ONE
TEAM
ONE
GOAL

D2O Storage Project Alternatives

FOAK/FIAW Options Review Board
Jun 19, 2017

Safety
Quality
Schedule
Cost

ONTARIO POWER GENERATION

Agenda

1. Project Summary – D20 Timeline of Events
2. Overview of what Plan "A" and Plan "B"
3. Quantities remaining
4. Estimates done to date summary slide
5. Early Contractor Involvement overview
6. SWOT analysis: Strengths, Weaknesses, Opportunities and Threats
7. Vendors Short Listed
8. Engineering , Procurement & QA/QC Overview
9. Schedule Overview
10. "Plan C"
11. Overview of the OPG PMT
12. Current Budget

Project Overview – D20 Timeline

D20 Timeline of events: Key dates:

October 2014 – Termination of Black and McDonald Contract

April 2015 – JV awarded LNTP

August 2016 – Final Award to JV for **$146M**

October 2016 – JV presented ECAC at **$187M**

January 2017 - JV presented updated ECAC at **$242M**

April 2017 – JV presented another updated ECAC at **$270M**

April 21st, 2017 – OPG Halted all works and started Transition

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Plan "A" vs. Plan 'B"

- Plan "A"
  1. JV Re-estimate the ECAC in a fully transparent process & Incorporate OPG's comments from the estimate review
  2. Lock in final estimate in a Lumpsum commercial arrangement
  3. Reach an acceptable reduction to the Lumpsum for all outstanding commercial issues and OPG impacts due to the JV's mismanagement of the D20 Project
  4. Re-assign D20 Project to the JV

Plan "A" vs. Plan 'B"

- Plan "B"
  1. Establish Early Contractor Involvement Process
  2. Identify two Vendors, that
     - Capacity and ability to finish the work
     - Enthusiastic (working with OPG)
     - Willingness to accept risk or "skin in the game"
  3. Incorporate Vendors teams with in OPG
  4. At conclusion Vendors provide:
     - Level 2/1 Estimate (high confidence)
     - Level 4 Schedule (detailed)
     - Hard money proposal (Lumpsum, unit rate, PMT at risk)

Scope of Work: Quantities

Item Description	QTY (April 2017)	UoM
BLOCK WALLS	18,669	SF
PIPE & SUPPORTS	39,071	LF
CONTROL CABLE / CABLE TRAY W/ SUPPORTS	154,940	LF
CONDUIT W/ SUPPORTS	60,313	LF
TERMINATIONS, POWER & CONTROL	11,307	Ea

Current Estimates Completed

Row	Description	HB Estimate	F&G April 26, 2017	Adjusted consolidated estimate, to be managed by JV	Adjusted consolidated estimate, to be managed by OPG
1	DIRECT LABOR	$37,194,210	$81,515,330	$37,097,930	$37,097,930
2	*CIVIL*	*$5,668,603*	*$4,905,927*	*$4,260,000*	*$4,260,000*
3	*ELECTRICAL/I&C*	*$13,229,787*	*$28,079,049*	*$18,808,667*	*$18,808,667*
4	*MECHANICAL*	*$15,059,400*	*$36,791,713*	*$10,792,844*	*$10,792,844*
5	*SCAFFOLDING*	*$3,236,420*	*$11,738,641*	*$3,236,420*	*$3,236,420*
6	SUPPORT LABOR & INDIRECTS	$11,371,850	$8,151,533	$7,035,669	$7,035,669
7	CONSTRUCTION EQUIPMENT	$1,756,963	$245,243	$1,112,938	$1,112,938
8	ENGINEERED EQUIPMENT/MATERIAL	$8,101,632	$6,293,202	$6,293,202	$6,293,202
9	PROJECT MANAGEMENT TEAM	$24,190,375	$4,177,000	$19,500,000	$15,400,000
10	DESIGN ENGINEERING	$5,724,078	$11,400,000	$5,000,000	$4,900,000
11	SUBCONTRACTOR	$7,414,213	$6,195,471	$5,977,897	$5,977,897
	Subtotal	**$95,753,321**	**$117,977,779**	**$82,017,636**	**$77,817,636**

Current Estimates Completed

Row	Description	HB Estimate	F&G April 26, 2017	Adjusted consolidated estimate, to be managed by JV	Adjusted consolidated estimate, to be managed by OPG
12	PROFIT, MARKUP & OVERHEAD	included above	$4,426,213	$5,904,889	$4,907,662
14	EPSCA FEE	not included	$4,669,685	$1,892,752	$1,892,752
13	VENDOR CORE TEAM COST	not included	not included	not included	not included
	Subtotal	**$95,753,321**	**$127,073,677**	**$89,815,277**	**$84,618,049**
16	SLOW DOWN COST	$3,733,000	not included	not included	not included
	Subtotal	**$99,486,321**	**$127,073,677**	**$89,815,277**	**$84,618,049**
17	CONTINGENCY	$9,027,043	$11,943,818	$7,185,222	$6,769,444
	Subtotal	**$108,513,364**	**$139,017,495**	**$97,000,499**	**$91,387,493**
15	OPG - SUPPORT COST	$6,391,996	$6,391,996	$6,391,996	$5,113,597
18	DISCRETE RISKS	To be added	To be added	To be added	To be added
	Grand Total	**$114,905,360**	**$145,409,492**	**$103,392,495**	**$96,501,090**

Class 5	*Class 3 - overestimated*

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Early Contractor Involvement

- Early Contractor Involvement (ECI) provides:
  - an efficient means of planning projects
  - cost-effectiveness
  - less adversarial structure
  - partnering relationship
  - increase transparency
  - reduced risk monetary allocation

Above all, Confidence:

1. Cost and Schedule Certainty confidence
2. Vendor confidence their understanding of the project

Plan “B” SWOT Analysis

SWOT: Strengths of Plan "B"

- Strengths
  - OPG / Vendor Planning Incorporation
  - Increased Flow of materials and information (as compared to normal RFP process)
  - Increased Vendor Confidence in scope (reduced Contract Price)
  - OPG PMT Integration
  - Vendor Skin in the game
  - Increased Cost and Schedule Certainly through Contract Model
  - Vendor to be in lock step with OPG manegment teams to understand OPG process and requirements

SWOT: Weaknesses of Plan "B"

- Weaknesses
  - New Vendors will take longer time to get familiar with OPG process
  - May encounter more interface issues with various groups
  - Rework or catch up from where JV has left potential
  - Change Procurement System and PO ownership
  - Re-establish relationship with sub-vendors (if applicable)
  - Project carrying costs; November start date

SWOT: Opportunities of Plan "B"

- Opportunities
  - Bring in fresh perspectives and management approaches, which will leads to efficiency gain and schedule recovery
  - OPG to optimize the Vendors PMT oversight levels
  - Potential over-all cost savings and reduced project cost
  - Increase OPG vendor roster bench
  - Customize and optimize OPG PMT requirements to complement Vendor setup

SWOT: Threats of Plan "B"

- Threats
  - Risk Contract price can be more than "Plan A"
  - New to OPG and Nuclear, steep learning curve in process and interface with OPG

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FOAK/FIAW Considerations

	FOAK / FIAW Aspects	Score 0-3		
1	New design / innovation / software unique to project?	2		describe the specific aspects scored: examples: FOAK conversion to digital control for this system. FOAK for Vendor to perform <task> previously only done by station. FIAW - <equipment> has not been disassembled since original build.
2	New line of equipment, devices, materials?	1		
3	New installation method / tools or first time in 5/10/20 years?	3		
4	Work is new to performing group and oversight or both.	2		
5	Equipment/asset not maintained/ accessed for 10/20 years?	2		
6	Unprecedented scale of activity (>10x, >20x, >50x)	4		
			14	

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Vendors

Potential Vendor Short list:

- The State Group *(interviewed)*
- Matrix NAC *(interviewed)*
- Lorneville *(interviewed)*
  - Sunny Corners *(interviewed)*
  - Kiewit Canada Corp.
- Bird Construction
- PCL Constructors Inc.
- Ledcor Group of Companies

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Engineering Strategy

1. In flight engineering change updates to be completed by the JV as part of the settlement/transition plan (primarily related to fire protection impacted ECs and incorporation of engineering equipment vendor information)

2. Remaining engineering to be performed in house under OPG's quality program: consists of support to field initiated changes, preparation of design manuals, commissioning specs, MEL updates, ITF review, closeout

3. Dedicated team of approx 7 FTEs required: will utilize existing experienced contract oversight staff and augment as required. Contracting strategy

4. Preparation of operation documentation removed from engineering scope. TRF procedures group to augment staff and prepare

Challenges:

• Competing for competent resources with U3 refurb replication needs

• Preparation of design manuals requires detailed knowledge of all the systems – may be difficult to find enough individuals

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Procurement Strategy

Majority of equipment/material has been procured by the JV. All remaining in flight PO's to be managed by the JV as per the settlement/transition plan. Supply chain aligned to procure any remaining material as required.

All JV procured materials to be taken over by OPG:

1. multiple warehouse visits and test transfer of material performed successfully
2. existing process to transfer cat id'd materials is in place and has been utilized on other projects material will be "receipt inspected" as it is loaded on to OPG transport
3. preparation of history dockets is critical path however can be performed by OPG more cost effectively than JV
4. space has been allocated in OPG's warehouses to take over full inventory from the JV.
5. Transfer of all material can be completed within 3 weeks.

Challenges:

Process for take over of non cat-id material still under review (OPG's QA program is cat id based)

Field Quality Control Strategy

1. P&M Field Engineering to perform non NDE quality control

2. Dedicated FLM and team of x staff being established using combination of experienced staff/new permanent hires/temps

3. Strategy to re-use JV CWPs with minimal rework under review

4. Transfer of CWPs and joint field walkdowns with the JV are in progress as per the settlement/transition plan. Transfer is progressing slower than plan due to JV resource constraints however no issues preventing OPG take over have been identified to-date.

5. NDE QC is under BTU jurisdiction. Discussion underway with IMS to determine resources/strategy to perform.

Schedule

Activity / Key Milestones			May 8, 2017	May 15, 2017	May 22, 2017	May 29, 2017	June 5, 2017	June 12, 2017	June 19, 2017	June 26, 2017	July 3, 2017	July 10, 2017	July 17, 2017	July 24, 2017	July 31, 2017	August 7, 2017	August 14, 2017	August 21, 2017	August 28, 2017	September 4, 2017	September 11, 2017	September 18, 2017	September 25, 2017	October 2, 2017	October 9, 2017	October 16, 2017	October 23, 2017	October 30, 2017	November 6, 2017	November 13, 2017	November 20, 2017	November 27, 2017	December 4, 2017	December 11, 2017	December 18, 2017	December 25, 2017
Plan "B" Competitive ECI Plan																																				
RFP Draft Packages									■	■																										
Identify Contractors			■	■	■	■	■	■																												
Award (Both Contractors)	*Milestone*	*July 3rd*									■																									
Early Contractor Involvement Program Setup								■	■	■																										
Material Supply (Drawings /Specifications etc.)											■	■	■	■	■																					
Tours:																																				
Warehouse													■	■																						
D20 Site													■	■																						
Security Screening																■	■	■	■	■	■	■	■	■	■	■	■									
Estimation & Scheduling													■	■	■	■	■	■	■	■	■	■	■	■	■											
ECI Proposals																																				
Final Deliverables	Milestone	Oct 9th																							■											
Final Package Review																									■	■										
Project Award	*Milestone*	*Oct 16th*																								■										
Contract Deployment Planning	LNTB																										■	■	■	■						
Project Start	*Milestone*	*Nov 20th*																												■						
ECI Imbedded (2 Teams)																																				
Estimate & Schedule Review etc.														■	■	■	■	■	■	■	■	■	■	■	■											
Engineering Team Contract Setup	*Milestone*	*Aug 28th*																	■																	
OPG Project Management Team Commitments											■	■	■	■	■																					

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Go/ No-Go Plan & Plan C

“Plan C”

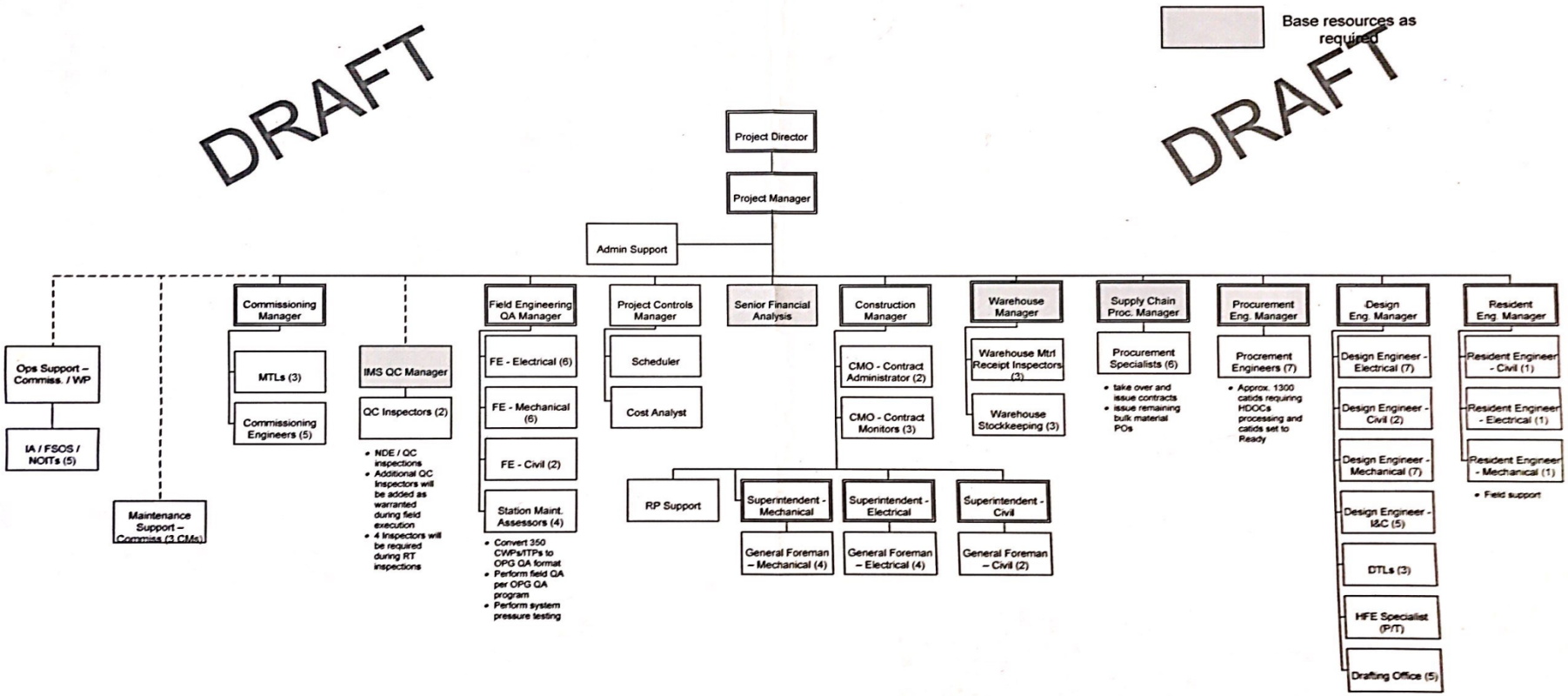
OPG Builds the Project:

1. Utilize Bremar for electrical work
2. On board new vendor to perform only mechanical scope,
3. OPG to complete/contract minor civil scope

Bremar has knowledge and competent team. Minimal oversight required which will allow OPG resources to focus on supporting new vendor. CUSW affiliation allows OPG to honor electrical settlement with CUSW.

OPG PMT

D2O Storage Project – proposed project Org Chart if completing project under OPG QA Program



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Current Budget

Rev 01 - Last Update: May 26, 2017

Deliverable /Services	May	June	July	Aug	Total	Remarks
Project PMT	$610,000	$610,000	$610,000	$610,000	$2,440,000	Estimated monthly funding to cover: - OPG Eng. Support - OPG Projects Team - OPG CMO/FE core team (Eric, Sue, Zane, Ted) - Aquatech - PGL - And support from TRF, DO, DCC group as required
Direct Hire (D/H) Elec/Laborers	$150,000	$150,000	$150,000	$150,000	$600,000	Includes 4 D/H BTUs (2 laborers, 2 Electricians per 8 hr shift, days, afternoons, part weekends) for dewatering/temp power monitoring, clean-up
Interest	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$4,000,000	
Project Controls	$50,000	$50,000	$50,000	$50,000	$200,000	2 CSAs + 1 PCM (40*2*$80+40*1*$115)/Week
OPG Costs Sub-Total	**$1,810,000**	**$1,810,000**	**$1,810,000**	**$1,810,000**	**$7,240,000**	
JV Transition Costs (Estimate)	**$690,000**	**$690,000**	**$690,000**	**$690,000**	**$2,760,000**	
Roofing installation		$250,000	$275,000	$75,000	$600,000	100% Flynn roofing contract & drains installation
HVAC installation		$75,000	$190,000	$185,000	$450,000	20% of remaining Cullition installation contract
Scaffolding support	$30,000	$75,000	$195,000	$195,000	$495,000	includes scaffold rental costs
Building civil works		$110,000	$290,000	$290,000	$690,000	masonry block installation, sealing precast walls, caisson removal, OE (12 BTU/Supervision)
Equipment Rentals		$20,000	$25,000	$25,000	$70,000	man lift, fork truck, skid steer with jackhammer
Construction Costs Sub-Total	**$30,000**	**$530,000**	**$975,000**	**$770,000**	**$2,305,000**	
Grand Total Estimate per Month	**$2,530,000**	**$3,030,000**	**$3,475,000**	**$3,270,000**	**$12,305,000**	
Grand Total Estimate Cumulative	**$2,530,000**	**$5,560,000**	**$9,035,000**	**$12,305,000**		**Requested Fund: $15,000,000**
Requested Fund per Month	$3,084,112	$3,693,620	$4,236,083	$3,986,184		
Requested Fund Cumulative	$3,084,112	$6,777,733	$11,013,816	$15,000,000		

Further Discussions

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