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**Subject:** Pre read for coming week  
**Date:** Sunday, January 31, 2016 5:26:47 PM  
**Attachments:** [Report Section 2 - Selected Contract Reviews - DRAFT V1.0.pdf](#)

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David, Mike,

I'm attaching a document which reflect the status of our work and so might be a helpful pre-read before joining us next week.

Last week we held detailed meetings on all of the major contracts we selected for analysis. So this document is a first draft of our analysis for each of these contracts, the 'so what' of which is our assessment of the cost and schedule risk in each case (this will form one section of a final detailed report). This individual contract view then needs to be integrated at a component and programme level in terms of cost and schedule risk.

The contents of this document will form the basis of any findings or identification of key issues which we want to use for 3<sup>rd</sup> Feb.

Safe flight and see you Monday

Tim

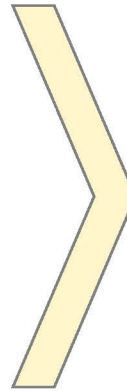
# Draft Contract Level Review

CIMFP Exhibit P-03433

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## Contract Summary

VENDOR	PO/CONTRACT TITLE	Asset	FINAL FORECAST COST	% of Project
CH0008	Gilbert North Spur Stabilization Works	MFG	\$143 M	2%
CT0319	Valard Construction of HVac TL	MFG/LTA	\$285 M	4%
CT0327	Valard Construction of HVdc TL	LIL	\$892 M	12%

# CH0030: Andritz – Supply and Install Turbines and Generators

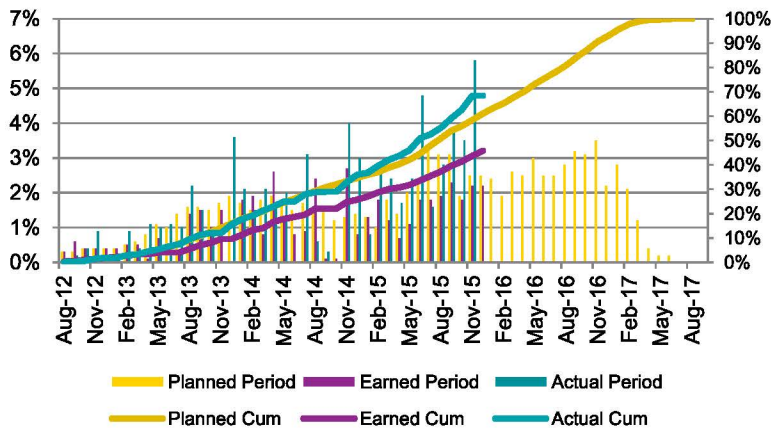


## Key Data Summary

<b>Scope</b>	The design, supply, install and commissioning of the four turbine generator units
<b>Contract Type</b>	100% EPC Lump sum
<b>LD Status</b>	Max 20% of contract price for not achieving progress milestones (plus other performance LD's)

<b>DG3 Budget</b>	205.3 Million
<b>AFE2 Budget</b>	[REDACTED]
<b>Current Forecast</b>	[REDACTED]
<b>Expended to Date</b>	97.0 Million
<b>Planned Progress to Date (Physical)</b>	61%
<b>Actual Progress to Date</b>	46%

## Contract Earned Value



## Progress to Date & Status

	Actual	Planned
<b>Engineering</b>	97.4%	100%
<b>Procurement</b>	93.5%	100%
<b>Manufacturing</b>	61.0%	84%
<b>Logistics</b>	25.1%	26.0%
<b>Installation</b>	0%	TBA
<b>Commissioning</b>	0%	TBA

- Installation was originally planned to begin in May 2015, however this has been delayed due to Astaldi not having progressed enough to provide a work area
- Currently equipment continues to be delivered to site, however Andritz are unable to commence installation works
- Andritz do not have a confirmed mobilisation date for installation. They have assumed, and are reporting a likely 8 month delay to mobilisation, though this will change once resolution to the Astaldi negotiations has occurred
- **Key Predecessors for Installation** – 1) Powerhouse service bay work area is complete, 2) Completion of 'balance of plant' manufacturing
- **Key Successors** – Commissioning / Ready for Operations activities

## Performance

- There has been an ongoing performance issue for this contract, and most pre-installation activities are tracking late
- Because of the delays associated with Astaldi in gaining access to the installation area, there is no commercial incentive for Nalcor to drive an acceleration to offset this progress while this issue is unresolved
- Management effort has focused on maintaining quality assurance (which is reported as high) rather than speeding up progress
- Manufacturing focus is shifting to the 'Balance of Plant' (BOP)



# CH0030: Andritz – Supply and Install Turbines and Generators

2. Forecast to Complete

CIMFP Exhibit P-03433

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	Contract	Project Materiality
Cost Risk	L	L
Schedule Risk	M	H

## Key Activity Milestones

Milestones	Contract Dates	Current Forecast*	Variance
Commencement of Work	TBA	TBA	
Commencement of Installation	TBA	TBA	
Unit 1 Ready to Turn	18 <sup>th</sup> Feb 2017	20 <sup>th</sup> Oct 2017	-244 Days
Unit 2 Ready to Turn	11 <sup>th</sup> May 2017	10 <sup>th</sup> Jan 2018	-244 Days
Unit 3 Ready to Turn	6 <sup>th</sup> July 2017	7 <sup>th</sup> Mar 2018	-244 Days
Unit 4 Ready to Turn	21 <sup>st</sup> Sept 2017	23 <sup>rd</sup> May 2018	-244 Days
Unit 1 Commercial Power	10 <sup>th</sup> Aug 2017	11 <sup>th</sup> April 2018	-244 Days
Unit 2 Commercial Power	10 <sup>th</sup> Oct 2017	11 <sup>th</sup> June 2018	-244 Days
Unit 3 Commercial Power	10 <sup>th</sup> Dec 2017	11 <sup>th</sup> Aug 2018	-244 Days
Unit 4 Commercial Power	10 <sup>th</sup> Feb 2018	12 <sup>th</sup> Oct 2018	-244 Days

\*Based on 8 month delay modelled by Andritz in their Dec Monthly repor, (not agreed / finalised with Nalcor) Will be confirmed when Asaldii discussions completed.

## Forecast to Complete

- The original agreed schedule baseline has been agreed as non-representative for the installation component.
- Andritz are continuing to supply equipment to the site area in anticipation of being advised a mobilisation date (Andritz are responsible for their storage)
- Prior to being advised a mobilisation date, a forecast completion date cannot be confirmed, and thus an interrogation of cost and schedule cannot be performed
- Andritz have advised their earliest mobilisation to site date will be 90 days post being advised by Nalcor

## Key Forward Risks and Issues

### Cost Risk

- Costs associated with delays in progress of engineering and procurement are incurred by the contractor due to the fixed price contract structure.
- The submitted change requests affecting cost focus on storage related matters for equipment arriving on site (~1.8M), and for a collective labour agreement claim (~4.4M)
- Andritz are expected to make an EOT claim related to the delayed site access.
- Only ~20% (~ \$25M) of the overall cost relates to installation and associated activities, and ~80% relates to the supply of materials.

### Schedule Risk

- **This package will be delayed in starting installation and completion milestones. Completion will be on the critical path**
- Further clarity on this can only be resolved once there is confirmation of a revised Astaldi plan

### Other

- Liquidated damages dates will be reset with the revised installation dates
- Readiness for mobilisation will be a key issue for successful delivery. Labour for CH0032 will likely feed into CH0030 which will assist with this
- Although there has been underperformance to date, this has been with pre-installation activities, and is not necessarily an indicator of likely installation performance



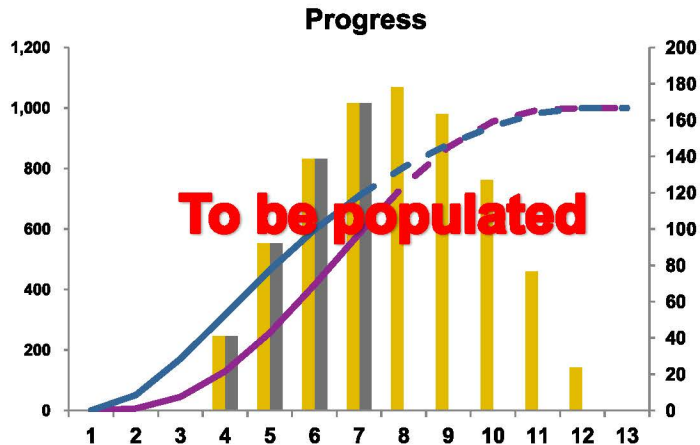
# CH0032: Andritz – Supply and Install of Powerhouse Hydro-Mechanical Equipment



## Key Data Summary

<b>Scope</b>	Design, supply, install and commission of hydromechanical equipment for; 1. Powerhouse 2. Spillway
<b>Contract Type</b>	100% EPC Lump sum
<b>LD Status</b>	Max 10% of contract price for not achieving progress milestones

<b>DG3 Budget</b>	104.2 Million
<b>AFE2 Budget</b>	[REDACTED]
<b>Current Forecast</b>	[REDACTED]
<b>Expended to Date</b>	86.4 Million
<b>Planned Progress to Date (Physical)</b>	60%
<b>Actual Progress to Date</b>	37%



## Progress to Date & Status

	<b>Actual</b>	<b>Planned</b>
<b>Engineering</b>	92.1%	100%
<b>Procurement</b>	93.6%	100%
<b>Manufacturing</b>	65.3%	77.4%
<b>Logistics</b>	4.2%	56.3%
<b>Installation</b>	0.7%	36.0%
<b>Commissioning</b>	0.0%	11.3%

- Similar to CH0030, access to work areas has been delayed due to lack of progress in the Ansaldo contract. Access is now available however.
- Initially the Spillway scope was due to start in May 2015 and finish in Feb 2015, however this was forecast to be delayed until Oct 2016. This scope of work is a predecessor to the river diversion milestone
- In October 2015 Nalcor executed an acceleration instruction for the portion of the Spillway scope that is needed for the river diversion, which included an additional payment (3.3M) and a bonus (2M)
- **Key Predecessors**– None (previously workfront access)
- **Key Successors** – River Diversion milestone (for the accelerated portion of the spillway), currently scheduled for 15<sup>th</sup> June 2016. Banard Pennecons work also dependant on the completion of these works

## Performance

- There was a consistent shortfall in progress across engineering, procurement and construction for each of the two scopes to date
- Because materials are not needed on site (due to delayed access), they have not been shipped to Muskrat Falls according to planned schedule. Manufacturing is done within the region (as opposed to CH0030 which is international)



# CH0032: Andritz – Supply and Install of Powerhouse Hydro-Mechanical Equipment

2. Forecast to Complete

CIMFP Exhibit P-03433

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	Contract	Project Materiality
Cost Risk	L	L
Schedule Risk	H	M

## Selected Key Milestones

Milestones	Contract Dates	Forecast Dates
<b>Spillway</b>		
All rollway Hydro-Mechanical primary embedded parts delivered to site	29 <sup>th</sup> Jan 2016	<b>Not currently being provided by Andritz</b>
All hydromechanical and electrical systems ready for river diversion	13 <sup>th</sup> Feb 2016	
Bay 1 stoplogs removed and ready for operation	25 <sup>th</sup> April 2016	
Bay 2 & 4 stoplogs removed and ready for operation	29 <sup>th</sup> April 2018	
Bay 3 & 5 stoplogs removed and ready for operation	1 <sup>st</sup> Nov 2017	
<b>Powerhouse</b>		
Draft Tube units delivered to site	5 <sup>th</sup> Aug 2014	
Hydro-Mechanical Primary embedded parts delivered to site	25 <sup>th</sup> July 2014	
All draft tube hydro-mechanical work complete, stoplogs installed, buklheads installed, and ready for water up to tailrace channel	9 <sup>th</sup> July 2016	
Substantial Completion	14 <sup>th</sup> May 2018	

## Forecast to Complete

- Astaldi has produced a preliminary plan for the 15<sup>th</sup> June
- A major variation has been raised to incentivise the acceleration plan to meet the river diversion plan. A provision of \$3.3M has been agreed and allowed for in the forecast as an incentive payment for achieving the 4<sup>th</sup> June date. Additionally there is a 2M bonus provisioned for when completing the scope by the due date
- The other spillway works and powerhouse works are currently expected to be completed in November 2016, though a comprehensive forecast has not been approved

## Identification of Key Risks and Issues

### Cost Risk

- As in CH0030, costs associated with delays in progress of engineering and procurement are incurred by the contractor due to the fixed price contract structure
- The value of change orders to date is \$23.9M. Aside from the Acceleration forecast 3.3M cost, the only other significant change order is \$20M for additional concrete works. This is additional scope to the contract, but existing project scope and thus provisioned for the forecast

### Schedule Risk

- The execution plan to achieve the accelerated target, which involves nightshift and additional resources within the existing work area, is still being reviewed and approved. Andritz have voiced concerns around loss of productivity with this plan
- If the acceleration plan did not hit its target, the contractor may re-optimies for cost over shedule, and this would have a significant impact on the river diversion mileston and subsequent activities
- This is andritz's first on-site works, and there will be very little scope for underperformance / slow ramp up to mee the target June milestone

### Other

- None



# CH0007: Astaldi – Construction of Intake & Powerhouse, Spillway and Transition Dams



## Key Data Summary

<b>Scope</b>	Civil construction of five discrete scope areas; South Dam, Intake, Powehouse, Transition Dam, Spillway, North Dam
<b>Contract Type</b>	Unit Cost for Concrete
<b>LD Status</b>	Labour is Cost Reimbursable subject to a cap (LMAX) N/A

<b>DG3 Budget</b>	751.9 Million
<b>AFE2 Budget</b>	[REDACTED]
<b>Expended to Date</b>	697.6 Million
<b>Planned Progress to Date (Physical)</b>	54%
<b>Actual Progress to Date</b>	TBA

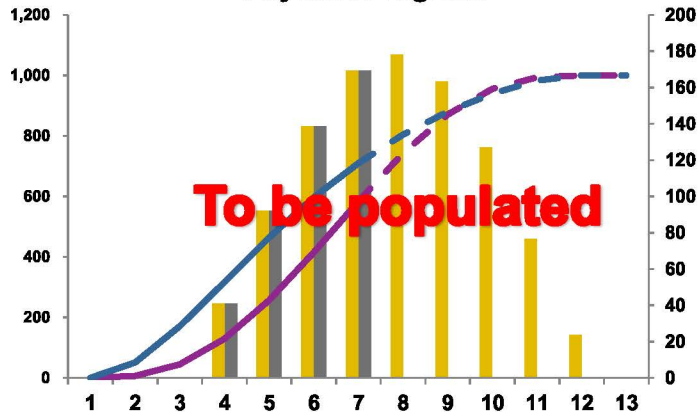
## Progress to Date & Status

- Astaldi employees approximately 1500 site workers at Muskrat Falls, which is XXX% percent of the total site manning in Dec 15, making it by far the largest contract in terms of both share of total CAPEX expenditure, and in on site labour
- Of the 471,926 m3 concrete to be poured, 153,572 m3 has been placed to date, (32.5%) (**Nov 15 Report**)
- Nalcor advised that the current actual progress measures are so divergent from the planned measures that comparisons are not reported as they are not representative
- The ICS cover is currently in the process of being removed
- **Key Predecessors** – There are no constraints to finish
- **Key Successors** – There are multiple scope s that are dependant on the progress of this package for CH0030 & CH0032 (Andritz), CD0501 (Alstom),

## Performance

- Issues driving poor performance have been;
- Lack of Astaldi management team involvement
- Not having a site batch plant
- Lack of skilled workforce (competitive labour market during early project works)
- Considerable management effort has been invested in improving the rate of progress for Astaldi. Nalcor believe this has been successful and focus will now shift to improving the productivity and efficiency of the contract
- Production has recently peaked at 24,800m3 per month in November 2015 (vs planned peak?)
- They are currently meeting their short term production forecasts

**Physical Progress**



# CH0007: Astaldi – Construction of Intake & Powerhouse, Spillway and Transition Dams

2. Forecast to Complete

CIMFP Exhibit P-03433

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	Contract	Project Materiality
Cost Risk	H	H
Schedule Risk	H	H

## Key Activity Milestones

Milestones	Contract Dates	Current Forecast*
<b>TBC / Forecast not available</b>		

## M3 Concrete Pouring Summary

Area	Total to Be Done	Completed m3	% Complete
North Trans Dam	9,200	8,720	95%
Centre Trans Dam	29,815	23,268	78%
South Trans Dam	9,835	3,144	32%
Sep. Wall	10,980	10,758	98%
Spillway (S/P/B)	49,226	48,122	98%
Spillway (R/D/R)	29,709	1,177	4%
Intake	147,951	21,324	14%
Powerhouse	167,347	31,829	19%
Other	23,813	5,230	22%
<b>Total</b>	<b>471,926</b>	<b>153,572</b>	<b>33%</b>

## Forecast to Complete

- A revised baseline proposed by Astaldi has not been accepted by Nalcor
- Astaldi are no longer reporting progress and forecast curves in their monthly report

## Key Forward Risks and Issues

### Cost Risk

- There is a large cost risk associated with the current re-negotiation that is not currently reflected in the current forecast
- Change requests to date are in the order of 50M, the largest being for a contractually agreed compensation payment for not being awarded further works (42M). Additionally there was a new washcar facility built for Astaldi (XXXM). Other changes are relatively small

### Schedule Risk

- Originally forecast to have a 3year duration, but now forecast for a 4 year duration.
- An earlier rebaseline exercise in late 2015 was not effective and the contractor immediately fell behind the revised baseline
- A significant risk is that the works going forward are of increased complexity compared to works to date. Additional works still outstanding are in a smaller footprint, involve more sequencing and have greater interdependencies

### Other

- In Nalcor's view, several major issues associated with underperformance, and future performance risk have been resolved. Significant management effort has gone into developing appropriate supervision, providing sufficient aggregates material and ensuring capacity and quality of their batchplants
- The negotiations with Astaldi have been ongoing for over one year, there is a risk this will not be resolved quickly
- There is an enduring risk that the revised work plan associated with the completed commercial negotiation fails in terms of its ability to improve or effectively forecast progress
- There is an enduring risk that the commercial negotiation does not succeed in ensuring the financial viability of the contractor, and their may be another renegotiation





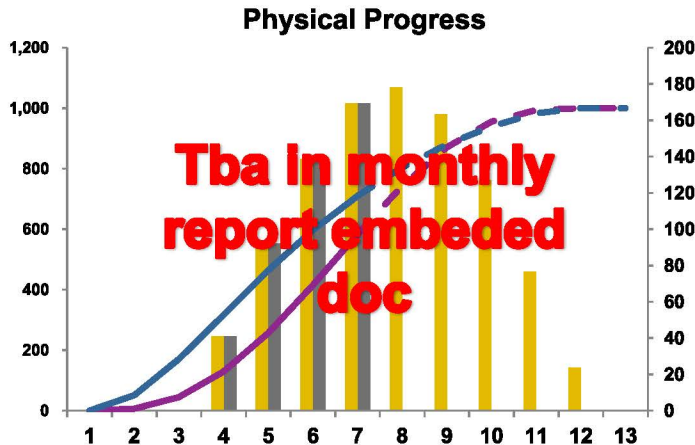
# CD0501: Alstom – Supply and Install Converters & Transition Compounds Project



## Key Data Summary

<b>Scope</b>	The contract scope is for the design, supply, install and commissioning of two (2) HVdc Converter Stations; one at Muskrat Falls and one at Soldiers Pond and two (2) Transition compounds; one at Forteau Point and one at Shoal Cove
<b>Contract Type</b>	EPC Lump Sum w/ Cost. Reimbursable Dynamic Commissioning
<b>LD Status</b>	\$/day up to 15% Schedule; 10% Performance; 20% Max. Agr.

DG3 Budget	
AFE2 Budget	
Current Forecast	
Expended to Date	89,475,117
Planned Progress to Date (Physical)	48.5%
Actual Progress to Date	23.6%



## Progress to Date & Status

	Planned	Actual
<b>Engineering</b>	91.2%	59.5%
<b>Procurement</b>	57%	28%
<b>Construction</b>	23.7%	7.8%

- A Workshop to review Procurement progress and implement a recovery plan is scheduled for Feb 10 & 11, 2016
- Nalcor executed a LNTP on the transformers as they were a schedule long-lead item.
- **Key Predecessors** – Dynamic Commissioning cannot commence until completion of Dynamic Commissioning of Substations (CD0502), Synchronous Condensers (CD0534) and the HVdc (CD0327) are completed.
- **Key Successors** – LITL Sub-Project Milestone Target – 1<sup>st</sup> Power Transfer from NFLD to Labrador is currently dependant upon completion of scope.

## Performance

- There has been an ongoing issue around the rate of schedule progress for this contract. Overall SPI has been tracking at **0.5**, mainly due to late engineering and procurement. The contract is materially behind against their baseline plan and tracking towards schedule LDs.
- Procurement Forecast is representing a plan of approximately **8%** per month starting in Jan 26, 2016. Past Procurement performance of earned progress is less than **1.5%** per month.
- Nalcor management indicated that early engineering was under resourced and undermanaged leading to initial schedule delays.

## Civil Works

<b>Scope</b>	The Civil Works component of CD0501 and CD0502 is being executed under a separate contract (CD0504) by subcontractors under the direct management of Alstom. Management of the Civil subcontractors is included in CD0501 and CD0502 respectively.
<b>Contract Value</b>	\$187 Million. (Approximately \$102 Million has been committed, with \$87 Million to be awarded).



# CD0501: Alstom – Supply and Install Converters & Transition Compounds Project

2. Forecast to Complete

CIMFP Exhibit P-03433

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	Contract	Project Materiality
Cost Risk	L	L
Schedule Risk	H	M

## Key Activity Milestones

Milestones	Contract Dates	Current Forecast*	Variance
Static Commissioning Completed (Soldiers Pond)	June 15, 2017	Aug 10, 2017	-56
Static Commissioning Completed (Muskrat Falls)	June 15, 2017	Aug 18, 2017	-64
Dynamic Commissioning Completed	Aug 15, 2017	Oct 19, 2017	-65
Contractor Substantial Completion	Nov 15, 2017	Jan 25, 2018	-71

\*Based on Current Forecast from Alstom Dec 2015 Monthly Report ("Review Incomplete")

## Forecast to Complete

- The contractor has represented schedule slippage and indicated dates post contract dates in monthly reporting.
- Majority of the schedule slipping can be attributed to engineering and procurement performance, some can be attributed to the Technical Changes.
- Sequence of Commissioning requires Dynamic Commissioning of Switchyards, followed by Synchronous Condensers, followed by Convertors. Delays in upstream milestones impact forecast timeline.

## Key Forward Risks and Issues

### Schedule Risk

- Schedule risk is significant for this contract package due to existing progress and current productivity, which could affect the critical path for Component 3 and the LITL Sub-Project Target Milestone – 1<sup>st</sup> Power Transfer Labrador to NFDL – Sept 9, 2017, but it is not expected to affect the critical path for the Project.
- Engineering, Procurement and Construction progress relative to the baseline has shifted overall contract completion dates past contractual milestones. Although mitigation plans are being implemented, forecasted progress earn rate moving forward is well above industry standard. For example, construction is currently showing a future forecast plan to earn 10% month in the Winter 2016. Based on current progress in Fall of 2015 of approximately 2.5% per month, this is unlikely. A paradigm shift in earned progress per period would be required to maintain schedule. Nalcor management hopes to address these forecasts in their February 2016 workshop. There is a material risk of not rectifying the existing negative float in the scope and it flowing through to construction.

### Cost Risk

- Technical changes required to the Harmonic Impedance Sectors and AC Filters been allocated and approved in a \$5M allowance Change Order. However, cost and schedule effects have not been fully determined and any outstanding value over the allowance has not been identified in pending changes to the FFC.
- The contract provides for liquidated damages in the order of 10% for Performance and 15% for Schedule with a 20% max aggregate. Based on current performance, contract dates are not forecasted to be achievable and LD is likely.

### Other

- Approximately \$100million of the Civil Works Scope associated CD0501 and CD0502 has been awarded to contractors who are executing the work under the management of Alstom. A future \$87million of Civil Works Scope related to building services and other Civil Works is required to still be awarded. Although the cost is capped at \$180million total, the timely award and execution of this scope may influence execution and interfaces with the CD0501 and CD0502 scope.

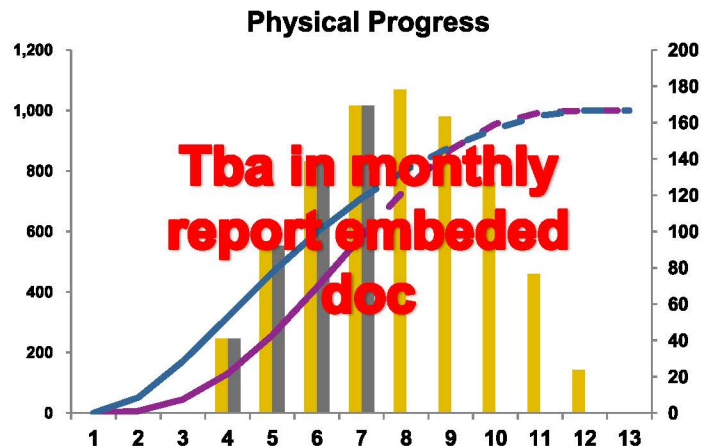


# CD0502: Alstom – Supply and Installation of Substations (Switchyard)

## Key Data Summary

<b>Scope</b>	The contract scope is for the design, supply, install and commissioning of three (3) new Substations; one at Muskrat Falls, one at Soldiers Pond, one at Churchill Falls and one (1) Substation Extension at the existing Churchill Falls substation.
<b>Contract Type</b>	100% EPC Lump sum
<b>LD Status</b>	\$/day up to Max 15% Schedule

DG3 Budget	
AFE2 Budget	██████████
Current Forecast	██████████
Expended to Date	65,796, 196
Planned Progress to Date (Physical)	63.11%
Actual Progress to Date	38.04%



## Progress to Date & Status

	Planned	Actual
<b>Engineering</b>	91.65%	60.56%
<b>Procurement</b>	75.42%	44.14%
<b>Construction</b>	52.74%	28.58%

- Civil Works associated with the Switchyards are approximately **60%** completed at each site.
- A Workshop to review Procurement progress and implement a recovery plan is scheduled for Feb 10 & 11, 2016
- **Key Predecessors** – Civil Works (managed by Alstom)
- **Key Successors** – Dynamic Commissioning of the Synchronous Condensers (CD0534) cannot be commenced until completion of Dynamic Commissioning of the Substations is completed.

## Performance

- There has been an ongoing issue around the rate of schedule progress for this contract. The contractor is materially behind against their baseline plan, tracking towards schedule performance LDs. Overall SPI has been tracking at approximately 0.6, equally across engineering, procurement and construction
- Corrective actions have been implemented to rectify previous late engineering progress resulting in recent performance gains. Primary engineering and Civil Works engineering progressing positively while Secondary engineering continues to lag behind recovery plans.
- Procurement progress reporting appears lumpy indicative of inaccurate reporting.

## Civil Works

<b>Scope</b>	The Civil Works component of CD0501 and CD0502 is being executed under a separate contract (CD0504) by subcontractors under the direct management of Alstom. Management of the Civil subcontractors is included in CD0501 and CD0502 respectively.
<b>Contract Value</b>	\$187 Million. (Approximately \$102 Million has been committed, with \$87 Million to be awarded).



# CD0502: Alstom – Supply and Installation of Substations (Switchyard)

2. Forecast to Complete

CIMFP Exhibit P-03433

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	Contract	Project Materiality
Cost Risk	L	L
Schedule Risk	M	M

## Key Activity Milestones

Milestones	Contract Dates	Current Forecast*	Variance
Static Commissioning Completed (Soldier Pond)	Dec 1, 2016	Nov 29, 2016	+2
Dynamic Commissioning Completed (Soldier Pond)	Dec 15, 2016	Jan 13, 2017	-29
Static Commissioning Completed (Muskrat Falls & Churchill Falls)	Mar 1, 2017	Mar 1, 2017	0
Dynamic Commissioning Completed (Muskrat Falls & Churchill Falls)	May 1, 2017	May 1, 2017	0
Contractor Substantial Completion	Nov 15, 2017	Jan 25, 2018	-71

## Forecast to Complete

- Switchyard at Soldiers Pond is priority due to follow-on construction, specifically the installation of the Synchronous Condensers.
- Despite current delays to due late mobilization, performance, etc. forecast commissioning dates are currently being maintained in the schedule .

## Key Forward Risks and Issues

### Schedule Risk

- Schedule risk against contract dates is significant for this package , but due to significant float in completion there is limited material risk of follow on affect to the component and/or program schedules .
- Contractor has adjusted forecast in highest risk contract dates (Soldiers Pond) to align with Contract Dates with no appreciable change to SPI.
- Procurement forecast progress plan is a material step change from past performance. No measurable or material changes have been implemented to justify aggressive forecast at this time.

### Cost Risk

- Due to the contract structure and current status, there is limited cost risk exposure.
- The contract provides for liquidated damages on a daily basis up to a maximum of 15% for missed Static Commissioning completion milestone dates. Although the forecast is showing the dates as achievable, based on current performance, contract dates are at risk to be affected by LD's.

### Other

- Approximately \$100million of the Civil Works Scope associated CD0501 and CD0502 has been awarded to contractors who are executing the work under the management of Alstom. A future \$80million of Civil Works Scope related to building services and other Civil Works is required to still be awarded. Although the cost is capped at \$180million total, the timely award and execution of this scope may influence execution and interfaces with the CD0501 and CD0502 scope.



# CD0534: Alstom – Supply & Installation of Synchronous Condensers at Soldiers Pond



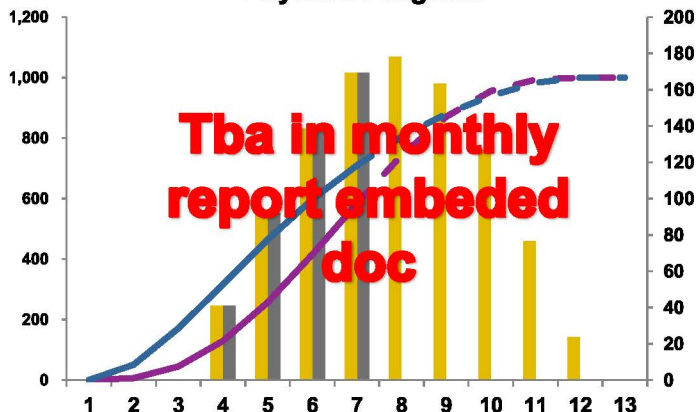
## Key Data Summary

<b>Scope</b>	The contract scope is for the design, supply, install and commissioning of three (3) Synchronous Condensers at Soldiers Pond
<b>Contract Type</b>	100% EPC Lump sum
<b>LD Status</b>	\$/day up to 10% Schedule; 15% Performance; 20% Max. Agr.

DG3 Budget	
AFE2 Budget	
Current Forecast	
Expended to Date	\$58,337,557
Planned Progress to Date (Physical)	62.6%
Actual Progress to Date	30.6%

\*FFC includes approx \$20M Civil Works budget allocated to HG O'Connell

### Physical Progress



## Progress to Date & Status

	Planned	Actual
<b>Engineering</b>	98.7%	81.9%
<b>Procurement</b>	74.2%	35.2%
<b>Construction</b>	48.4%	16.4%

- Contractor is working with suppliers to develop optimized delivery schedules for key equipment to address procurement progress.
- A Workshop , with a primary focus on the development of a revamped construction progress and forecast plan is scheduled for the week of Feb 8, 2017
- **Key Predecessors** – Dynamic Commissioning cannot commence until completion of Dynamic Commissioning of Substations.
- **Key Successors** – Dynamic Commissioning of the Converter & Transition Stations (CD0501) and the HVdc Line (CD0327).

## Performance

- Overall schedule performance continues to trend at approximately 0.5 (need trend development).
- Schedule performance of procurement and construction are trending flat or lower, despite awareness of key critical issues and early recovery attempts.
- Management effort has focused on maintaining quality assurance which has led to holds on key manufacture items, affecting the procurement progress.



# CD0534: Alstom – Supply & Installation of Synchronous Condensers at Soldiers Pond

2. Forecast to Complete

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	Contract	Project Materiality
Cost Risk	L	L
Schedule Risk	M	M

## Key Activity Milestones

Milestones	Original Contract Dates	Revised Contract Dates*	Current Forecast	Variance
Unit 1 - Static Commissioning Completed	Apr 5, 2017	Apr 26, 2017	May 11, 2017	-15
Unit 1 – Dynamic Commissioning Completed	June 15, 2017	TBD	June 29, 2017	
Unit 2 - Static Commissioning Completed	Apr 5, 2017	Apr 26, 2017	Jun 3, 2017	-38
Unit 2 - Dynamic Commissioning Completed	June 15, 2017	TBD	July 15, 2017	
Unit 3 – Static Commissioning Completed	May 5, 2017	June 5, 2017	June 29, 2017	-24
Unit 3 - Dynamic Commissioning Completed	July 15, 2017	TBD	Aug 1, 2017	

\*Revised Contract Dates shift has been agreed due to by Company (but not published):

- a) Construction issues with Piling contractor delaying early civil works
- b) Stator Frame PO Issuance (due to lack of QA procedures)

## Forecast to Complete

- A shift in the contract dates has been agreed due to the upstream construction issues associated with piling (performed by a separate contractor) affecting mobilization of early Civil Works and procurement hold on the fabrication of the Stator Frames.

## Key Forward Risks and Issues

### Schedule Risk

- Schedule risk for this package mainly due to the anticipated delay in delivery date of the Stator Frame Units. All three units are currently forecasting past revised contract dates. This contract is a predecessor for Dynamic Commissioning of the Converter Stations and further slippage of the first two Units may delay downstream activities. Visibility to the Float Watch will be required to maintain the critical path for Component 3 and the LITL Sub-Project Target Milestone – 1<sup>st</sup> Power Transfer Labrador to NFLD – Sept 9, 2017
- Mitigation efforts to continue to be implemented to manage delays originating from the procurement and fabrication hold on the Stator Frames.
- Procurement schedule performance continues to track to an **SPI < 0.5**, with recent flat-lining of procurement progress. Although, key mitigations including prioritization of critical path PO's and splitting of PO's to expedite components are implemented, forecasted progress will require review vs. past performance. Continued efforts to optimize the procurement schedule are ongoing via planned workshops and procurement expediting. Schedule for Stator Units 2 and 3 have been optimized, with priority Unit 1 still outstanding. It is difficult to envision that all causes of past performance will be corrected by a workshop.
- Construction data indicates reporting discrepancies. Revamping to progress curves to develop accurate assessment of current progress will be required. Nalcor has indicated concerns with respect to contractor underreporting site construction progress.

### Cost Risk

- The contract provides for liquidated damages in the order of 15% for Performance and 10% for Schedule (\$100K/day) with a 20% max aggregate. Based on current performance, revise contract dates are in jeopardy.
- Nalcor management indicated that cost risks regarding the delay to the later mobilization determined to be caused by early (non-contract) Civil works have been captured in the forecast.

### Other

- Contractor has noted delays due to late mobilization approvals and procurement holds for Stator fabrication. Nalcor held contractor mobilization due to readiness and believes to have a strong position to defend any potential claims.



# CH0008: Gilbert – North Spur Stabilization Works



## Key Data Summary

<b>Scope</b>	The scope of work consists of overburden excavation, embankment construction, construction of two cement-bentonite cut-off walls, permanent access roads and related works and instrumentation
<b>Contract Type</b>	Reimbursable with Fixed Price Components, Fees, Performance Savings & Bonus. See table below.
<b>LD Status</b>	None

Reimbursable Component	\$123.5 Million
Lump Sum Component (Indirects)	\$8.2 Million
Lump Sum Component (Subcontracts)	\$17.8 Million
Fee Component	\$12 Million
<b>Estimated Cost for Scope</b>	<b>\$161.5 Million</b>
Project Costs Savings in Performance	(\$27.3 Million)
Bonus	\$7.975 Million
<b>Final Contract Value</b>	<b>\$142.1 Million</b>

DG3 Budget	
AFE2 Budget	143.4 Million
Current Forecast	143.6 Million
Expended to Date	74.8 Million
Planned Progress to Date (Physical)	39.2%
Actual Progress to Date	43.6%

## Progress to Date & Status

Key Metrics	Planned	Actual
<b>Upstream Embankments</b>	65.4%	56.6%
<b>Upstream CB Cut-Off Wall</b>	100%	100%
<b>Downstream Embankments</b>	20.6%	40.5%
<b>Northwest CB Cut-Off Wall</b>	9.8%	15.6%
<b>Site Clearing</b>	100%	100%

- Completed Upstream Cut-Off Wall.
- Completed Site Clearing
- Upstream embankments are tracking slightly behind schedule (-8.8%) due to early commencement of the excavation for the Northwest Cement Bentonite Cut-Off Wall prior to baseline start to better position 2016 scope execution plan.
- **Key Predecessors** – None
- **Key Successors** – The scope is one of the key schedule drivers for preparation of the Winter Head Pond Filling. The scope is essentially complete for the initial (25m depth) fill level requirements.

## Performance

- Performance has been tracking positively. Productivity levels of approximately 1.9 for backfill and 1.5 for overburden excavation represent the major components of the earthworks scope.
- Planned progress for 2015 was completed in terms of excavation, backfill, crushing and screening.



# CH0008: Gilbert – North Spur Stabilization Works

	Contract	Project Materiality
Cost Risk	L	L
Schedule Risk	L	L

## 2. Forecast to Complete

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### Key Activity Milestones

Milestones	Contract Dates	Current Forecast*	Variance
Commencement of Work	Dec 23, 2014	Dec 23, 2014 (A)	●
Ready for Winter Head Pond	Oct 31, 2016	Sept 15, 2016	+46 ●
Final Completion of Work	Aug 15, 2017	June 12, 2017	+64 ●

\*Based LCP North Spur December 2015 Monthly Report

### Forecast to Complete

- The milestone requirements for Ready for Winter Head Pond are already essentially complete.

### Key Forward Risks and Issues

#### Schedule

- The contract is tracking ahead of project baseline schedule with forecasted early finish on contract milestones.
- The original baseline schedule and progress curves incorrectly illustrated expected progress for backfill work during November and December. The baseline curves will not be updated as, based on 2015 performance, a significant recovery will be accomplished in late spring/summer 2016.

#### Cost

- Current progress and productivity levels tracking towards successful project execution indicating contract savings will be achieved along with issuance of bonus payment. Final Forecasted Cost is representative of expected outcome.
- Contractor has three unresolved disputes regarding accommodation, annual winter maintenance for equipment and early winter shutdown. Nalcor management indicated that the disputes were minor in terms of contract value and/or existing contract conditions.

#### Others

- Original geotechnical reports and analysis conducted by Nalcor and Independent 3<sup>rd</sup> Party indicated potential issues with sensitive soil conditions in downstream overburden excavation and upstream of cut-off wall. Despite initial concerns, risk has not materialized to date. Based on current progress and known conditions, the risk potential has been significantly diminished.





# CT0319: Valard - Construction of 315kv HVAC transmission line



## Key Data Summary

**Scope** The design, supply, install and commissioning of the four turbine generator units

**Contract Type** Lump sum (XX% - Scope Element)  
Unit Prices (XX% - Scope Element)

**LD Status** 10% of Contract Value

<b>DG3 Budget</b>	204.4 Million
<b>AFE2 Budget</b>	277.0 Million
<b>Current Forecast</b>	284.9 Million (4% of FFC)
<b>Expended to Date</b>	221.4 Million

Commodity	Planned Progress to Date	Actual Progress to Date
<b>Anchor Installation</b>	74%	95%
<b>Foundation Installation</b>	75%	98%
<b>Tower Erections</b>	74%	81%

## Progress to Date & Status

- The contract was awarded in December 2013. It is for the construction of 500 km of two parallel single circuit 3-phase 315 kV HVac transmission lines from Muskrat Falls to Churchill Falls including switchyard interconnection lines.
- Contract covers the construction of footings, erection of steel towers, line stringing and installation of all hardware, insulators, overhead shield wire, optical ground wire, spacers and counterpoise wire for line 1 and line 2 from Muskrat Falls to Churchill Falls..
- Materials are free-issued by Nalcor and received by Valard at designed marshalling / storage yard.
- Contractor is responsible for providing all labor, supervision, equipment, and construction consumables required to construct the line, as well as provide all indirect support, access roads, and accommodations.
- Engineering complete.
- Material 100% delivered.
- ROW and access complete.
- Predecessor: ROW and access
- Successor: LTA first power available; AC Switchyards and interconnect tower structures at MF.

## Performance

- Construction progress ahead of plan. Schedule performance better than planned.
- Work forecasted to complete ahead of schedule, the original planned duration was 22 months, they are now targeting 19 months

\*Based on Nalcor November Monthly Report



# CT0319: Valard - Construction of 315kv HVAC transmission line

## 2. Forecast to Complete

CIMFP Exhibit P-03433

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	Contract	Project Materiality
Cost Risk	L	L
Schedule Risk	L	L

### Key Activity Milestones

Milestones	Planned Date	Current Forecast*
Line Inspected and Ready for Energization (substantial completion achieved)	01 August 2016	01 April 2016
Construction completion	30 September 2016	30 December 2016

\* Source: Valard schedule updated 25 November 2015

Nalcor to clarify the following:

In section 10 of the contract, Ready for Energization milestone is 20 April 2016, however in Exhibit 9 of the contract that same milestone is 01 August 2016.

Liquidated damages tie to that milestone.

### Forecast to Complete

- Contract is expecting to complete the work ahead of schedule.
- Final forecast cost is estimated \$7.9M higher than AFE2 budget. This is mainly due to installation of additional foundations and micro piles.

### Key Forward Risks and Issues

#### Cost Risk

- Cost risks appear minimal

#### Schedule Risk

- Schedule risks appear minimal
- The contractor is planning to finish 3 months early compared to plan and shift his screws from this AC line construction package to the CT0327 DC line construction package

#### Other

- Some tower foundation tolerance and concrete quality issues have been raised and under investigation (NCR's raised on 100+ tower foundations under CT0319/CT0327). Delays on subsequent activities (tower erection and stringing) are expected. Data is being gathered on the specific issues and remediation planning is underway to address concerns. Some rework has commenced.



# CT0327-001: Valard – Construction of 350 kV HVdc Transmission Line



## Key Data Summary

<b>Scope</b>	Construction of 350 kV HVdc Transmission Line.
<b>Contract Type</b>	Lump sum (XX% - Scope Element) Unit Prices (XX% - Scope Element)
<b>LD Status</b>	TBA

<b>DG3 Budget</b>	453.5 Million
<b>AFE2 Budget</b>	891.5 Million
<b>Current Forecast</b>	892.0 Million (12% of FFC)
<b>Expended to Date</b>	190.3 Million
<b>Planned Progress to Date (Physical)</b>	TBA
<b>Actual Progress to Date</b>	TBA

Work Front 1 (Labrador)	Planned Progress to Date *	Actual Progress to Date
Anchor Installation	100%	48%
Foundation Installation	100%	51%
Tower Erections	100%	17%

\* Verify the discrepancy between progress reported in Nov Monthly Report above vs. the progress in the OC presentation of end of Jan.

Work Front 2 (Island)	Planned Progress to Date	Actual Progress to Date
Anchor Installation	12%	0%
Foundation Installation	8%	0%
Tower Erections	0%	0%

Work Front 3 (Island)	Planned Progress to Date	Actual Progress to Date
Anchor Installation	14%	0%
Foundation Installation	14%	0%
Tower Erections	0%	0%

Based on Nalcor November Monthly Report

## Progress to Date & Status

- The contract was awarded in August 2014. It is for the construction of 350 kV HVdc Transmission Line.
- The contract covers construction footings, erection of steel towers, line stringing and installation of all hardware, insulators, overhead shield wire, optical ground wire, spacers and counterpoise wire.
- Materials are free-issued by Nalcor and received by Valard at designed marshalling / storage yard.
- Right of Way (ROW) clearing and access development of the HVdc Transmission Line is on going with approximately 85% and 48% (source: November 2015 Nalcor Monthly Report) complete of the clearing required in Labrador and the Island respectively. Both ROW and access are not Valard scope and are executed by other contractors, however Valard is responsible for them (contract terms / responsibilities to be assessed).
- Tower, foundation, and hardware design are complete. Line design is also complete (not in Valard scope)
- Despite the re-baseline exercise finalized in September 2015, in November 2015 a \$7.4M contingency drawdown was required for additional foundations, geotechnical fields investigations and micro pile foundation studies on HVdc TL.
- Predecessor: ROW clearing and access
- Successor: First power transfer Labrador to Newfoundland; commissioning of converter stations, switchyards, synchronous condenser conversion and transition compounds.

## Performance

- Construction progress is significantly behind plan as shown of the tables on the left. On work front 1 (Labrador) less than 50% of the planned work has been completed so far. No progress has been achieved on work progress 2 and 3 (Island) yet. There is a growing potential for schedule impact.
- Low productivity with foundation assembly and installation and anchor installation are the key drivers of poor performance, as indicated by Nalcor during meetings. In the monthly reports, Valard indicates the unsuitable / limited road access and missing materials for tower assembly (supplied through Nalcor) are also contributing to poor performance. That may suggest a potential dispute between Nalcor and Valard.

# CT0327-001: Valard – Construction of 350 kV HVdc Transmission Line

## 2. Forecast to Complete

CIMFP Exhibit P-03433

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	Contract	Project Materiality
Cost Risk	M	M
Schedule Risk	H	M

### Key Activity Milestones

Milestones	Planned Date	Current Forecast
HVdc Transmission Line Construction Complete and Connected	30 June 2017	3 July 2017 *

\*Based on Cost and Schedule presentation 19-Jan-2016

Contractual milestones to be added (copy of contract not available yet)

### Forecast to Complete

- Overall forecast to complete is being revised in order to mitigate current delays and poor performance. Revised forecast is not available at this time. On work front 1, work is estimated to complete by September 2016; however a detailed schedule is still to be finalized.

### Key Forward Risks and Issues

#### Cost Risk

- There is a risk of claim for unexpected geotechnical conditions, access not constructed to fit-for-purpose standard and provision of incomplete structure material. These issues are indicated in Valard monthly report. However, Nalcor considers its position very strong against potential claims.
- Exposure to cost and schedule increase due to geotechnical conditions, geographical challenges and extreme weather conditions.
- Potential cost and schedule impact if work front in Southern Labrador is not completed in this winter season.

#### Schedule Risk

- Schedule is currently being re-baselined. A recovery plan has been discussed with Valard over the past 10 months and is expected to be submitted shortly. Few iterations may be required since submission.
- Schedule risk is high, mainly due to poor performance and low productivity of Valard so far. More precise assessment can be done upon review of the recovery plan. It is to be noted that over the past few months the schedule performance has improved (more work fronts becoming available, more resources), despite being still considerably below plan.

#### Other

- Some tower foundation tolerance and concrete quality issues have been raised and under investigation (NCR's raised on 100+ tower foundations under CT0319/CT0327). Delays on subsequent activities (tower erection and stringing) are expected.



# CH009: Banard Pennecon – Construction of North & South Dams



## Key Data Summary

**Scope** Construction of 350 kV HVdc Transmission Line.  
**Contract Type** Lump sum (XX% - Scope Element)  
Unit Prices (XX% - Scope Element)  
Cost Reimbursable (XX% - Scope Element)  
**LD Status** No LD's (confirm)

DG3 Budget	127.7 Million
AFE2 Budget	[REDACTED]
Current Forecast	[REDACTED]
Expended to Date	26.6 Million
Planned Progress to Date (Physical)	4%
Actual Progress to Date	5%

## Progress to Date & Status

- > The contract was awarded in October 2015. It is for the construction of the South Dam and the North Dam, construction and removal of Cofferdams, construction and removal of a temporary access bridge over spillway approach channel as well as excavation of Tailrace Rock Plug.
- > The Dam Contractor is responsible for closing of the river by constructing the upstream cofferdam using material produced by the Bulk Excavation contractor.
- > The construction of the North roller compacted concrete (RCC) dam can only commence following river diversion through the spillway, and must be complete prior to impoundment. This is considered the critical interface for this contractor. RCC concrete cannot be placed in winter given temperature restrictions.
- > Intake Cofferdam completed.
- > Commenced starter groins as part of river closure operations.
- > Started temporary upstream bridge construction.
- > Key Predecessors: river diversion through the spillway
- > Key Successors: a) Winter headpond to 25M b) full impoundment of the water level c) commissioning of the turbines

## Performance

- > Early progress has been tracking the baseline

Based on Nalcor November Monthly Report

# CH009: Banard Pennecon – Construction of North & South Dams

2. Forecast to Complete

CIMFP Exhibit P-03433

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	Contract	Project Materiality
Cost Risk	M	L
Schedule Risk	M	M

## Key Activity Milestones

Milestones	Planned Date	Current Forecast
Substantial Completion of Work	30-Aug-18	30-Aug-18
Spillway Read for River Diversion, which includes: -Completion of the North Transition Dam	15-Jul-16	15-Jul-16
Completion of Upstream Cofferdam to Elevation 26m and Downstream Cofferdam	31-Oct-16	31-Oct-16
South Dam completed	31-Oct-17	31-Oct-17
Temporary Spillway Bridge and Intake Cofferdam Removed	14-Nov-17	14-Nov-17
North Dam Complete - RCC Structure and Associated Work to Permit Reservoir Impoundment to a Minimum Water Elevation of EL. 36m -All RCC Complete -All Drain Holes from Gallery and Grouting Complete	31-Oct-17	31-Oct-17
North Dam Complete - Remainder of Structure Including all CVC Components	10-Aug-18	10-Aug-18

## Forecast to Complete

- Control schedule baseline is being currently under review.
- Upcoming activities include: mobilization, material procurement, engineering and submittals.

## Key Forward Risks and Issues

### Cost Risks

- Interface with Astaldi and Andritz at Intake Channel Cofferdam may impact Barnard Pennecon schedule and costs
- Geotechnical risks
- Labour cost is not capped, however this is only 20% of total contract price)

### Schedule Risks

- The roller compacted concrete works must be done in one effort. There is a dependency on the completion of Andritz finishing their work on time. Should this be late, the works may be delayed until post 2016 / 17 winter. If this situation occurs, there is also a 15M fee payable to Banard Pennecon

### Other

- Barnard Pennecon has not developed a risk management plan yet.

