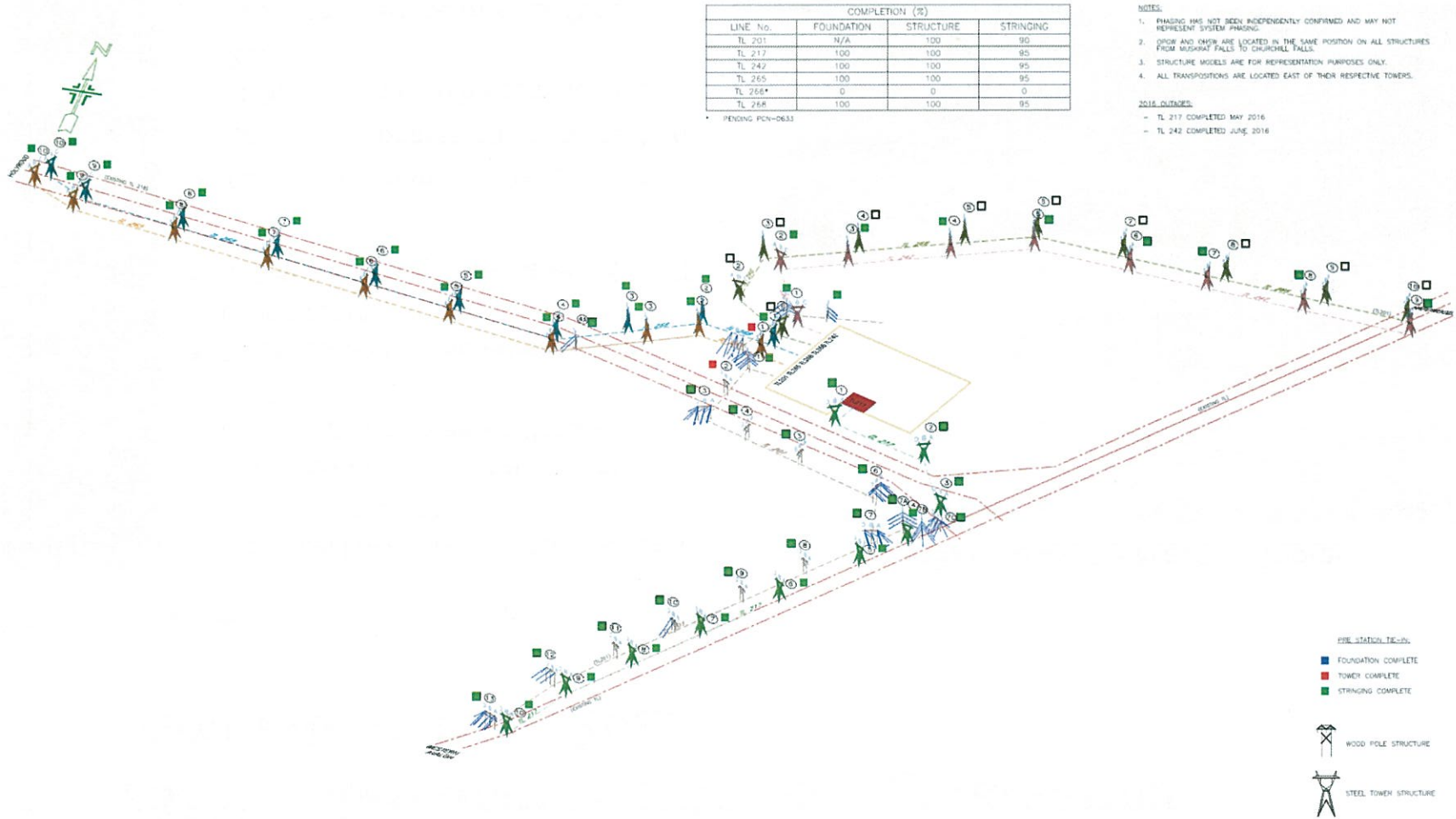
Current Priorities & Focus Areas

- Completion of micro-pile foundation
- Completion of assembly and erection
- String expected to be completed early 2017
- Working interface with C3 HVdc Specialties re timing of slack span to gantries

735kV Towers – Erected Bodies



2 Island AC Rebuilds and Re-routes completed



LINE No.	COMPLETION (%)		
	FOUNDATION	STRUCTURE	STRINGING
TL 201	N/A	100	90
TL 217	100	100	95
TL 242	100	100	95
TL 265	100	100	95
TL 266*	0	0	0
TL 268	100	100	95



* PENDING PCN-0633

- NOTES:**
1. PHASING HAS NOT BEEN INDEPENDENTLY CONFIRMED AND MAY NOT REPRESENT SYSTEM PHASING.
 2. CROSS AND WALK ARE LOCATED IN THE SAME POSITION ON ALL STRUCTURES FROM MUSKAY FALLS TO CHURCHILL FALLS.
 3. STRUCTURE MODELS ARE FOR REPRESENTATION PURPOSES ONLY.
 4. ALL TRANSPOSITIONS ARE LOCATED EAST OF THEIR RESPECTIVE TOWERS.

- 2016 OUTAGES:**
- TL 217 COMPLETED MAY 2016
 - TL 242 COMPLETED JUNE 2016

FILE STATUS TRACKING

- FOUNDATION COMPLETE
- TOWER COMPLETE
- STRINGING COMPLETE

 WOOD POLE STRUCTURE
 STEEL TOWER STRUCTURE

2

Success completion of this work made possible with close working interface with NLH



- Following the successful line re-route and outage work on TL 204 in central NL, we've reached an important milestone with the completion of all steel foundations, towers and major conductor stringing required as part of the HVac Re-Builds Scope.
- The focus now shifts for the team to interface with the detailed outage planning for station connection and energization in 2017.

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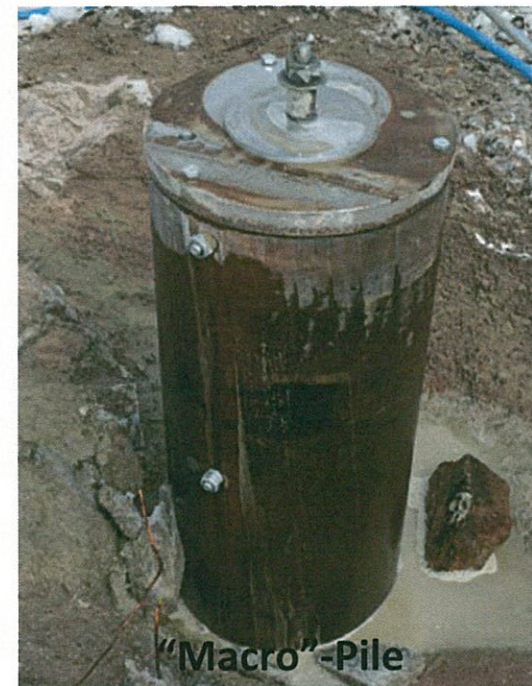


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We are focus on solutions to reduce schedule risk.

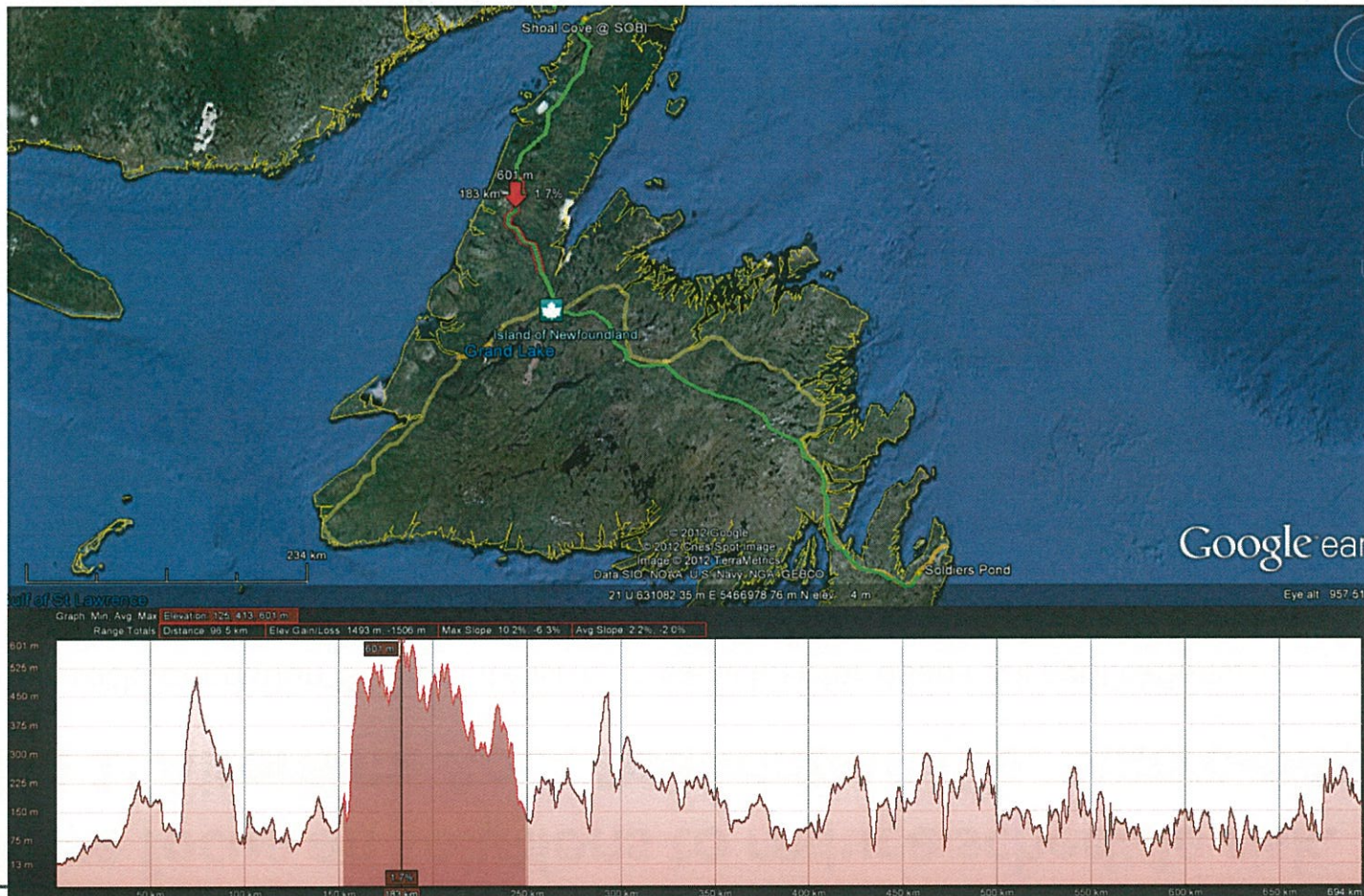
Solve 1: Alternate Rock Foundation (i.e. macro-pile)

- Current rock foundation is labor intensive, in particular for deep rock applications, requiring both significant excavation, rock leveling, and concreting. Time consuming and costly when deep overburden and non-suitable native backfill.
- Approved design for alternate foundation (i.e. macro-pile) sanctioned for field implementation using LEG in Jan 2017. Target zones identified for application.



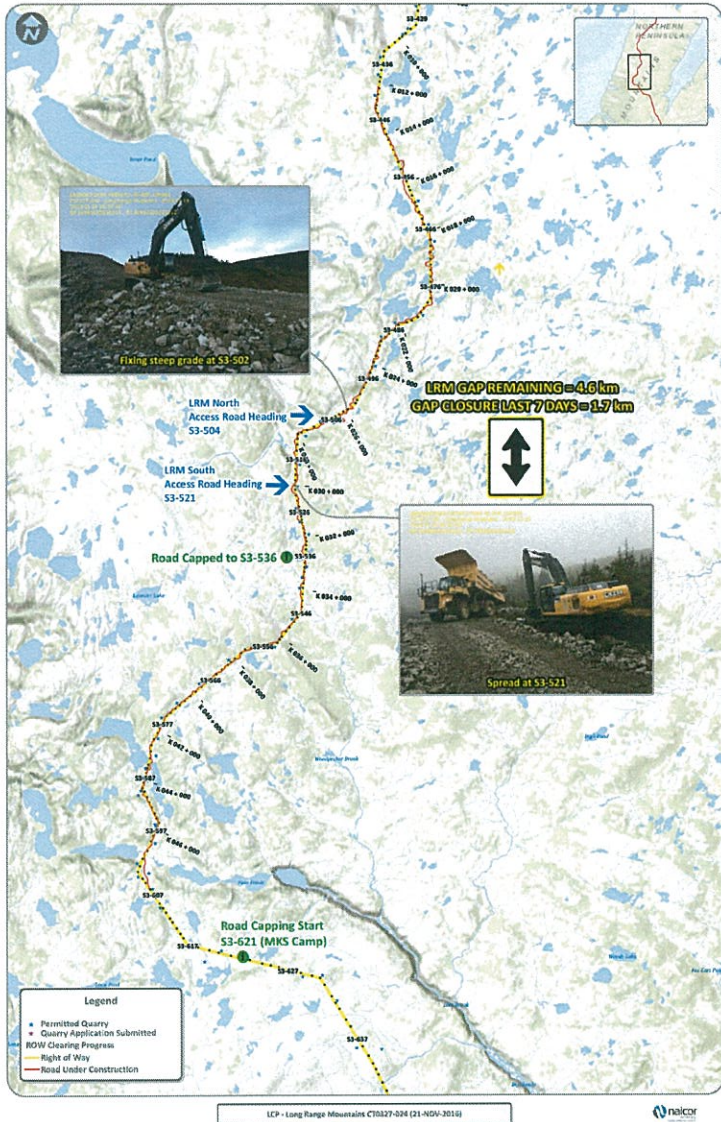
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LRM presents schedule risk due to unpredictable and harsh weather and rugged terrain. Heli operations have limited viability, thus pushing need for roads.



3

Solve 2: LRM access construction nearing completion. Will afford very productive line construction.



Incremental Capital Investment \$32M

3 Long Range Mountains

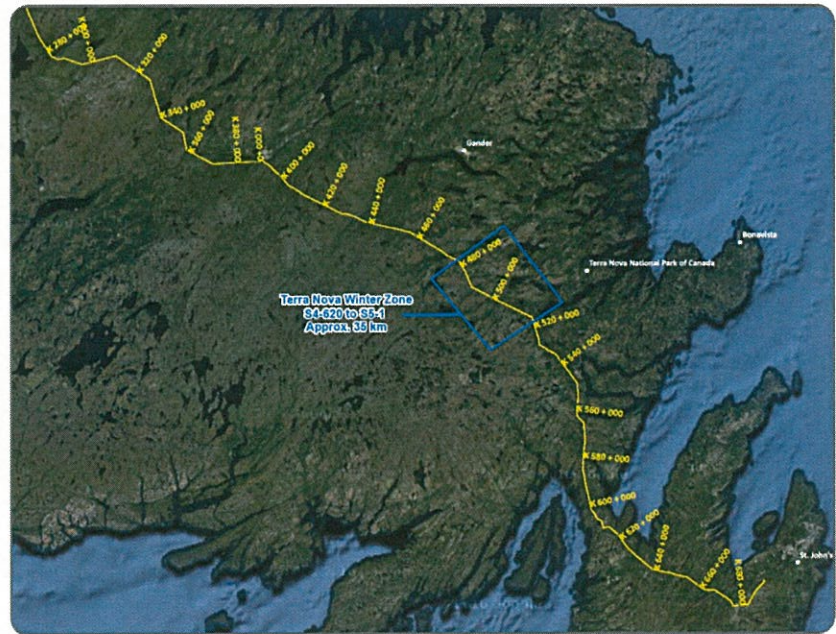
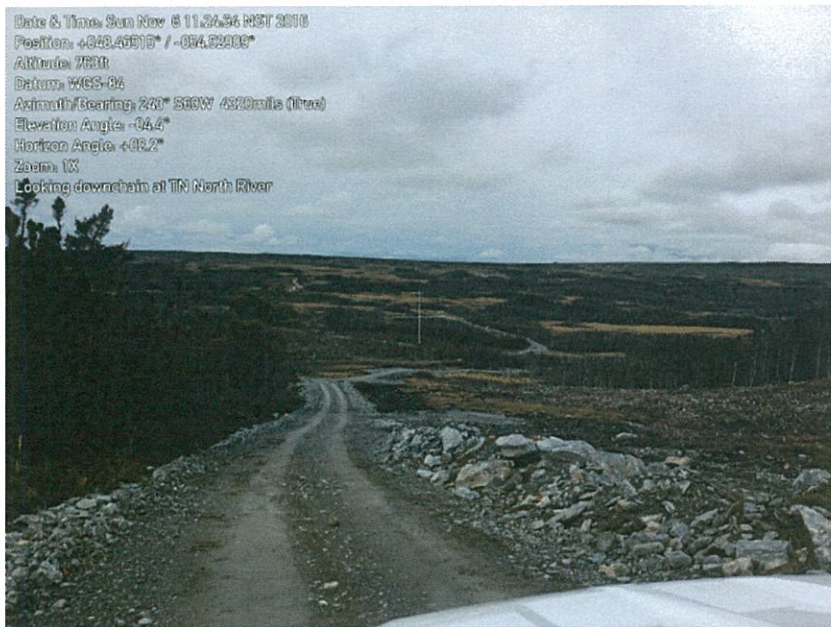
Showtime!

3

Solve 3: Removed winter-only construction restriction in Eastern NL ... now all-season rock road

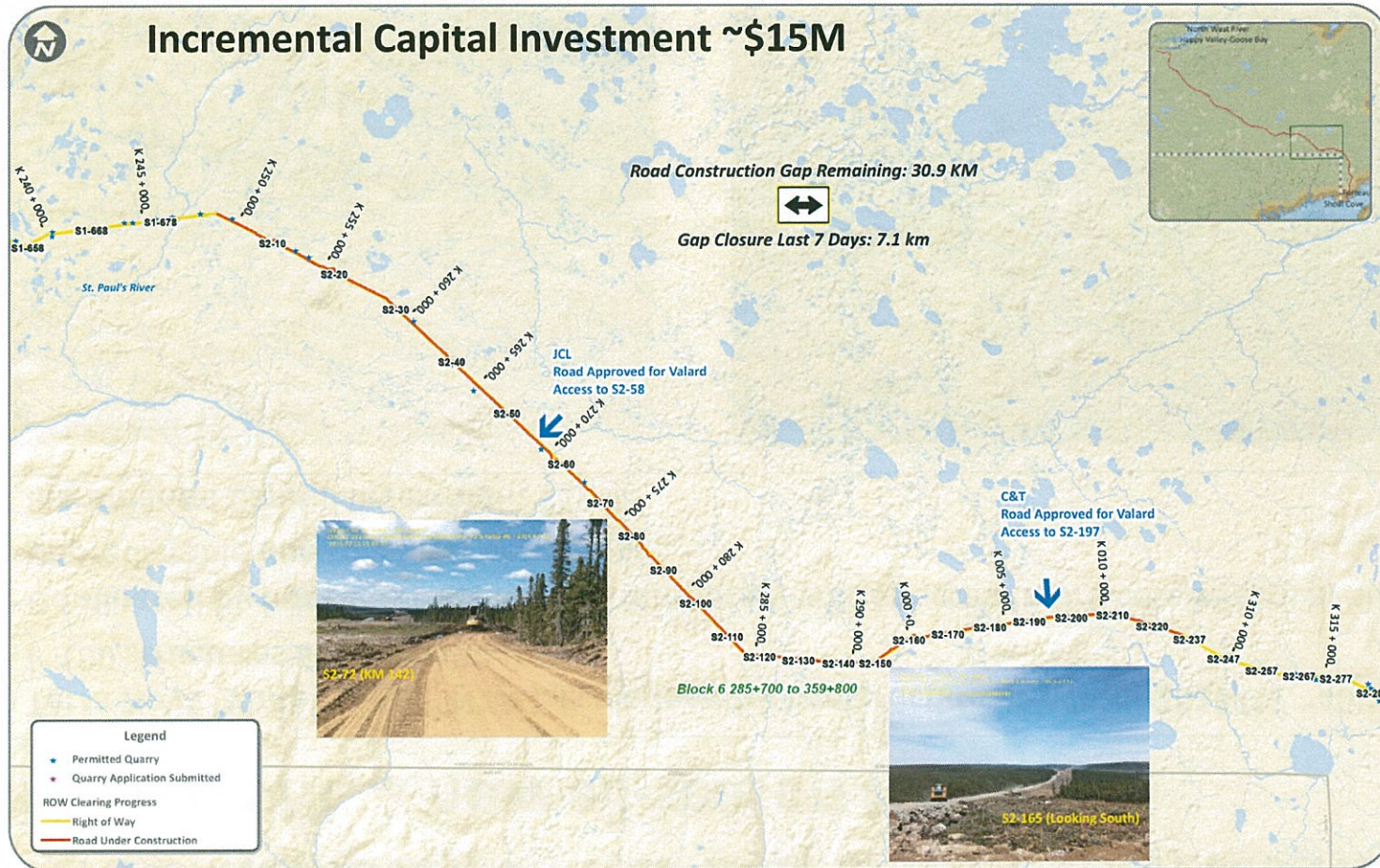
Key Facts

- Terra Nova Winter Zone (TNWZ), is planned for construction in Winter 2016/17 ~40km long (~100 structures S4-610 to 704)
- Dominated by boggy terrain, making temporary winter access more cost effective, but unpredictable due to winter conditions
- Incremental Capital Investment \$12M



3

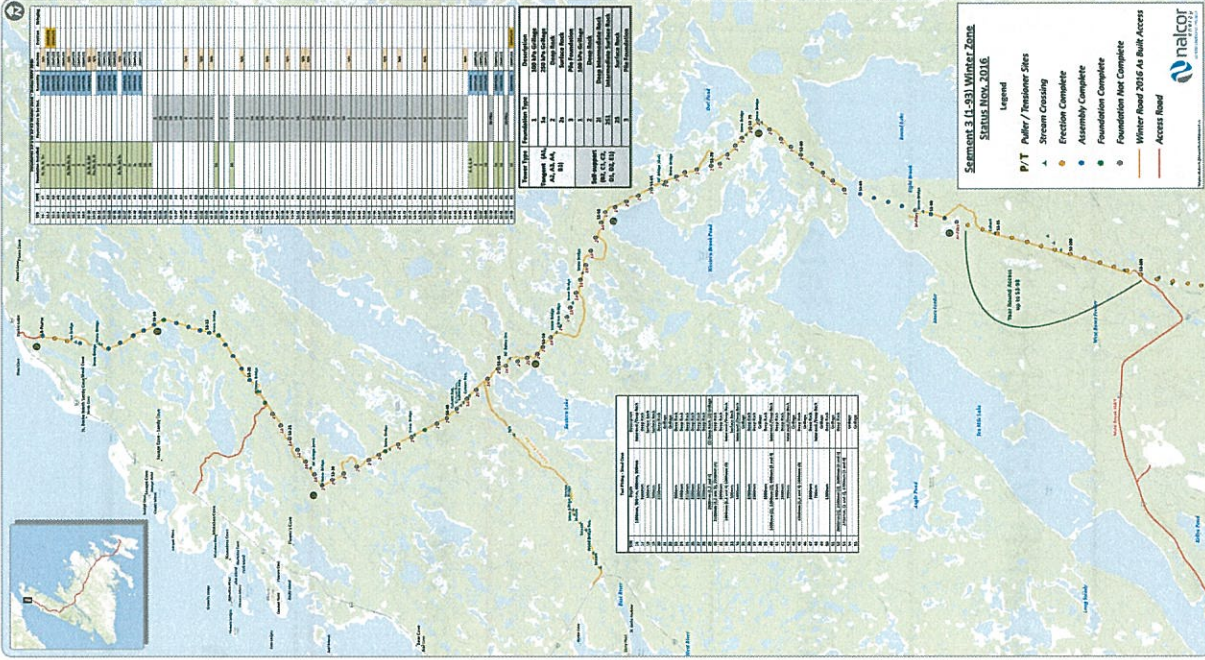
Solve 4: We removed winter-only construction restriction for interior of Labrador (235 structures)



3 Key Risk Area: Segment 3 (1-93) Winter Zone

Scope & Status

- Segment 3 winter zone comprised of 93 structures – winter only access
- Plan was to execute in Winter 2016, but Valard expended minimal effort (~15% complete)
- Only Winter 2017 remains to complete balance of scope; working with Valard to drive out a detailed plan
- If late winter / early spring or production risk materializes, then mitigation is construct summer road
- Valard are committed to the winter program



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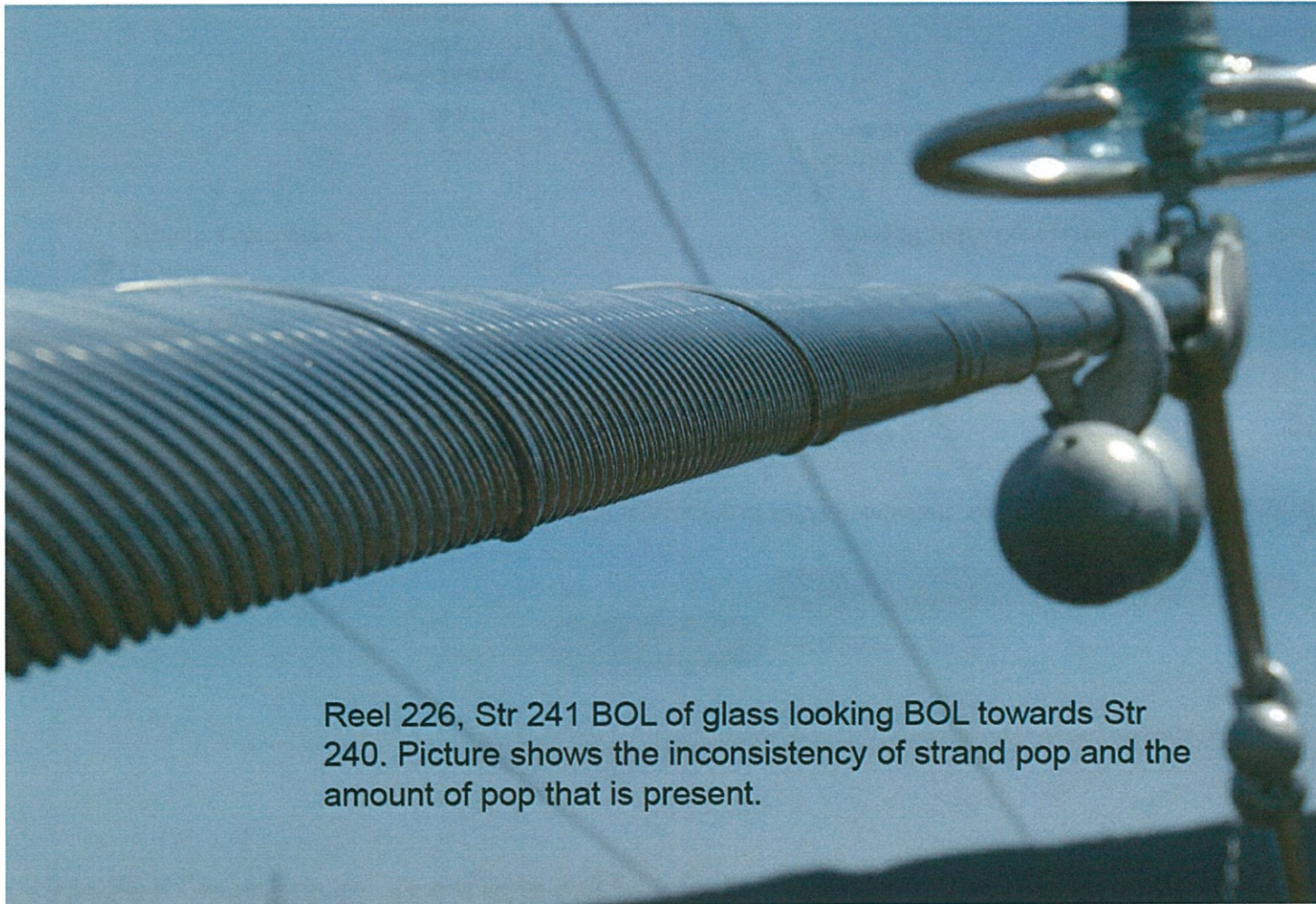
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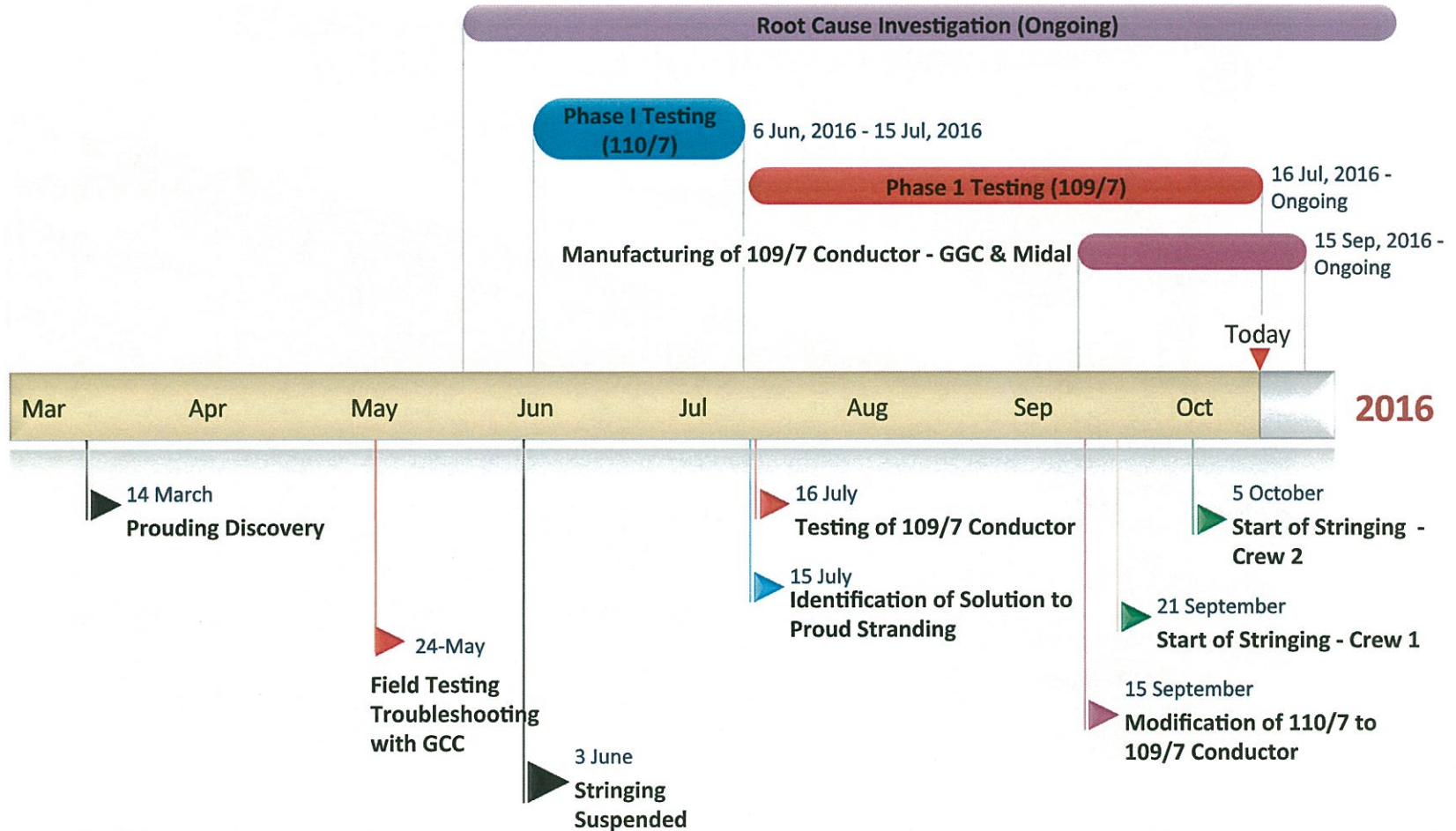
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HVdc Conductor – Proud Stranding Condition

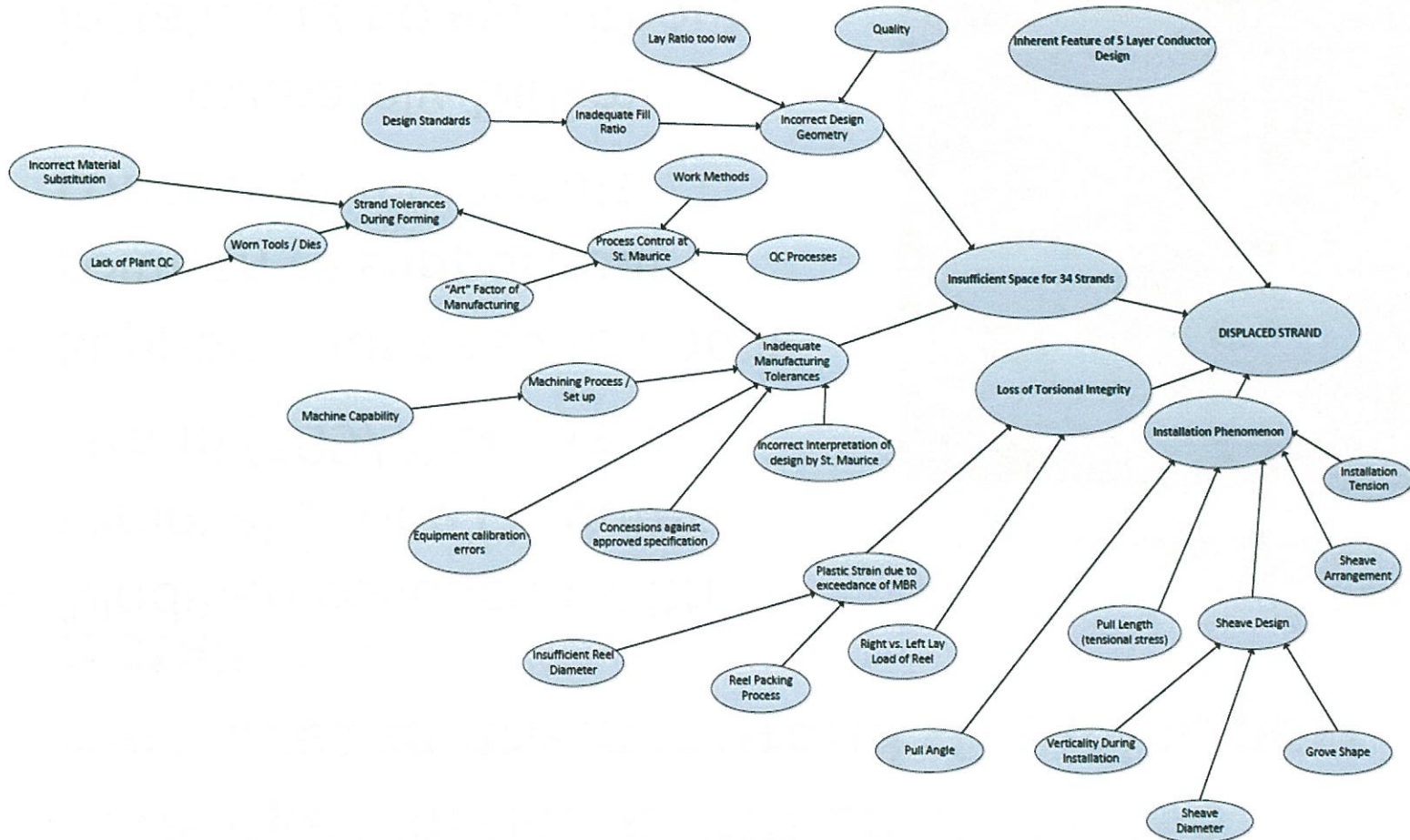


4 Root Cause Investigation Commenced in May



4 Significant number of variables to be assessed

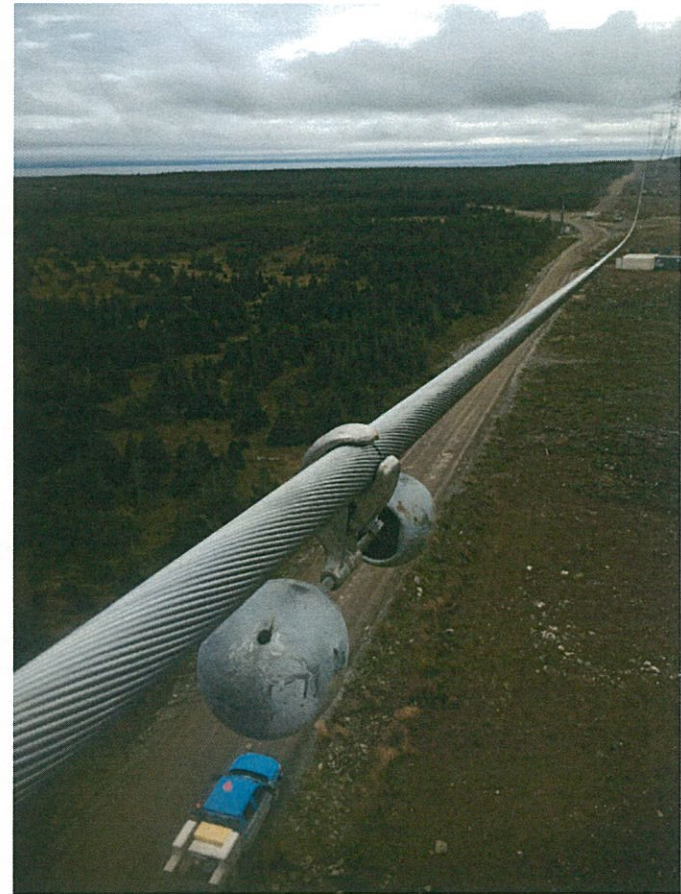
Influence Diagram – Displaced Conductor Root Cause “Theory Testing Framework”



4

Investigation has identified corrective measures to prevent proud stranding post installation

- Modified conductor with removal of one (1) outer strand (109/7) works
- Supports our need to find a solution to support our construction schedule
- Approximately 180km installed (2 poles) without observation of proud stranding



4

Investigation Status

- Inconclusive findings as to why this is the case; appears to be a combination of variables
- Significant focus on influence of tension during conductor “pulling” process and the likelihood that this aggravates the situation
- Further testing on conductor layer behavior will continue
- At this point we have not concluding any viable way to installing the 110/7 conductor to avoid the occurrence of proud stranding

4 HVdc Conductor – In Summary

- Root cause investigation remains underway; fix underway to allow continuation of stringing
- Stringing with modified conductor re-commenced on 20-September
- Damaged conductor presents an unacceptable level of reliability risk and must be replaced
- Implementation plan underway for replacement of 180km of damaged conductor
 - Replacement conductor in HVGB by 7-December
 - Change Order executed with Valard for removal and replacement

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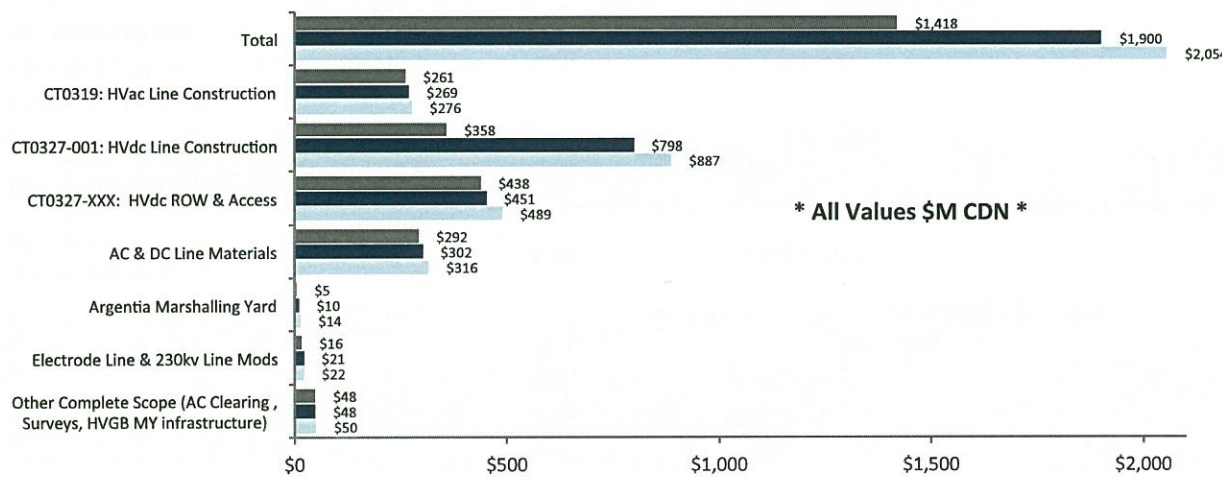
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5 Several Key Issues / Risks remain under close watch

Key Issues / Risks	Management Strategy	Level
<p>Potential delay to construction schedule due to proud strand on HVdc conductor</p>	<ul style="list-style-type: none"> • Conclude investigation and prep commercial position • Secure replacement cable (Midal) & modify existing cable (General Cable) • Secure arrangement for removal and & replacement 	
<p>Valard's Performance – Overall Completion Delay (Slow start-up, inadequate resourcing, leadership and competencies)</p>	<ul style="list-style-type: none"> • Help Valard see the gaps, identify solutions for Valard, protect LITP's position • Help Valard create a viable plan – get new Project Director and COO buy-in • Work with Valard to resolve resourcing issues, including crew mobilization and incremental supervision • Minimize ROW and material constraints • Get out ahead and remove obstacles 	
<p>Potential Commercial Claims from Valard</p>	<ul style="list-style-type: none"> • Manage to the contract • Achieve strategic alignment with Quanta • LCMC resources on the ground proactively monitoring Valard • Designated resources mobilized to support in-field commercial management 	
<p>Segment 3 Winter Zone Execution – Single Season Constraint</p>	<ul style="list-style-type: none"> • Work with Valard to develop a viable plan • Increase visibility of readiness • Leverage macro-pile to reduce foundation schedule exposure 	

5 FFC remains within AFE Rev 3. Conductor exposure is manageable.



Current Control Budget (AFE Rev 3)

69% Incurred against budget and trending on-budget

Excludes Reservoir Clearing (MF Scope) & GWF Bond Recuperation

October 2016 Cost Data:

- Incurred-to-Date
- Total Commitment
- Approved Budget

Key Cost Trends	Status
1. Potential cost implications and delay to construction schedule due to proud stranding on HVdc conductor (re-commence stringing)	• Change Order completed for Re-string with Valard Forecasting a \$10 million exposure reduction
2. Address Valard's position regarding travel MOU	• Valard objecting to LITP ability to implement
3. Construction Access Cost Exposure - Ongoing Maintenance & Snow Clearing	• Currently under review
4. Foundation Program Quantity Exposure (pile vs. grillage)	• Review undertaken & tracking with AFE Rev 3 • Macro-pile will assist with exposure management
5. Verification and assessment of potential out of scope work (Valard submission of LEMs / Change Requests)	• Initial assessment completed. Commercial position communicated to Valard.

5 All elements in-place by end of 2017

COMPONENT	COMPLETED	% COMPLETE	Forecast/Actual Completions Date*	Period Forecast Delta	AFE Rev. 3 (Jul-16) Planned Completions Date	ON SCHEDULE?
315 HVac MF to CF	Clearing /Access TL Construction	100% 100%	28-Oct-2014 30-Sept-2016			
735kV AC line at Churchill Falls	Clearing / Access TL Construction	100% 20%	28-Oct-2014 15-Feb-2017		15-Dec-2016	
HVdc TL MF to Soldiers Pond	ROW Clearing Access TL Construction	84% 94% 46%	31-Dec-2016 31-Dec-2016 31-Oct-2017		30-Jun-2017 30-Jun-2017 30-Mar-2018	
Electrode Line-Island East	TL Construction	65%	15-Feb-2017		15-Dec-2016	
Electrode Line-Labrador	TL Construction	0%	30-Jun-2017		30-Aug-2017	
Soldiers Pond AC Line Rebuilds & re-terminations	TL Construction	90%	15-Feb-2017		15-Dec-2016	

Note: Schedule Completions Dates do not include slack spans durations

Planned

Completed

In terms of scope, schedule, and budget, the project is:

- on track
- generally on track, with minor issues
- off track

5 Key Focus Getting to the Finish Line in 2017

Enabling the Plan

- Prioritization H&S action plan against key risks
- Work with Valard to achieve committed production levels
 - Real-time / daily management of deficiencies and opportunities through improve coordination and cooperation (both LCMC and Valard)
- Strong focus on ensure quality objectives are met and risk areas under close surveillance
- Work towards addressing open commercial items of disagreement
- De-risking Tactics
 - Test pitting, geotechnical and advanced groundtruthing
 - Implement Macro-Pile
 - SWOT team approach on open risk areas (e.g. Segment 3 Winter Zone)
 - Investment in critical access (e.g. LRM, TNWZ)

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