

Carter, Paul

From: TanyaPower@lowerchurchillproject.ca
Sent: Monday, April 1, 2019 9:14 PM
To: Carter, Paul
Cc: StevePellerin@lowerchurchillproject.ca; RosanneWilliams@lowerchurchillproject.ca; JamesMeaney@lowerchurchillproject.ca
Subject: Power Development - OC Deck and Project Cumulative Incurred Variance Explanation
Attachments: Power Development Progress Briefing FINAL 29-Mar-2019.pdf; Oversight Committee Request - Cumulative Incurred Variance to February 2019.pdf

Hi Paul,

Please find attached the Power Development slide deck for this week's meeting.

As well, please find attached the requested Cumulative Incurred Variance Explanation - I will also speak to this in the meeting.

Apologies for the delay!

Regards,

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You owe it to yourself, and your family, to make it home safely every day. What have you done today so that nobody gets hurt?

LCP Power Development

Progress Briefing

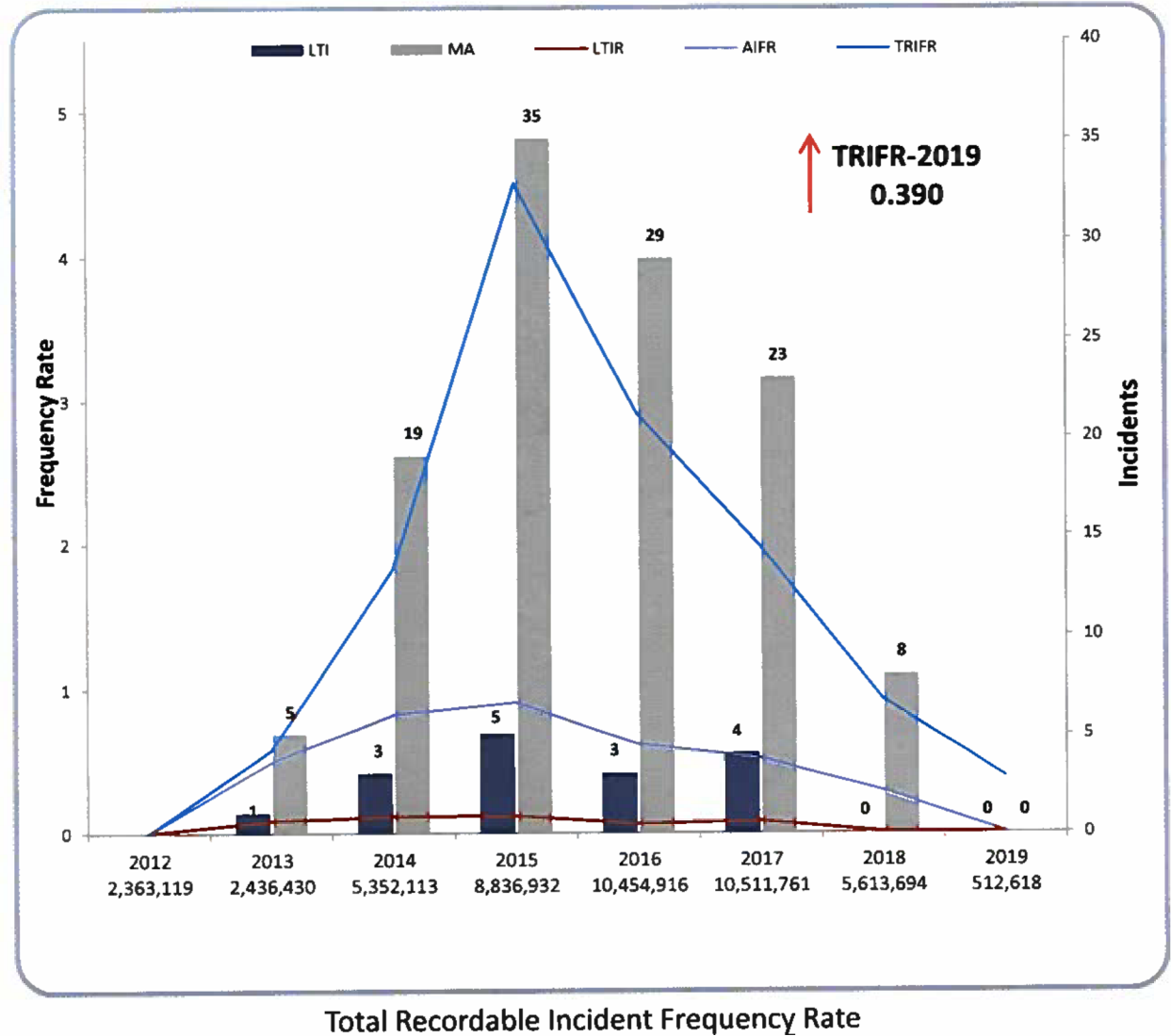
March 29, 2019

Boundless Energy




Committed to Safety

- ~ 46M hours worked project wide (to Feb 2019)
- Multiple work fronts
- Harsh working locations
- Multiple contractors with varied safety procedures/processes
- *2 Years since last LTI (March 2017)*



Current Progress Status (Generation)

MFG Budget and Schedule in Compliance with June 2017 Targets (AFE Rev 5)

	Substantial Completion	Risk Status
<p>Powerhouse and Spillway</p> <ul style="list-style-type: none"> • Spillway/Gates - 91% construction complete • Powerhouse - 91% construction complete 	On-Track	-Interface - Astaldi claim/follow-on claims
<p>Dams</p> <ul style="list-style-type: none"> • North Dam – Complete 		-Minimal
<p>Impoundment Preparation</p> <ul style="list-style-type: none"> • Tailrace/Upstream Water Passage – preparations ongoing • Rollways – 2 of 5 complete 	On-Track	-Timing -Stakeholder concerns

Progress Details (Generation) – February 2019

MFGen Progress Table 2019 February

This Reporting Period

	Weight Factor %	Period %			Cumulative %			
		Plan	Earned	Variance	Plan	Earned	Variance	Forecast (Next Period)
		B	C	C-B	E	F	F-E	G
MFG Access Rd/Accom	8.9%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	100.0%
MFG Reservoir Preparation	5.8%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	100.0%
MFG Spillway & Gates	12.2%	0.0%	0.0%	0.0%	100.0%	91.4%	-8.6%	91.4%
MFG North Spur Stabilization	3.9%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	100.0%
MFG North Dam (Incl Cofferdams/Trans Dam)	5.7%	0.0%	0.4%	0.4%	100.0%	100.0%	0.0%	100.0%
MFG Powerhouse & intake	61.3%	0.8%	0.9%	0.1%	90.8%	91.3%	0.5%	92.4%
MFG South Dam (incl South Trans Dam)	1.1%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	100.0%
MFG Misc	1.1%	0.0%	0.0%	0.0%	90.3%	89.0%	-1.3%	89.1%
MFGen TOTAL	100.0%	0.4%	0.6%	0.2%	94.2%	93.5%	-0.7%	94.2%

*Adjusted for Planned Delay to Rollway Construction

93.2% 93.5% 0.3%

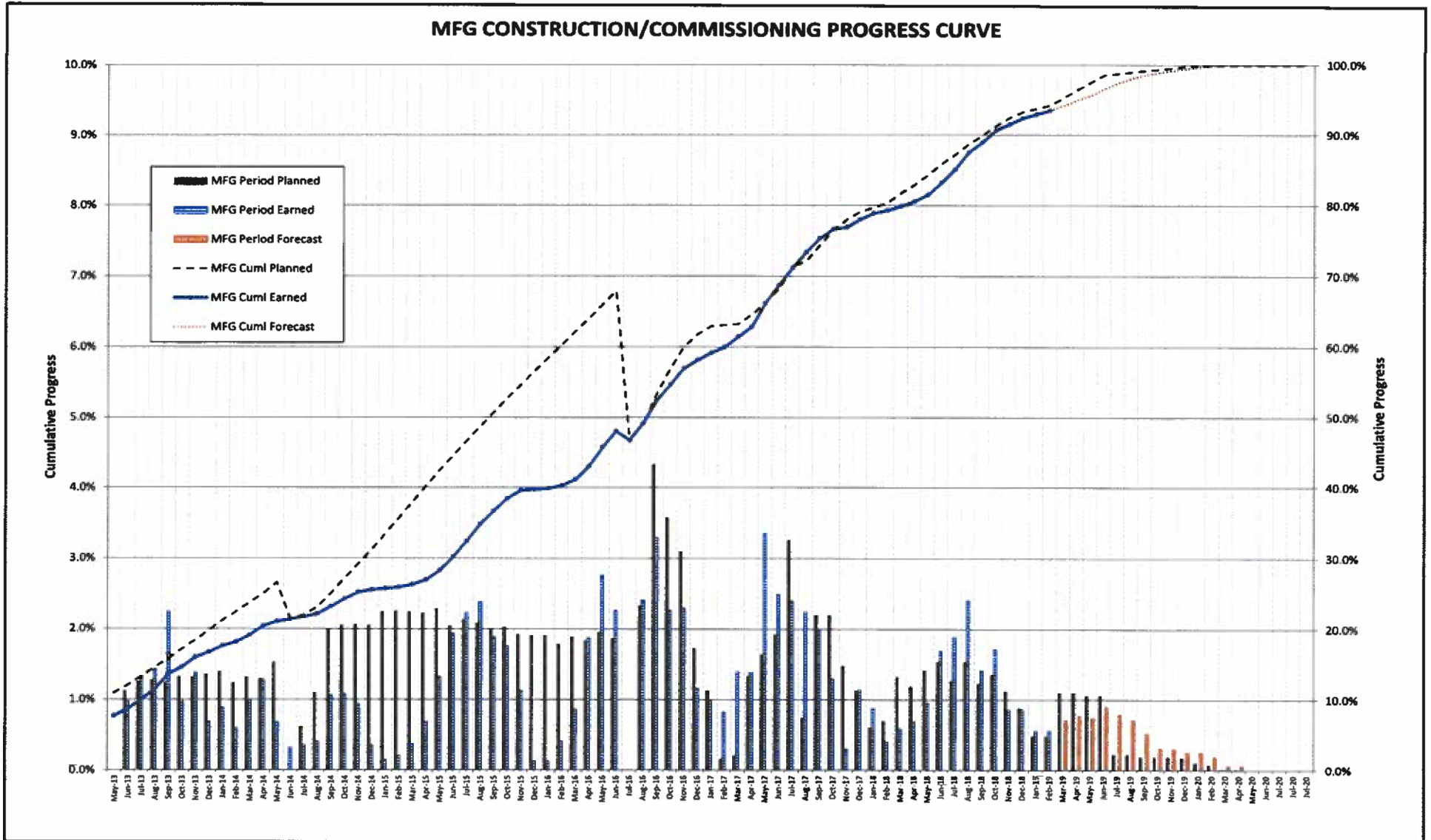
Last Reporting Period (January)

	Weight Factor %	Period %			Cumulative %		
		Plan	Earned	Variance	Plan ⁽¹⁾	Earned	Variance
		B	C	C-B	E	F	F-E
MFG Access Rd/Accom	8.9%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%
MFG Reservoir Preparation	5.8%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%
MFG Spillway & Gates	12.2%	0.0%	0.0%	0.0%	100.0%	91.4%	-8.6%
MFG North Spur Stabilization	3.9%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%
MFG North Dam (Incl Cofferdams/Trans Dam)	5.7%	0.0%	0.6%	0.6%	100.0%	99.6%	-0.4%
MFG Powerhouse & intake	61.3%	0.8%	0.9%	0.1%	90.0%	90.4%	0.4%
MFG South Dam (incl South Trans Dam)	1.1%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%
MFG Misc	1.1%	0.0%	0.0%	0.0%	90.3%	89.0%	-1.3%
MFGen TOTAL	100.0%	0.5%	0.5%	0.0%	93.8%	92.9%	-0.9%

*Adjusted for Planned Delay to Rollway Construction

92.8% 92.9% 0.1%

Progress Details (Generation) – February 2019



Schedule (Generation)

Power Development Summary Schedule Current Forecast (February 2019)

Activity	2010	2011	2012	2013	2014	2015	2016	2017				2018				2019				2020				Comments				
								Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4					
Spillway	Spillway											Rollways								Spillway Complete 2016, Rollways Complete November 2019								
Reservoir	Initial Impoundment EL.21.5m											EL. 25m				Impoundment EL.39m				Impoundment Complete August 2019								
Dams	North RCC Dam																			North RCC Dam Complete February 2019								
Powerhouse: Intake	Unit 1 Hydromechanical (draft tube gates)							Unit 1 Hydromechanical (intake)				All 4 Intakes Complete (intake & draft tube gates)				Prep of Intake Channel and Removal of Intake Cofferdam				Intake Channel Water Up				Civil Complete October 2018, Embedments Complete March 2019, Hydromechanical Complete March 2019 Intake Channel Water Up April 2019				
Powerhouse: Turbines & Generators	Unit 1 Embedded Parts & Structure							Unit 1 Pit Free				Unit 1 Installation of Turbine/Generator				Unit 1 Ready to Turn				Water Available				Unit 1 Dynamic Commissioning - Grid Synch. & Wet Test				Forecast in Compliance with AFE Rev 5 (P75) Planned Dates: Unit 1 Pit Free October 2018 Unit 1 Ready to Turn September 2019 1st Power (Grid Synch) October 2019 1st Commercial Power December 2019 Full Commercial Power July 2020

Legend:
 ◆ Current Forecast (February 2019)
 ◆ Planned Dates (June 2017 AFE Rev 5)

Update

Key Milestones 2019 – Status

CH0011 - Intake, Powerhouse, Transition Dams and Spillway - Remaining Construction

MILESTONE	TARGET	STATUS
CH0011 – Main Civil – PHCL:		
CH0011 Contractor Mobilized	Q1 '19	
Intake 2 Civil Scope Complete	Q1 '19	
Unit 2 Pit Free	Q1 '19	
Unit 3 Pit Free	Q2 '19	
Unit 4 Pit Free	Q3 '19	
Tailrace Rock Plug Removal Complete	Q3 '19	
Construction of Rollways, Bays 2, 3 & 4, Complete	Q4 '19	

- Full Contract (CH0011-002) awarded to Pennecon Heavy Civil in February.
- Intake 2 civil scope completed in March.
- Unit 2: U2 Pit Free achieved in February; now with Andritz.
- Units 3 and 4: Stage 7 concrete ongoing.
- Arbitration process ongoing with terminated CH0007-001 Contractor.





TAILRACE - February 25, 2019



DRAFT TUBE PROGRESS - February 25, 2019

Unit #1



Unit #2



DRAFT TUBE PROGRESS - February 25, 2019

Unit #3









Unit #4



Update

Key Milestones 2019 – Status

CH0009 - Construction of North and South Dams

MILESTONE	TARGET	STATUS
CH0009 – Dams – BPLP:		
North Dam Complete	Q1'19	
North Dam in Service	Q1'19	
Ready for Water-up of the Intake Channel	Q2'19	
Intake Cofferdam Removed	Q2'19	
Spillway Program Complete	Q2'19	
Contractor Demobilization Complete	Q3'19	

- All scope complete for the North Dam in February 2019; North Dam now in service.
- Spillway pressure relief holes scope complete in March.
- Ready for Intake water-up scope completed in March.
- Intake cofferdam removal (Phase 1) has commenced and nearing completion; with full removal (Phase 2) expected to be complete by end April.
- Demobilization of various work areas continuing.

Update

Key Milestones 2019 – Status

CH0030 - Supply and Install Turbines and Generators

MILESTONE	TARGET	STATUS
CH0030 – T/Gs – Andritz:		
Stator Bar Installation Complete - Unit 1	Q1'19	
Hub Installation Unit 1	Q1'19	
Stator Bar Installation Complete - Unit 2	Q2'19	
Hub Installation Unit 2	Q2'19	
Installation of Unit 1 Control System in Control Room	Q3'19	
Unit 1 - Ready to Turn	Q3'19	
Unit 2 - Ready to Turn	Q4'19	
Unit 1 Release for Service - Complete the Assets Transfer to Operations	Q4'19	

- Preservation work complete (with exception of minor touch-ups).
- Stator bar and protection and control panel FATS complete for Units 1 and 2; manufacturing ongoing for Units 3 and 4.
- Unit 1: Runner, rotor and head cover assembly ongoing; stator core stacking in progress; tower assembly commenced. Stator winding commenced in March.
- Unit 1 Hub installation is forecast for first week of April; no impact on critical path to First Power.
- Unit 1 Stator Bar Installation completion is forecast for end April; no impact on critical path to First Power
- Unit 2: Pit free achieved and U2 with Andritz; placement of pit machining equipment underway.
- Units 3 and 4: Handed over to CH0011 Contractor for Stage 7 concrete.

Update

Key Milestones 2019 – Status

CH0031 - Supply and Install Mechanical & Electrical Auxiliaries

MILESTONE	TARGET	STATUS
CH0031 – Balance of Plant:		
Control Room Ready for Equipment Installation	Q1'19	
Slack Span Installed	Q2'19	
Unit 1 315 kV Ready for Backfeed Energization	Q2'19	
Telecommunications Equipment Installed in Telecoms Room	Q2'19	
Systems to Support Ready to Turn Unit 1 Complete	Q3'19	
Systems to Support Ready to Turn Unit 2 Complete	Q4'19	

- Cable tray and supports installation ongoing.
- Lighting, battery installation at various powerhouse elevations ongoing.
- Drywall/stud, fireproofing, insulation for service water system, and plastering progressing.
- Installation of pipes and supports for various systems ongoing.
- Isolated phase bus (IPB) installation on Units 1 and 2 continued.
- Mechanical Completion and commissioning activities throughout Powerhouse ongoing.
- Priority given to Ready to Turn Milestone.
- Control room ready for equipment installation is pending completion of the control room floor leveling/finishing; expected by mid-April. No impact on critical path for First Power.
- Overall scope ~57% complete as of end February.

Update

Key Milestones 2019 – Status

CH0032 - Supply and Install Powerhouse Hydro-mechanical Equipment

MILESTONE	TARGET	STATUS
CH0032 – HydroMechanical – Andritz:		
Intake Water Tight	Q1 '19	
Delivery of 3 rd Set of Spillway Stoplogs	Q2 '19	
Install Stoplogs in Bay 2, 3 and 4 to Start Rollway Construction	Q3 '19	
Intake Trash Cleaning Machine Commissioned	Q3 '19	
Intake Complete - All Units	Q3 '19	
Spillway Struts Complete	Q3 '19	
Spillway Work Complete (Bays 2, 3 & 4)	Q4 '19	

- Secondary concrete complete, all Bays.
- Gates and hoists installed in all Bays.
- Intake hoist house electrical work in all Units (1-4) ongoing.
- Mechanical Completion, Static and Dynamic Commissioning activities ongoing at Intake Gates; commissioning substantially complete in Bays 1-8.
- Post-rollway Mechanical Completion and Static Commissioning activities in Bay 1 and Bay 5 complete.
- All physical scope completed for water tight; intake water-up expected to start 1st week of April.
- Spillway strut installation completed in March.

Update

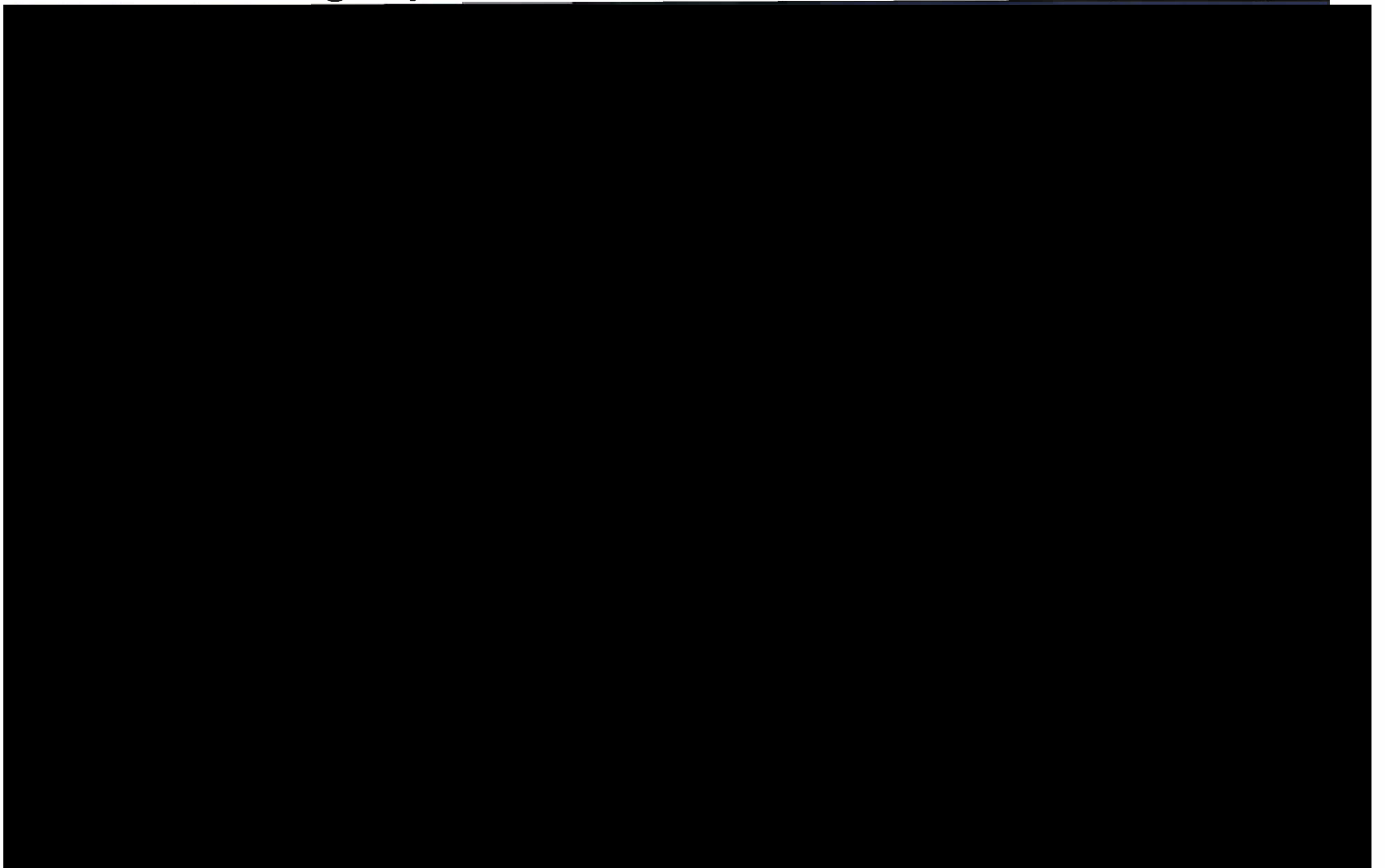
Key Milestones 2019 – Status

Powerhouse Readiness

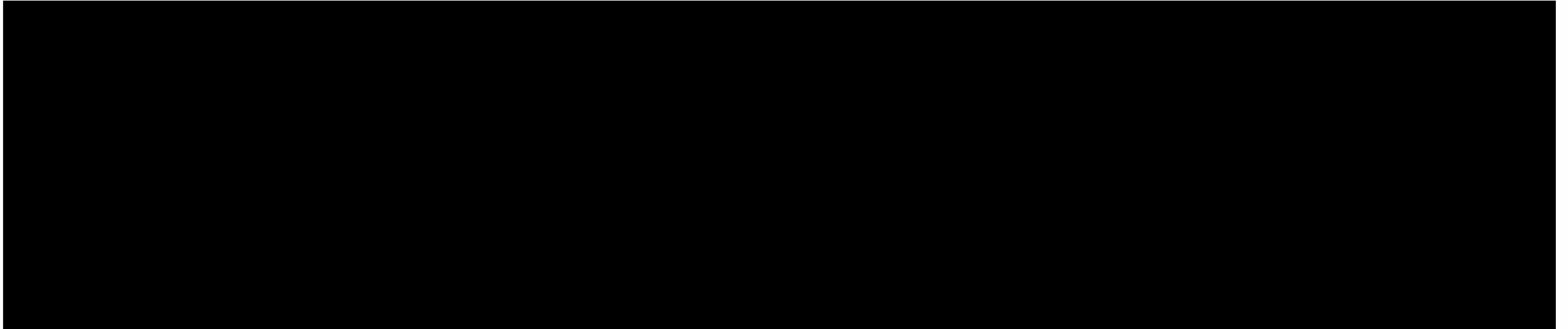
MILESTONE	TARGET	STATUS
River Operations:		
Ice Handling Program Finalized	Q1'19	
Debris Ice Safety Boom Inspection Complete	Q3'19	
Ready to Impound to Full Supply	Q3'19	
Post-Impoundment Debris Monitoring Program Implemented	Q3'19	
Long Term Monitoring and Dam Safety Program Complete	Q3'19	
Ready for 2019/2020 Ice Season Management	Q4'19	

- Ice Handling Program Finalized.
- Ice monitoring activities ongoing.

Cost Risk & Contingency Draw



Cost Risk & Contingency Draw



Notable Activities/Observations

- Preparing for Reservoir Impoundment:
 - Structure construction (North Dam, North Spur, South Dam) complete.
 - Temporary dewatering works (pumps) at North Spur de-activated.
 - All monitoring processes and instrumentation operational.
 - Water passage preparation underway in Intake.
 - Intake water up planned for April.
 - Intake cofferdam removal planned prior to Spring Freshet.
 - Impoundment scheduled for July 2019; timing limited by window established in DFO authorization.

Information Requests

- **North Spur Stabilization Works – Construction Report**
 - The report is effectively a record of the stabilization works as designed and as built. It includes a record of the progression of the stabilization works, and a synthesis of technical information related to the stabilization works and the foundations to be relied on during the operations phase of the overall project. Certain specific construction methods used during the works are also presented in this report.
 - Report provided to the Oversight Committee.

Information Requests

- **North Spur – Post Construction Assessment**

- The purpose of this report is to review the actual design conditions and parameters encountered in the field as compared to those for design to verify that the design of the stabilization measures is appropriate and the North Spur is fit for purpose
- The assessment has indicated that the stabilization works were carried out in accordance with the design; no changes to the conclusions of prior studies was found to be warranted; stability analyses indicate that the Factor of Safety for all stabilized slopes of the North Spur works are satisfactory; and the North Spur in its as-built configuration is therefore deemed to be fit-for-purpose.
- A sensitivity analysis completed for an area on the downstream of the North Spur indicates the potential for local instability if pore pressures exceed those expected in that area. The report recommended that piezometers be installed in this area to monitor conditions and to inform a decision as to whether further mitigation might be required in this area. The recommended piezometer installation has been completed.
- Other recommendations include monitoring equipment installations (much of which completed), monitoring and future inspections post impoundment.
- Report provided to the Oversight Committee.

Information Requests

- Meetings in St. John's and Visit to Soldiers Pond December 3-6, 2018 (*Independent Engineer Report, March 24, 2019*)
 - The scope of the report includes observations and findings on both Generation (Power development) and Transmission (power Supply) aspects of the overall Project. Furthermore, it includes commentary on a factory visit to Andritz facilities to witness powerhouse Protection & Controls equipment being built.
 - The contents of the report record nature of information exchanged, project team members involved in the visit and discussions held, and the IE's observations and opinions on design and execution elements of the progress reviewed during the visit.
 - Recommendations related to protection and controls configuration are being reviewed and a response will be provided to the IE and OC.
 - Report provided to the Oversight Committee.

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

Memo at Request of Oversight Committee: Cumulative Incurred Variance to February 2019 |

Note: Current planned monthly incurred was set in June 2017 at the time of the last AFE update.

