

CH0009

Construction of North & South Dams

Status Presentation

July 24, 2015

Agenda

- Safety Moment
- Purpose
- Background
- Actions Since May 19
- Schedule & Execution Plan
- Bidder Overview
- Evaluation & Scoring
- Recommendation
- Status of Articles/Commercial
- Next Steps

Purpose

- Provide an update on the status of CH0009
Construction of North and South Dams

Background

- Scope
 - Construction of Cofferdams
 - Removal of Cofferdams
 - Construction of North Dam (RCC)
 - Construction of South Dam
 - Removal of Tailrace Plug
 - Construction of Road to C1 (optional)

Milestone Schedule
CIMFP Exhibit P-02802

Item:	Interface	Description	Date
GENERAL			
M1		Contract Award	30-Jun-15
M2		Substantial Completion of the work	31-Nov-2017
M3		Completion of the construction road to Laydown Area C1	31-Dec-2015
DIVERSION AND RIVER CLOSURE (UPSTREAM COFFERDAM)			
	I1	Spillway Ready for River Diversion, which includes: - Completion of the North Transition Dam	15-Jul-2016
M4		Completion of upstream cofferdam (to El. 26m) and downstream cofferdam.	31-Oct-2016
SOUTH DAM			
	I2	South Dam area available for Foundation Work (Limited)	Contract Award
	I3	South Transition Dam Completed (for construction of South Dam Fill)	30-Sep-16
M5		South Dam Completed	31-Oct-17
IMPOUNDMENT			
	I4	Other Structures Ready for Site Impoundment, which includes: - Intake completed; - South Transition Dam Completed; - Centre Transition Dam Completed	31-Oct-17
M6		Temporary Spillway Bridge and Intake Cofferdam Removed	I4 + 2 weeks
M7		North Dam Completed	31-Oct-2017
TAILRACE			
	I5	Powerhouse Ready for Tailrace Impoundment	15-Oct-17
M8		Tailrace Rock Plug Removed	I5 + 2 weeks

Background (cont'd)

- Budget
 - \$182M
- Bid/Evaluation/Award Schedule
 - Bid Closing 22-Oct-14
 - Complete Evaluation 21-Nov-14
 - Award 23-Dec-14
- Overview
 - Evaluation completed Dec 2014
 - Bidders provided cost reduction ideas
 - Reduction to 2 bidders (Barnard/Pennecon JV & H.J. O'Connell/Dragados/JV)
 - Bid evaluation team change
 - Approach (focus on cost savings and firm conditions (tech & commercial))
 - Spillway delayed to 15-Jul-2016
 - Provision (Option) for possible delay of River Diversion into 2017
 - Repricing received June 30
 - Interface issues with CH0007
 - Overall cost reduction of \$40M from Bid submissions

Actions Since May 19

- Reviewed previous work completed and all tech deviations, execution plans, proposed teams and schedules
- Worked toward closure on all commercial/technical exceptions
- Incorporated option for delayed river closure
- Revised pricing based on new spec for roads & culverts, RCC mix design resp'y, tailrace bridge removal, selection method for 3C material, option for road & jet grouting (Engineering engaged in design efficiencies)
- Developed new evaluation/scoring model
- Revision of all technical and commercial documents (95%)
- Focus on laydown/staging areas. Communication with site and CH0007
- Final evaluation based on revised proposals submitted June 30 & subsequent discussions and clarifications
- Clarified impacts related to interface issues with CH0007 (Area J & Intake Cofferdam area)

Schedule & Execution Plan

	BIDDER 2				BIDDER 3			
	Start	Finish	Calendar Duration (d)	Work Duration (d)	Start	Finish	Calendar Duration (d)	Work Duration (d)
UPSTREAM COFFERDAM								
Starter Groins	10-Oct-15	24-Nov-15	45	38	14-Sep-15	2-Nov-15	49	49
Remaining Cofferdam (River Closure)	10-Aug-16	24-Oct-16	75	64	25-Jul-16	31-Oct-16	98	98
Full Cofferdam Construction Duration			120	102			147	147
NORTH DAM								
Foundation Preparation	25-Sep-16	18-May-17	235	40	19-Sep-16	30-Oct-16	41	41
Levelling Concrete	18-May-17	16-Jun-17	29	25	3-Oct-16	30-Oct-16	27	27
RCC Construction (Critical)	16-Jun-17	9-May-18	327	125	1-May-17	1-Oct-17	153	153
RCC Construction (Non-Critical)	18-May-18	5-Jun-18	18	15	2-Oct-17	15-Oct-17	13	13
CVC Ogee	1-Jun-18	10-Aug-18	70	60	28-Aug-17	29-Oct-17	62	62
SOUTH DAM								
Excavation	1-Apr-16	28-Apr-16	27	24	1-May-17	28-May-17	27	27
Foundation Preparation	29-Apr-16	10-Jun-16	42	37	29-May-17	30-Jul-17	62	62
Fill Placement to Completion	11-Jun-16	15-Jun-17	369	77	31-Jul-17	24-Sep-17	55	55
KEY MILESTONES								
River Closure (31-Oct-16)	Meets date with 7 days float				Meets date with 0 days float			
North Dam Completion (31-Oct-17)	Opportunities exist (beyond schedule buffers) to enhance schedule for critical North dam works to be complete by 31-Oct-17				Meets date with 2 days float			
Given the pressure on overall schedule from other areas (CH0007), higher importance should be placed upon the ability to meet the River Closure Milestone in 2016 than full completion of the North Dam in 2017								
EXECUTION AND RISK NOTES								
Spare capacity/float					Spare capacity/float			
- Weather allowance 4d/mth					- No apparent weather allowance			
- 6d work week, 10 hr shifts					- 7d work week, 10h shifts			
- Methodology provides potential for working concurrent activities					- Schedule includes concurrent activities			
- Planned construction season May to end Oct					- Planned construction season May to December			
Double lane upstream temporary bridge provides adequate capacity for cofferdam construction					Single lane temporary bridge may introduce traffic congestion & delay			
Plan to stockpile materials on starter groins					Plan to stockpile 45,000m3 of closure materials in limited space at riverside; subsequently retreated from position without adequate replacement plan			
RCC Construction utilizing truck placement					RCC construction utilizing creter cranes. Potential for breakdown and delay.			
Proposed flip bucket & downstream face design will further reduce time to construct North Dam					No design modifications proposed. Must meet air entrainment spec. for GERCC			
OVERALL	Believable plan and schedule, supported by solid project team				Challenging work plan and schedule, especially for proposed project team			

Bidder 3 Commercial Exception

<p>1.</p>	<p>Civil Works Agreement</p>	<p>Liquidated Damages GC 26</p>	<p>Delete all references to Liquidated Damages throughout the Agreement. Limitation of liability at GC 26.1 (7.5% of Contract Price) shall apply to all delay damages.</p> <p>Response (01/16/2015):</p> <p>This exception is withdrawn but our proposal price would have to increase by \$1.0 M unless the current schedule is de-risked, in which case there would be no additional price increase. Given the opportunity to work in partnership with the client we are confident the schedule can be de-risked.</p> <p>Response (06/30/2015):</p> <p>Response provided on 01/16/2015 above to remain.</p>	<p>It is in our best interest to complete all works on time. However, due to the project conditions – remoteness of site, geotechnical conditions, river flows, interaction with other contractors on-site and union agreements in force we cannot accept liquidated damages for delays and as such our proposal has not accounted for these risks.</p>		
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CIMFP Exhibit P-02802

Bidder Overview

Barnard / Pennecon JV

Pros

- Solid Project Team, RCC experience in team leadership
- Solid execution plan & schedule
- Schedule float and built-in additional capacity
- Driven by JV member with most experience
- Robust design (facing concrete vs GERCC)
- Previous Muskrat Falls experience
- No impacts related to recent CH0007 interface issues
- Risk/reward scheme proposed on limited profit value
- All staff/mgmt. costs lump sum (\$45M)
- Using 150T trucks (ODJV using 80T trucks)

Cons

- Higher evaluated price (additional mhrs added for RCC, Upstream CD & Tailrace Works)
- Marginally higher extra work rates
- No Cap on craft labor

Bidder Overview (cont'd)

H. J. O'Connell/Dragados JV

Pros

- Lower evaluated price after normalization (BPIV -\$977k to +\$5M)
- Lump Sum (except for apprentices, shadow workers and escorts)
- Highly rated RCC experience
- Previous Muskrat Falls experience

Cons

- Weak Project Team (Lack of RCC experience of team leadership, weak Project Manager, QA manager unacceptable)
- Key RCC resources appear to be on “ad hoc’ basis
- Execution plan not well conceived, adjustments after challenge, remains questionable
- Very tight schedule, no float – Critical Path in jeopardy (River Closure)
- Driven by JV member with less experience in RCC construction
- Possible issues with CH0007 interface
- Takes no responsibility for cement/fly ash availability
- GERCC (versus facing concrete) unproven in Canada

Evaluation and Scoring

- New scoring model emphasizing execution and project team
- Elements accepted from previous evaluation plan (Benefits/Labour Relations/Environmental/Quality/Risk/Safety) – however, proposed team members reviewed by LCP leads

Bid Evaluation – Weighted Scores

Description	Evaluated Scoring		Weight	Final Weighted Scoring		
	BPJV	ODJV		BPJV	ODJV	Notes
1. Commercial						
a) Bid Price						
Base Bid	\$287,171,000	\$288,148,000				
Normalized Items	\$6,100,000	\$0				
Sub-total	\$293,271,000	\$288,148,000				
b) Commercial Items						
Cash Flow						
Sub-total	\$0	\$0				
Item Total	\$293,271,000	\$288,148,000	60	57	60	Note 1
2. Technical						
Execution Plan	10	8.5				Note 2
Schedule	10	9				
Technical (facing concrete etc)	10	9				
Item Total	30	26.5	20	20	17.7	Note 3
3. Project Organization & Team Quality						
	333	229				
Item Total	333	229	20	20	13.8	Note 4
Overall Weighted Score			100	97	91.4	

Health & Safety	Pass	Pass	
Quality	Pass	Pass	
Environmental	Pass	Pass	
Risk Management	Fail	Fail	

Notes:

1. Low Bidder receives 60 points. Second Bidder deducted 3 points for each 5% its evaluated price is above low Bidder.
2. Technical evaluation of ODJV proposal based on its Alternate proposal (includes cost saving methodology). The evaluation of Bidder 2's proposal is based on its Initial bid, then normalized for cost reduction ideas presented by Bidder 2.
3. For final scoring, the higher technically evaluated Bidder receives 20 points, the lower evaluated Bidder receives a percentage of the 20 points based on its score over the higher evaluated score.
4. For final scoring, the higher evaluated Bidder receives 20 points, the lower evaluated Bidder receives a percentage of the 20 points based on its score over the higher evaluated score.
5. The Pass/Fail threshold is 70%. A score of less than 70% (Fail) is not considered a fatal flaw but should be used for guidance purposes in the overall evaluation and, if applicable, in pre-award negotiations.

Recommendation

- Barnard Pennecon JV is recommended by bid evaluation team
- Cost premium range is -\$977k (base) to +\$5M (normalized)
- Defining Factors
 - Schedule Assurance
 - Solid Project Team & Execution Plan
 - Robust Design

Craft Labour Target Price Model

BPJV Target Price Model		
Craft Labour Target Price	\$ 46,462,521	551,878 mhrs @ \$84.19/hr
7.9% G&A Fixed Fee	\$ 3,670,539	G&A fixed at Craft Labour Target, no adjustment
8.3% At Risk Fee	\$ 3,856,389	Risk/Reward = 50/50 depleted after 45,800 mhrs
Total	\$ 53,989,449	

Note: Craft labour target excludes subcontractors approx. 70,000 mhrs

Status of Articles/Commercial

- **Barnard /Pennecon (65/35JV)**
- Performance Security is a 15% letter of credit reducing to 5% for the one year warranty period
- Holdback Release Bond
- No amendments to liability limit wording
- Four remaining minor exceptions to Articles – no show stoppers
- Bidder has proposed unit prices/lump sums with target cost for craft labour and 50/50 sharing for cost underrun and over run until profit pool is exhausted
- Fixed amount for craft overhead calculated at 7.9% based on target value
- Craft Profit at risk calculated at 8.3%
- Changes subject to O/H and profit adjustment up or down of 16.2%
- Price adjustment for quantity variation
- Need to revise Exhibit 2 to reflect target cost model and finalize wording of parental guarantee and letter of credit. Other documents need to be finalized based on latest price reduction

Status of Articles/Commercial (cont'd)

- **O'Connell/Dragados (50/50 JV)**
 - 50% Performance bond that covers the one year warranty period
 - Liability cap of 50% of contract price
 - Bidder has proposed unit prices/lump sums
 - No price adjustment for quantity variation, accepted mark-ups for changes for related work.
 - Bidder has not accepted delivery risk for cement and flyash (neither bidder has been able to complete due diligence for availability because sources have not selected)
 - Open items with Articles – release of holdback, proposed six year limit on latent defect claims, timeframe for termination due to force majeure event(s) and concern with assignment to Lenders provision (no recourse against LCP for non-payment previous two months)

- Issue LNTP to BPJV immediately
- Finalize all commercial & technical documents
- Initiate discussions & actions on RCC mix design
- Initiate upstream temporary bridge design
- Initiate value engineering workshop
- Assign Package Leader and Contract Administrator

Bidder 2 Identified Risks

- **1. Contract Milestone Interface I2 “Spillway Ready for River Diversion.”** This Contract Milestone is an interface point between the existing powerhouse contract and this contract. This milestone represents the start of all critical work for this contract; any delays to this milestone may substantially impact this project, including delayed completion into the next construction season of 2018.
 - Mitigating Action:
 - There is little we can do to avoid this risk because the milestone is not controlled by our work. If a delay is encountered on this milestone, we may be able to accelerate our work to minimize delay impacts and the potential for additional work seasons. If not, we will need to re-evaluate our schedule and submit any schedule and cost impacts.
 - Early notification by Nalcor of the potential for this milestone to slip will allow all parties the opportunity to work together and mitigate the impacts to the project.
 - Another interface which is currently not a milestone for our contract is the North Spur Contract. It is our understanding that we cannot raise the water level until that contract has made certain milestones.
- **2. RCC Construction Methodology – Air Entrainment.** In general, the RCC Technical Specifications control the means and methods of all mixing, delivery and placement requirements. In addition, there are minimum quality control requirements required. Should the means and methods specified not result in meeting the quality control requirements, we would have a problem.
 - RCC air entrainment is not commonly achieved. It is our understanding that there may be only one job ever that has achieved air entrainment required by the Specifications for RCC and GERCC facing. There are no Specifications that require any special equipment or product requirements; we can only look at this item as what would normally be required for concrete.
 - Since there are no mix designs or Specifications for the admixtures, we have included only an ARA and WRA typical for concrete.
 - Mitigating Actions:
 - Barnard-Pennecon J.V. has only priced facing concrete for the face of the RCC. Air-entrained GERCC is not likely achievable and GERCC is more expensive to place in NL than facing concrete.
 - Barnard-Pennecon J.V. has priced the specified means and methods required; however, we cannot guarantee these means and methods will yield the desired quality requirements.
 - Barnard-Pennecon J.V. has only included the RCC test sections required by the Contract; any additional testing required to achieve air-entrained RCC would be considered extra work.
- **3. Impacts to Schedule due to Labour Productivity.** Extended schedule impacts due to poor labour productivity is a large risk for us.
 - Mitigating Actions:
 - Barnard-Pennecon J.V. will need to observe progress and schedule from the outset and adjust labour requirements early if it appears work rules or productivity are an issue in meeting the scheduled milestones or Barnard-Pennecon J.V.’s project schedule.
- **4. Bridge removal before the North Dam work is complete.** Barnard-Pennecon J.V. has provided a unique solution that allows for watering up the powerhouse while work is still being finalized. We will need access to the North Dam until all of the CVC is complete and finished. If this plan is not accepted, it will have a significant cost and schedule impact.
 - Mitigating Actions:
 - Barnard-Pennecon has provided a modified bridge access plan that allows for the removal of a portion of the powerhouse upstream cofferdam that provided water for wet testing. We have included this plan in our Execution Plan.
- **5. Abnormal Weather (May 1 to November 1).** Barnard-Pennecon J.V. has a lot of work planned in the favorable months between May 1 and November 1 in each of the three years while onsite. We have not included winter protection or do not anticipate that winter work will be possible and still meet the requirements of the technical Specifications.
 - Mitigating Actions:
 - Should hot weather prevent the placement of RCC in the summer months, we will look to reduce our placing time to nighttime hours. We would also challenge the Engineer on the strict placement temperature requirements of the RCC.

Bidder 3 Identified Risks

- **Water diversion/ Environmental**
- *High flow due to late Spring Freshette would delay river diversion.*
- *The potential for environmental damage to the Lower Churchill River water system should a slide occur) while we are on site.*
-
- **Coordination and Interface with ongoing projects:**
- *Delays in spillway construction, powerhouse construction and the North Spur stabilization could delay river diversion.*
- **Delivery of Critical Materials**
- *The project is located in a remote area where access is limited and can be affected by events such as forest fires which could cause delivery delays beyond what has been accounted for in the Proposal.*
- **Camp Space**
- *The camp is of a limited capacity and additional capacity in the local area is extremely limited. Should the camp allotment not be available, this could cause delays to the work.*
- **Labour Unrest**
- *The Joint Venture will follow the Labour Agreement for the site. However, if there are concessions that we are unaware of that causes labour unrest, this could cause lower productivities and hence delays to the Project Delivery.*

Bidder 3 Identified Risks (cont'd)

Mitigation

Water diversion/ Environmental

The Bidder will be ready to start the river closure one month in advance to the expected date when the flow is appropriate. This will ensure we can take advantage of an early start. Should the flows delay the works and prevent placement of RCC in 2016, our placement method can achieve the work in 2017.

Coordination and Interface with ongoing projects

Identify and mitigate any possible interference with other contractors and coordinate regular meetings

Delivery of Critical Items

The Bidder will have an alternate route identified that will help minimize delays.

Camp Space

The Bidder will maintain a database of local accommodations.

The Bidder will remove staff from the camp and house them in the local area by providing a monthly allowance. This would be reimbursable by the Company.

Labour Unrest

The Bidder has strong relationships with the local unions. We also have experienced Labour Relations personnel. We will utilize the strengths of these relationships and these personnel to minimize or prevent labour unrest.

Initial Evaluation Summary (Dec 2014)

- **Bid Evaluation Results**

- **Bids Received:** 3

- **Reviews;**

	Bidder 1	Bidder 2 (Excl. Direct Labour Risk)	Bidder 3 (Excl. RCC Conv.)	Bidder 3.1 (Incl. RCC Conv.)
Technical	56.64	66.56	70.88	73.68
Safety	Fail	Pass	Pass	Pass
Quality	Pass	Pass	Pass	Pass
Risk Management	Fail	Fail	Fail	Fail
Environmental	Pass	Pass	Pass	Pass
Commercial	61.14	68.65	57.38	57.38
Price	3	2	less than 1	1
Normalized	3	1	less than 1	2

- **Comments**

- All Bids exceed budget estimate.

- Bidder 1 price + normalizing + reviews = do not consider as price is too high and Bidder has failed Safety Review.

- Bidder 2 price + normalizing + reviews = consider but has highest risk due to exclusion of Direct Labour Risk and subsequent impact on Equipment (extension of time claim). Bidder accepts Risk for Staff.

- Bidder 3.1 price + normalizing + reviews = consider and has low risk due to inclusion of Labour Risk.

- **Bidder 3 price + normalizing + reviews = best option assuming RCC Technical Expert (Company) is satisfied that RCC placement method (Agitator Mixer Trucks and Creter Crane(s) in lieu of Conveyor System) is acceptable.**

- RPL 15-Dec-2014

Initial Evaluation (Dec 2014)

Lower Churchill Project		MAIN SUMMARY		NORMALISED	
Muskrat Falls Hydroelectric Development CH0009					
CONSTRUCTION OF NORTH AND SOUTH DAMS		SUMMARY			
Item No.	Description	Bidder 1	Bidder 2	Bidder 3 Base	Bidder 3 Alternative
	TOTAL Contract Price (C/F from Appendix A2.1 Schedule of Price Breakdown)	394,380,086	323,488,544	340,368,175	308,701,420
	NORMALISATION				
1	Deviations not identified by Bidder	4,759,660	25,505,190	5,569,231	5,569,231
2	Exceptions by Bidder (none priced by Bidder)	incl. above	incl. above	incl. above	incl. above
3	Other (Define)	incl. above	incl. above	incl. above	incl. above
	TOTAL ESTIMATED VALUE AFTER NORMALISATION	399,139,746	348,993,734	345,937,406	314,270,651
	Adjustment to Low Bid	7	8.5	9	10
	Conditioned Contract Price	570,199,638	410,580,863	384,374,895	314,270,651
	Commercial Weighting	61.14	68.65	57.38	57.38
	Final Conditioned Contract Price	932,689,356	598,078,460	669,934,458	547,748,410
	Technical Weighting	56.64	66.56	73.68	73.68
	FINAL ESTIMATED CONTRACT VALUE	1,646,697,309	898,555,379	909,248,721	743,415,324
	% of low bid	29%	13%	10%	
	Health & Safety *	Fail	Pass		Pass
	Quality*	Pass	Pass		Pass
	Risk Management*	Fail	Fail		Fail
	Environmental*	Pass	Pass		Pass
	* Pass/Fail Threshold is 70%				
	A score of less than 70% is not considered a fatal flaw but shall be used for guidance purposes in the overall Proposal evaluation.				

