1.0 Introduction

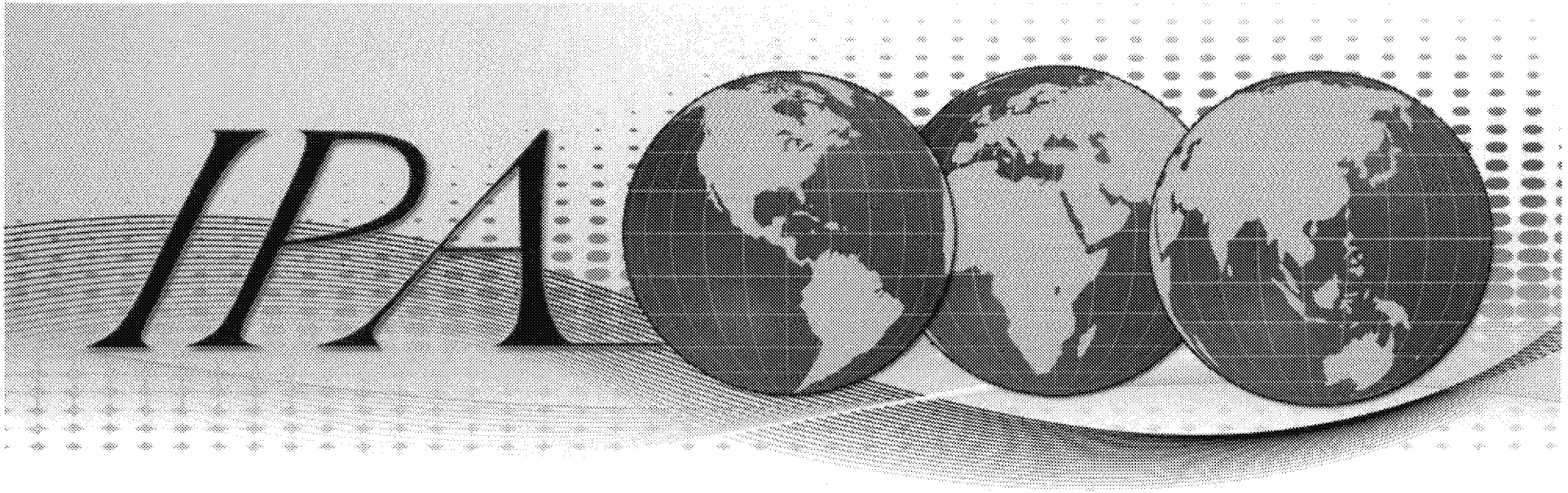
Astaldi Canada experienced significant start up issues in early 2014 associated with their execution of CH0007 - Construction of the Spillway, Transition Dams and Powerhouse for the Muskrat Falls Generating Station. While many of these issues have since been resolved, the consequences of that slow start-up will impact their ability to complete their scope. Nalcor has conducted a detailed analysis to provide guidance on how to move forward with this contract.

In preparing this analysis, Nalcor engaged external support from industry leaders, including Long International, Westney Consulting and sub-consultants, Cleveland Shaw Litigation Accountants and McInnis Cooper. During this period the project also had an analysis complete regarding the capability and capacity of the Nalcor team by International Project Analysis (IPA). In preparing a recommendation, Nalcor and its advisors considered the following:

1. The strength of a potential claim by the contractor;
2. The value of time and impact of the distraction of a disgruntled contractor;
3. The cost to complete outstanding work;
4. Astaldi's liquidity position on a go forward basis; and
5. Alternative execution options and the cost/time consequences.

The outcome of this process was a recommendation to retain Astaldi as the contractor and negotiate with them a financial contribution which would provide enough financial incentive to complete the job, but at the same time maximize their losses and minimize Nalcor's contribution.

This package summarizes the process used in developing that recommendation.



Mid-Execution Assessment

Nalcor Lower Churchill Project

Presented to Lower Churchill Project Team

Félix Parodi and Lucas Milrod

December 2015

Confidentiality Statement

Prepared by Félix Parodi and Lucas Milrod
Reviewed by Baqun Ding
Edited by Loren Farrar

NLC-2501-EXE

Objectives

- Assess management approaches and practices used in Lower Churchill Project* (LCP)
  - LCP is currently in mid construction phase
- Identify relative risks that may affect the project as field construction progresses
  - Learn from past megaprojects to prepare for potential risks that may need to be adequately managed
- Provide recommendations to reduce execution risks and to achieve successful completion

rmation used in the analysis is based on project interviews, documentation received, and
equent communications with the LCP team

Key Message

LCP has characteristics that are comparable to those of successful megaprojects:

- LCP established solid foundations for team effectiveness, overall good staffing, and Transition to Operations (TTO) organization to ensure optimal business value
- Clear understanding of progress recently confirmed by the September 2015 re-baseline and systems are in place to manage and control progress

To succeed, LCP should continue strengthening its organization and planning

- Focus on Muskrat Falls generation construction management and team alignment and ensure targets are achievable
- Strive to maintain continuity of senior project management and construction safety focus
- Continue strengthening TTO organization

Overall Key Findings (1)

- Organization is well staffed and teams are well developed
  - Solid foundations for team effectiveness established early in project development
  - LCP teams are well developed and the organization has overall good staffing
  - Continuity of senior management is a strength
- Important opportunities remain
  - Increasing alignment between owner and non-owner staff and vertical alignment among senior and lower management levels
  - Increasing construction management staffing and interfaces for Muskrat Falls Generation scope and ensure adequate management field presence

Overall Key Findings (2)

- LCP Project has achieved significant progress in execution and is organizing to complete construction and to start operations
  - Clear understanding of progress recently confirmed by the September 2015 re-baseline
  - Systems are in place to manage and control progress
  - Proactive collaborative approach with contractors
  - Transition to Operations (TTO) strategy is sound and well established

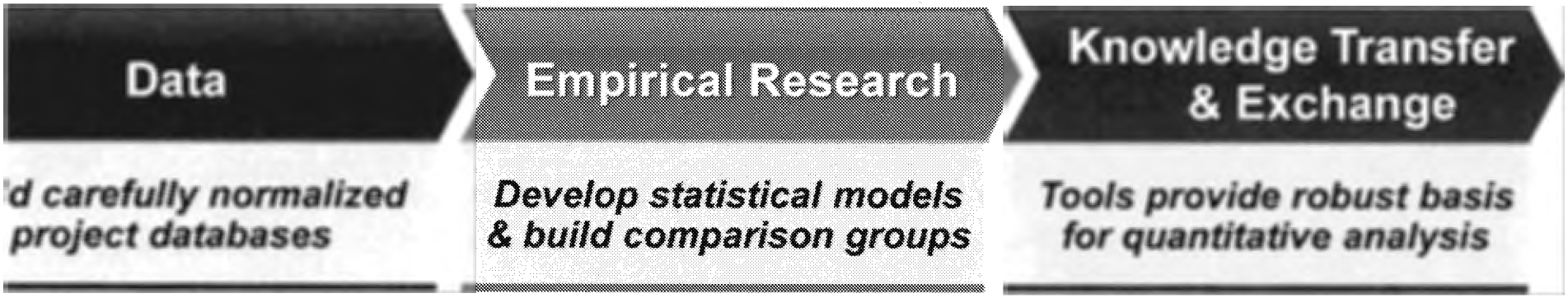
Overall Key Findings (3)

- The assessment revealed that LCP strategies are consistent with the focus on achieving successful LCP execution to completion
- Opportunities remaining
  - Update the execution plan to completion (e.g., Muskrat Falls' schedule) to reflect the latest re-baseline
  - Increase details of TTO plans

Outline

- ***Introduction***
  - *Independent Project Analysis Expertise*
  - *Basis of Analysis*
- **LCP Development and Execution**
- **Organization and Team Effectiveness**
- **Selected Megaproject Lessons**
- **Conclusions and Recommendations**

A Is the World's Leading Advisory Firm on Capital Project for the Last 30 Years



',000+ capital 'ojects from ultiple industries

500+ megaprojects and 400+ Canadian projects

Owners, operators, EPCs, and service providers

Information obtained from project teams several points in project cycle

- First principles and statistical analysis
  - 500+ project research studies
  - Practices vs. results
  - Industry/sector trends and whitepapers
  - Customized research for individual companies
- 30+ research professionals

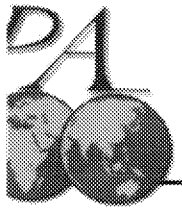
- Performance and plans
  - Individual project or system assessments
  - System and portfolio benchmarking, process improvements
  - Organization and staffing analysis
  - Customized consulting
  - Implementing Best Practice programs

IPA Database
Selected Clients

- IPA has worked in the past 25 years with leading private and state-owned companies and joint ventures worldwide
  - Exxon Mobil, Shell, Chevron, Total, BP, Conoco Phillips, Anadarko, Nexen, Marathon, and other major oil companies
  - State-owned or partially state owned companies such as Saudi Aramco, Pemex, Petronas, Petrochina, Statoil, Petrobras, PDVSA, ADNOC, OMV, Oman Oil, Sabic, Repsol, and Codelco

Basis of Analysis

- Organization charts and team staffing for 50 global megaprojects
  - Over 20 functions, both line and support positions
  - Over 8,000 individual positions
  - Model-based approach that controls for project characteristics such as project size and scope, contracting strategy, number of sub-scopes, and project type
- Lessons from over 500 global megaprojects and over 500 research studies



Outline

- Introduction
- *LCP Development and Execution*
- Organization and Team Effectiveness
- Selected Megaproject Lessons
- Conclusions and Recommendations

LCP Project Development Objectives and Scope

- LCP is providing renewable electrical energy and contributing to Newfoundland Labrador (NL) development

- Design and install hydroelectric generation facilities, transmission links, and support structures

  – Muskrat Falls Generation (MFG) includes 4 206-MW (totaling 824-MW) turbine/generators, dams/spillways, river diversion, north spur stabilization, reservoir, access road, and buildings

  – Labrador Island Transmission Assets (LITL) includes:

    - Island Link ±350-kV HVdc transmission connection from Muskrat Falls to Soldier's Pond (over 1,050 km of Transmission Line)

    - HVac to HVdc converter stations, shore electrodes, and 30 km of 350-kV HVdc cable crossing at Strait of Belle Isle (SOBI)

  – Labrador Transmission Assets (LTA) includes 315-kV HVac transmission interconnection from Muskrat Falls to Churchill Falls and HVac switchyards

LCP Project Development and Start of Execution (1)

- Owner developed business case and did Front-End Loading (FEL) with assistance from consultants
- In February 2011, SNC Lavalin in St. John's continued project definition and started detailed engineering under reimbursable contract*
- LCP team obtained environmental permits, agreements with Innu Nation, local communities, and other stakeholders
- Nalcor reached agreement with Emera to build Maritime Link to Nova Scotia

ecution phase start with production of issue for construction drawings and ends in mechanical
ipletion. LCP's start of detailed engineering followed Nalcor's Gateway process

LCP Project Development and Start of Execution (2)

- Canadian government provided $5 billion loan guarantee and NL province provided equity guarantee for completion
- LCP's December 2012 authorization was supported by the Canadian and NL governments and NL stakeholders

LCP Project Execution Organization

- LCP execution was organized under an Executive Committee, LCP Vice-president, LCP Corporate Integrator, and Project Director
- LCP use a Project Delivery Team Model that consists of Nalcor staff, significant SNC-Lavalin resources, third party consultants, and independent consultants
- Project Director leads Functional Managers, General Project Manager, and SOBI Manager
- LCP team has significant participation from non-owner staff (consultant and agency professionals) in leadership roles

LCP Status and Progress Key Findings (1)

LCP has achieved significant progress in execution and is organizing to complete construction and start operations

- Systems in place and coordinated effort by quality management, project controls, procurement, and technical integration
- Collaborative approach with contractors
- LCP team is updating its detailed construction plan and schedule to completion as part of the re-baseline effort for MFG

Re-baseline efforts helped LCP team communicate progress and organize path forward

Established TTO organization manages mechanical completion, transition to operations, and optimizes commercial value

LCP Status and Progress Key Findings (2)

- LCP has the following characteristics that are comparable to those of successful megaprojects moving forward:
  - Clear understanding of progress recently confirmed by re-baseline of September 2015
  - Systems in place to manage and control progress
  - Organization to manage all execution scopes and transition to operations
  - Proactive collaborative approach with contractors
- LCP should continue the continuous control and detailed planning to ensure meeting the recently updated project targets

Outline

- Introduction
- LCP Development and Execution
- *Organization and Team Effectiveness*
- Selected Megaproject Lessons
- Conclusions and Recommendations

Components of Team Development Index (TDI)

Project Objectives	Team Composition	Roles & Responsibilities	Project Implementation Process
ecific project ectives eloped ectives clearly mmunicated to understood by n members	• All functions that can influence project outcomes adequately represented on team	• Roles, responsibilities, and expectations clearly defined • Responsibilities and tasks agreed on • Project team aligned • Problem areas identified	• Common work process in place for developing and executing projects • Process understood by project team

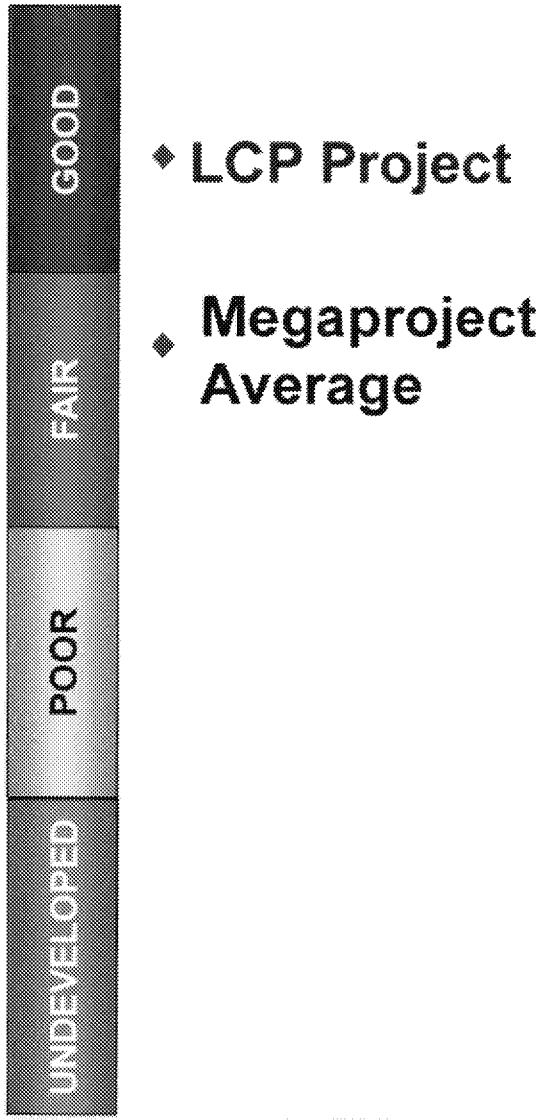
LCP TDI Is *Good*
LCP Project Team Is Integrated

Business and project objectives are clearly defined and communicated

Project team is fully integrated with all functions that have influence on project success

Roles and responsibilities are defined, and risks have been frequently assessed

Nalcor's Gateway work process followed



Key Drivers of Megaproject Performance
LCP Team Established Drivers of Team Effectiveness

Key Project Characteristics of Successful Megaprojects	LCP Status
lear Defined Objectives	Yes
ritical Owner Team Members*	Yes
eam Development Index	*Good*
ıtegrated Team	Yes
roject Director/Manager Continuity	Yes

Critical functions include Project Controls, Scheduling, Estimating, Operations, and Construction anagement

LCP Organization and Team Effectiveness Key Findings (1)

LCP established solid foundations for team effectiveness early in project development that are characteristic of successful megaprojects

- Clearly defined business and project objectives
- Integrated project team
- Defined roles and responsibilities
- Frequent risk assessments
- Use of work processes

Continuity of Project Director and senior key team members during execution is a characteristic typical of successful megaprojects

LCP Organization and Team Effectiveness Key Findings (2)

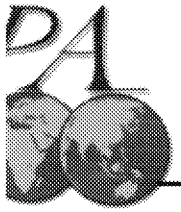
LCP organization comprises more levels than typically observed for similar projects, suggesting additional communication efforts required

Overall team staffing, team continuity, and colocation at St John's are strengths, but opportunities to improve communications and strengthen alignment remain

- Top vs. lower level management levels
- Owner vs. non-owner staff
- MFG and Island Link teams

Organization staffing analysis indicates that MFG would benefit from additional construction management

LCP lower level management comments suggest an increased management field presence will be beneficial



Outline

- Introduction
- LCP Development and Execution
- Organization and Team Effectiveness
- *Selected Megaproject Lessons*
- Conclusions and Recommendations

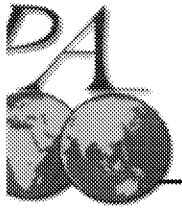
Introduction to Megaproject Lessons

- This lessons learned section include typical issues that megaprojects experience during execution
- These lessons provide insights that LCP can use to increase focus on aspects that can help avoid or mitigate potential risks

Megaproject teams tend to underestimate execution risks because they feel better prepared than ever before to manage organization and execution

Selected Megaproject Lessons
Execution Risks Are Often Underestimated

- Organizational complexity and team issues
- Failure to establish achievable schedule targets
- Unclear safety/schedule trade-offs
- Engineering and procurement schedule slip
- Inadequate effort to maintain value during construction
- These lessons are presented in the context of LCP path forward to completion as basis for recommendations



Outline

- Introduction
- LCP Development and Execution
- Organization and Team Effectiveness
- Selected Megaproject Lessons
- *Conclusions and* Recommendations

Conclusions

LCP has the following characteristics that are comparable to those of successful megaprojects:

- LCP established solid foundations for team effectiveness early in project development
- Organization has overall good staffing to manage all execution scopes, teams are well developed
- Established a TTO organization to ensure effective start of operations and optimal business value
- Clear understanding of progress recently confirmed by the September 2015 re-baseline
- Systems in place to manage and control progress
- Proactive collaborative approach with contractors
- Continuous focus on construction safety

Opportunities

IPA assessment revealed opportunities to continue strengthening organization and planning

- Increase detail of execution plans and further define the construction schedule to reflect the most recent re-baseline
- Establish achievable schedule milestones and completion target
- Increase alignment between owner and non-owner and vertical alignment among organization levels
- Increase construction management organization
- Ensure clarity of responsibilities and interfaces for Muskrat Falls Generation team

The assessment revealed that LCP strategies are consistent with the focus on achieving successful LCP execution to completion

Recommendations

- We offer recommendations based on assessment of LCP status and extensive experience with megaproject execution issues
- Most megaprojects underestimate execution issues, which often appear without advance warning and have effects across multiple dimensions
- LCP team is addressing these issues that industrial megaprojects experienced as it moves forward to complete construction
- These recommendations are presented as an explicit reminder that they should not be forgotten

Key Recommendations (1)

- All megaprojects have to be vigilant and exercise due diligence in reacting to capital productivity challenges
- Facilitate team effectiveness
  - Continue engagement with sponsors
  - Ensure effective interface management
  - Foster team continuity
  - Strengthen Team Functionality
- Continue to strengthen execution and TTO plans and optimize schedule to completion

Key Recommendations (2)

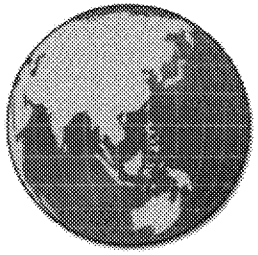
- **Continue to influence construction contractors' performance**
  - Understand and use current contractors' capabilities
  - Continue leading construction safety
  - Monitor alignment with contractors
  - Monitor and avoid potential claim issues
  - Continue managing construction productivity
  - Monitor procurement delivery and management
  - Avoid late changes and maintain effective controls
  - Help contractors achieve their incentives
- **Complete remaining engineering deliverables**
  - Implement engineering control and management

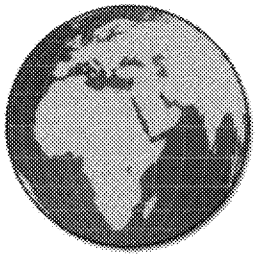
IPA

ıtact Information

Félix Parodi
+1 703 726 5304
fparodi@ipaglobal.com

www.ipaglobal.com





States
ndent Project Analysis, Inc.
Atwater Drive
rn, VA 20147

729 8300

ndent Project Analysis Latin America
sa E Consultoria em Projetos LTDA
ısteur, 463
:obá - 12o. andar
080 Curitiba, Paraná

3028 9028

Australia
Independent Project Analysis, Inc.
Level 1, 56 Burgundy Street
Heidelberg, Victoria 3084
Australia
+61 3 9458 7300

Singapore
Independent Project Analysis, Pte Ltd.
No. 1 International Business Park
#10-02 The Synergy
Singapore 609917
Singapore
+65 6567 2201

China
Independent Project Analysis, Inc.
#36 Chuangye Middle Road, #502
Haidian District, Beijing 100081
China
+86 10 6530 6170

United Kingdom
Independent Project Analysis, Ltd.
Wellington House - First Floor
Worton Drive
Reading RG2 0TG
United Kingdom
+44 118 920 7800

The Netherlands
WTC The Hague Business Center
Prinses Margrietplantsoen 33
2595 AM The Hague
The Netherlands
+31 70 335 07 07

2.0 Scope of Decision

Contract award
Following a competitive process on 24 September 2013 Nalcor issued a Limited Notice to Proceed to Astaldi Canada for the CH0007 contract for construction of the Intake and Powerhouse, Spillway and Transition Dams. The final contract was executed 30 November 2013 following project sanction. This contract, valued at $1.104 billion, represents 13.4% of the $7.653 AFE2 total costs of the Lower Churchill Project.

Slow startup at Muskrat Falls
Despite being one of the largest civil contractor's in the world with extensive experience in hydro generation construction, the contractor struggled to gain traction as it mobilized to the Muskrat Falls Site. In early 2014, Nalcor became concerned over the contractor's ability to complete the spillway and transition dams in time for river diversion in 2016. This was a critical path milestone which, if not met, could delay project schedule. ***It was at this point that Nalcor set the goal of ensuring Astaldi improved performance which became the Focus of 2014 and early 2015.***

Nalcor concluded Astaldi was weak in project management and field supervision for its Muskrat Team. It raised these concerns with Astaldi in early 2014 and was successful in convincing the contractor to undertake recovery and mitigation measures culminating in them hiring construction managers with decades of construction experience in Canada and Newfoundland and Labrador specifically. These individuals in turn recruited construction superintendents who were familiar with craft workers and unions in Newfoundland and Labrador and could better manage the provincial workforce.

Improved performance and increased confidence in contractor capacity
As 2014 came to an end, it became evident that progress on the spillway and associated structures were on the path to improvement, flagged by a marked difference in organization and planning. A step change was occurring that continued throughout 2015. It became evident to Nalcor's project team that the spillway completion/river diversion milestone would be attainable and that the contractor had the capability to complete its scope of work.

With the spillway, transition dams and separation wall clearly going to be essentially complete in 2015, Nalcor's construction focus with Astaldi became limited to the powerhouse, with the cost of the work under consideration now equal to <8% of the total project cost.

From Nalcor's perspective, it was evident that progress on the powerhouse was being hampered by delays in constructing the Integrated Cover System (ICS). The decision was made by Astaldi in late Q3 of 2015 to abandon the ICS and remove it at first opportunity. The powerhouse had seen positive movement in 2015 but should now be poised for much greater progress in 2016 due to this decision.

As 2015 came to a close, Nalcor worked with Astaldi to develop an optimal construction program for late 2015 and into 2016. The decision was made by Astaldi to halt the placement of concrete, which had been a costly and unproductive exercise during the previous winter. Instead, focus was placed on the installation of rebar and the construction of formwork such that the contractor would be much better

positioned to place concrete as the temperatures began to rise and daylight hours extended with the approach of spring.

Commercial Considerations- Potential Claim Preparation

When a contractor has a slow start, especially to the extent of Astaldi's, it typically leads to commercial challenges down the road for that organization. As 2014 pressed on, the Nalcor team not only focused heavily on turning Astaldi performance around but maintained a steady concentration on commercial management of the agreement to ensure no additional liability was assumed by Nalcor. Once the performance improvement was evident Nalcor set the goal of preparing for and mitigating any future claim from Astaldi. ***This was the Focus starting in mid 2015*** onward.

Throughout 2015, Astaldi continued to blame the pace of construction on issues such as actual labour productivity vs perceived at award and began to suggest Nalcor had misrepresented the capabilities of the Newfoundland and Labrador workforce. Accordingly Nalcor increased its claims mitigation focus and increased its understanding of the commercial issues at play.

The traditional Claim situation in construction occurs at the end of a project but it was clear that this issue would likely raise its head mid execution. In those situations a common approach is to assess the strength of any potential claim, consider the value of potential lost time due to the contractor becoming commercially focused, consider the value of having a cooperative contractor to complete the project and at the appropriate time set up an incentive program for the contractor to ensure timely completion. It was on this basis that the original commercial focus of the Nalcor team was based on:

1. **Strength of Claim**
2. **Mitigation of potential lost time**
3. **Mitigation of execution issues due to an uncooperative contractor**

Whilst analyzing these factors, early consideration was also given to possible alternatives given the stage of the project.

Analysis of costs to complete powerhouse

Given the fact that construction was mid stream it was clear that understanding the cost to complete may form a large part of any commercial or claim discussion. As part of its commercial due diligence, in mid-2015 Nalcor commenced what would become a multi pronged analysis of the costs to complete the powerhouse compared to Astaldi's bid. It should be noted that multiple contractors put forward bids that contained similar estimates for person hours of work and production. However, given the actual amount of funds spent on labour in 2014, the gap for Astaldi to complete the project was thought to have the potential to be significant. Internal analysis in mid 2015 showed the potential for the financial gap to be in excess of $500million. Further reviews would show the gap to be forecast between $600 and $800+million depending on the approach used to analyze.

With such a significant gap apparent this introduced new factors that needed to be considered on top of the traditional items previously noted and added considerable more emphasis to the consideration of alternatives.

4. **Cost to complete over and above Astaldi contract**
5. **Astaldi's financial strength, i.e. their ability to pay**
6. **The cost of Alternative execution approaches given the size of the issue**

Nalcor engaged Westney Consulting out of Houston, Texas, who had previously been engaged on the file from a construction analysis perspective, to look at Astaldi's financial status and its financial capacity to complete the job. At award, both Standard and Poor's and Moody's rated Astaldi as a B+ credit risk. However, as a result of risks to the company, including the Muskrat Falls project and other work in Turkey and South America, Westney advised that Astaldi now had liquidity and credit concerns which raised questions about the contractor's ability to complete the job. The market began to recognize these challenges as well, and Astladi's stock price on the Milan exchange fell from more than 10 Euros to approximately 4 Euros and saw downgrading or negative outlooks by several analysts and rating agencies.

Nalcor, supported by external consultant Westney, also determined through the 2015 period that Astaldi would not be able to complete the powerhouse by late 2017 consistent with the project schedule. Recent analysis indicates the powerhouse will require an additional 12-18 months to complete.

Alternatives for moving forward

Nalcor used the productive time of 2015, and indeed spent much of the last part of the year considering its alternatives for completing construction of the powerhouse. Its alternatives can broadly be categorized as either staying with Astaldi as the primary contractor or replacing them with a new contractor. The options for each alternative are as follows:

1. Stay with Astaldi
    a. Provide no financial assistance (sub categories of solvency vs insolvency)
    b. Negotiate financial assistance (Pay full cost to complete would be maximum number under this scenario)
    c. Integrate with Astaldi
2. Replace Astaldi
    a. Terminate without cause (possible subcategory of mutual termination)
    b. Terminate for cause
    c. Astaldi default – i.e. abandons the job

Various versions of these options have been considered. The main options deemed worthy of further analysis and presented under Section 6.0 of this document.

Decision Making Framework

The Lower Churchill Project uses an established and documented process to facilitate alternative evaluation and strategic decision making. This framework is embedded in Nalcor's Decision Gate process for project delivery and mirrors oil industry standards, including such companies as Chevron and ExxonMobil. Critical to this framework is the understanding that non-plausible alternatives must be screened out early in order to focus on outcomes that are more likely. Similarly, there needs to be an

understanding of the implications of all the alternatives on the outcome of the project which balances risk and reward.

LCP's framework for making decision is iterative by necessity, as inherent in the evaluation of alternatives for multi billion dollar projects is the need to adapt to the fluid and changing nature of variables which cannot always be predicted. Decisions such as this one are made based on the best information available at the time and are very dependent on the experience of the team.

The steps in the model are as follows:

- Issue identification;
- Framing and initial assessment;
- Identification of alternatives;
- Analysis of alternatives;
- Selection of preferred alternative; and
- Implementation.

It should be noted that LCP's decision making model balances absolute costs against cost certainty.

Conclusion and recommendation – Negotiate a financial contribution that allows Astaldi to complete the job

Nalcor's conclusion was that negotiating with Astaldi to continue construction for at least the 2016 construction season provides the least cost/risk exposure to Nalcor and the Government of Newfoundland and Labrador for moving forward. Considerations include;

- Astaldi has proven it has the capability to complete the work;
- It minimizes the possibility of Nalcor having to pay another contractor the full cost to complete the job, or minimizes the additional money that should have to be paid to another contractor should the decision eventually be made to remove Astaldi;
- It preserves the current construction team, including highly experienced Newfoundland and Labrador supervision;
- It allows the project to benefit from the 2016 construction season, which is now upon us; and
- Provides the most certainty and controlled predictive outcome with the least exposure to Nalcor.

Furthermore, providing financial support to Astaldi mitigates a number of important risks, including the possibility of abandonment by Astladi, a distress sale of Astladi which could result in their replacement with a less cooperative contractor, and future litigation with Astaldi.

It is also Nalcor's position that any financial support will only lessen Astaldi's losses, which will be significant. It will not result in Astaldi returning to a profit scenario in any way, but will only get them to a position where they are more able to complete the job.

Pros

- Much decreased likelihood of Astaldi default and associated higher cost exposures of switch out;
- Maintains our contractual rights with Astaldi – Deal done on our terms;
- Decreases likelihood of slowed powerhouse progress and control of project path forward remains with Nalcor;
- Decreased likelihood of completion date beyond 18 months and increasing associated costs;
- Decreased risk of justified claim creation by Astaldi – focus will be on meeting dates and collecting funds versus claims;
- Eliminates any historical claim risk;
- Better cooperation from contractor lowers probability of new risks;
- Bolstering of owners team, although necessary, will be less.

3.0 Decision Process

In an effort to select and recommend the preferred course of action for the Astaldi file, LCMC has employed a Decision Analysis ("DA") framework, as shown in Figure 1 and further described in Section 3.1. Using this DA framework, LCMC has attempted to transform the Astaldi situation described in the earlier section into a situation wherein the recommended solution becomes an obvious choice.

Pursuant to this DA framework, the Astaldi file has been evaluated in order to select the recommended action plan.

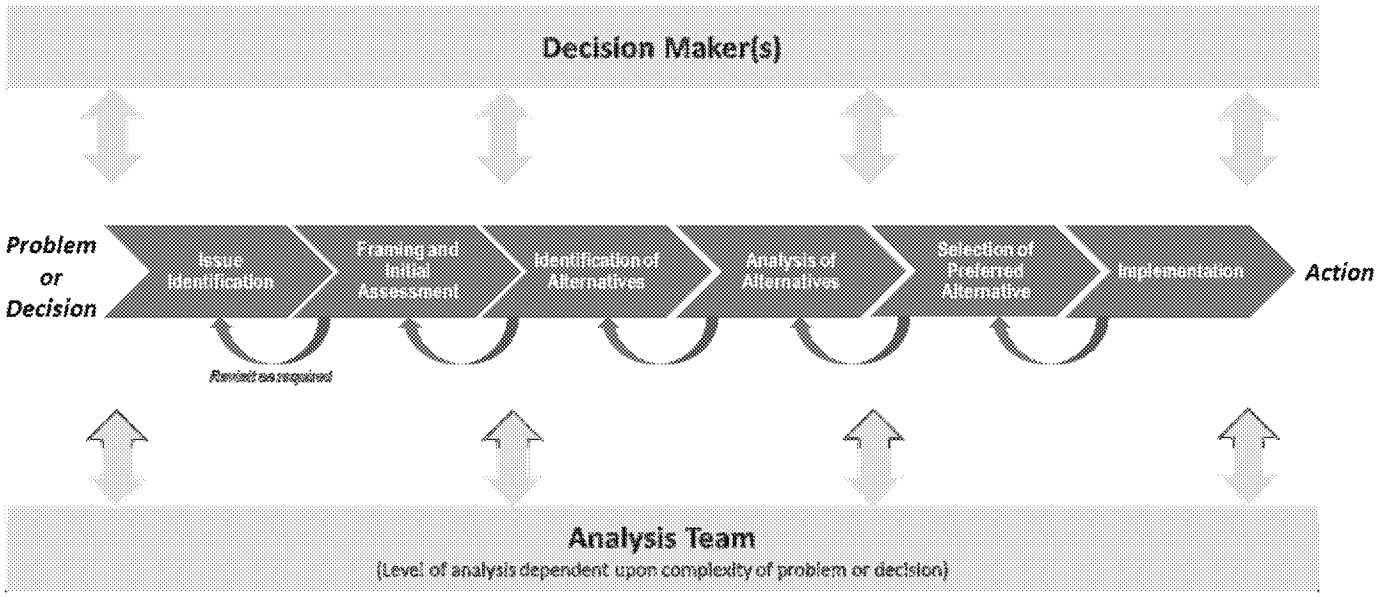


Figure 1: LCMC's Decision Analysis Framework

Pages 42 – 52 have been fully redacted.

4.0 Range of Options

The options considered were broken into two broad categories:

- Continue with Astaldi
- Continue without Astaldi

Within each of these two categories, a number of additional options were considered:
With Astaldi Options:

- Status Quo Resulting in Astaldi's Insolvency
- Status Quo Not Resulting in Astaldi's Insolvency
- Amend Contract with Financial Assistance (negotiate)
- Integrated Team (Astaldi/Nalcor)

Without Astaldi Options:

- Terminate Contract with Cause
- Terminate Contract without Cause (possible sub category of mutual termination)
- Astaldi Defaults on Contract i.e., abandons the job
- A brief overview of each of these options is presented below.

Option 1a) Status Quo Resulting in Astaldi's Insolvency
Under this option, it is assumed that Nalcor takes no action under the assumption that Astaldi will fulfill their contractual obligations and absorb all losses, resulting in the eventual insolvency of Astaldi Canada.

Option 1b) Status Quo Not Resulting in Astaldi's Insolvency
Under this option, it is assumed that Nalcor takes no action under the assumption that Astaldi will fulfill their contractual obligations and absorb all losses. It is also assumed that Astaldi Canada will be able to absorb these losses and remain solvent.

Option 2) Amend Contract with Financial Assistance (Negotiate)
Under this option, it is assumed that Nalcor and Astaldi Canada complete negotiations and enter into an agreement to revise the contract. The approach to be taken during negotiations is under continuous assessment but is summarized at a high level under the path forward section of this document.

Option 4) Integrated Team
Under this option, it is assumed that Nalcor will provide management support to Astaldi and form an integrated management team to oversee completion of the CG0007 work scope. Under this scenario, Nalcor assumes much of the completion cost of the project.

Option 3) Terminate with Cause

Under this option, it is assumed that Nalcor will terminate the contract with Astaldi for cause and bring in another contractor to complete the scope of work. Nalcor will then proceed to collect on the contractual securities in place.

Option 5) Astaldi Defaults

Under this option, it is assumed that Astaldi defaults on their contractual obligations and abandons the job, resulting in the need to bring in another contractor to complete the scope of work. Nalcor will then proceed to collect on the contractual securities in place.

Option 6) Mutual Termination

Under this option, it is assumed that Nalcor and Astaldi agree to mutually terminate the contract. As part of the mutual termination agreement, it is assumed that securities will be removed and an overall mutually agreeable settlement will be agreed to.

5.0 Analytical Framework

To provide Nalcor management with an appropriate framework for analyzing the relative merits of each option, an analytical framework was established. This framework allowed for a comprehensive analysis of each option on the same basis so that the options could be compared in a consistent and thorough manner to the degree possible.

The following categories are being used to compare the alternatives:

Schedule/Time Lost

The main basis of Schedule/Time Lost determinations is the current Astaldi schedule that shows 12-18 months delay. This assumes a negotiated outcome with Astaldi (i.e., Option 2) wherein Astaldi do not artificially constrain the planned production program due to cash flow constraints. This is considered the best case, non-risk adjusted planning scenario – and is considered to be the base case. When estimating probable time/schedule for all other options under consideration, the variances are relative to this base case.

Project Team Carrying Costs

Project team carrying costs reflect the following:

- Salaries, fees, expenses associated with the Project Delivery Team required to support the final delivery of Muskrat Falls Generation facility;
- Site operating costs for services required to maintain/operate the Muskrat Falls Site (i.e. keeping it open for business), including fixed and variable costs; and
- Camp and travel costs.

Monthly costs reflect the current spend rate, and no provision has been set for annual cost escalation. These monthly costs are multiplied by the schedule/time lost assumption to arrive at a total estimate of Site Carrying Costs, and are expressed as a range when the Schedule/Time Lost is also projected to be a range.

Financing Costs (IDC's)

Terms of the bond call for fixed semi-annual $150 million payments beginning in December 2018. These terms are fixed regardless of how the Project is executed and when the Project is completed. The impact is on the source of the cash flow (i.e., whether it is from capital or operations). Total financing costs are relative to length of protracted Schedule.

Third Party Direct Cost Impacts

Delay of the Powerhouse and Intake have a "knock-on" effect to other contracts – notably CH0030, CH0032, CH0031, CH0009, and others (Elevators, powerhouse cranes and GSU transformers, Powerhouse Interconnect scope). LCMC internal resources have performed estimates of these probable costs.

Revenue and Opportunity Costs

The cost of this impact is dependent on both the length of the delay and the seasonality of the delay. Detailed analysis by Nalcor Energy's Investment Evaluation team was conducted in the fall of 2015 and is currently being updated to reflect the latest information on expected schedule delays and on expected project cost impacts.

CH0007 Scope Completion Costs

The source of CH-0007 Scope completions costs includes Astaldi generated estimates, LCMC generated estimates, stipulated contractual amounts, and various adjustments to account for the degree of uncertainty at this stage. While at a high level, it is considered this method delivers appropriate accuracy and precision to complete the comparative evaluation and inform a decision on the path forward.

6.0 Options Analysis

A matrix summary of the CH0007 Execution Options Analysis and supporting notes are attached. In addition, the notes make reference to a number of documents and further supporting rationale – these are appended.

Notes to CH-0007 Execution Options Analysis

0) This document is a relative comparator using deterministic data to assist in a decision-making process. The assumptions and data are under continuous review given the ongoing fluid nature of the project execution.

1) General: LCMC has prepared an internal schedule review for Muskrat Falls resulting in a first power date of February 2019 (or a 14 month delay from the original baseline). (Ref: Nalcor PCS as of December 2015 – UNAPPROVED Working File) This is still subject to a review pending outcome of work-in-progress. Its main basis is an Astaldi schedule that shows them 12-18 months delayed. (Ref: Astaldi Schedule as of January 2016 [Level 1 and Level 2]). However, it does assume a negotiated outcome with Astaldi (i.e., Option 2) wherein Astaldi do not artificially constrain the planned production program due to cash flow constraints. This is considered the best case, non-risk adjusted planning scenario – and is considered to be the base case when estimating time/schedule for all other options considered.

2) Option 1(a) As-is – No Assistance / Insolvency: [redacted] In this scenario, the assumption is the delay will exceed the base case schedule prepared and reflect closer to a 21-27 month delay (or worse). This is because the schedule is dramatically altered due to Astaldi's insolvency, leading to a number of disruptive factors driving the schedule risk including:
   a. attrition of key management and supervisory personnel required to achieve the production rates achieved in 2015 and required to achieve re-baseline schedule;
   b. delayed and deferred decision making due to cash flow constraints;
   c. production slowdown due to cash flow constraints;
   d. creditors influence project execution decisions; and
   e. creditor constraints will drive decision making and will constrain decision making in favor of creditor protection versus project execution.

3) Option 1(b) As-is – No Assistance / Solvency: The base case schedule prepared and underlying production plan is considered not viable given the constraints imposed by Astaldi's operating cash flow limitations. In this case, Astaldi are focused on survival and minimizing capital outlay, while matching to available cash flow, which underlies the production plan. Quite simply, progress is not constrained by what is technically achievable, but by operating cash flow restraints and excessive commercial focus that detracts from execution. Work is slowed considerably and the impacts identified in 2) above are tempered, but the outcome is still further delay assumed to be 24 months or greater.

4) Option 2 Negotiated Outcome: The Nalcor schedule analysis forecasts a 14 month delay (the base case). But for the purposes of options analysis – a range of 12 to 18 months is assumed using the Astaldi base schedule. The outer range of 18 months reflects a risk-adjustment to the re-baseline production plan driven by concrete placement rates. This risk is attributable to the volume of concrete production going forward which is significant, the size and complexity of our concrete pours, and the potential risk associated with trade-stacking in the Powerhouse (single 'compressed' work location). The negotiated outcome

would ensure focus on completion with appropriate incentives that would make the estimated window of completion viable.

5) Option 4 Integrate: Time risk is evident in any scenario that contemplates a merger of the two organizations of Astaldi and LCMC. Herein it is assumed that production rates are no better than those used in the base case. However, additional delay is expected with additional time added for transition to a new organization, with time impact (i.e. production losses) varying depending on ease of integration. It is not plausible that the momentum maintained under Option 2 can be fully sustained due to transition issues, thus when combined with production placement rate risks, results in an incremental delay of 3 months – thus 15 to 21 months overall delay. It should be noted that in this case Nalcor will assume completion risk.

6) Option 3 Termination for Cause: Time exposure is one of the highest. Incremental time over Option 2 is required under this scenario to demobilize existing contractor (2 to 3 months), mobilize a new contractor (2 months), ramp up of management and labour resources (assumes max 100 new persons per week 2 – 4 months) and a learning curve exposure (3+ months). It must be stated that under this scenario it is also assumed that infrastructure assets and key subcontractor arrangements are maintained (i.e. concrete batch plants, temporary power, cranes, fleet, shops, etc.). If this is not the case then further time exposure exists for the duration to remobilize new contractor. Time will be lost to survey status of all partially complete work and ensure the work-site is demobilized in a safe and orderly fashion as well as set the basis upon which the contract scope and compensation scheme will be established for the replacement contractor. It assumes that the replacement contractor will hit the same production targets as the Option2 scenario, which is considered aggressive given the learning curve that would be applicable. This time has minimal or no time allowance for a procurement process. It can however be mitigated in part if replacement occurs at the end of a season. Such a move would allow more time for demobilization, ramp up and learning curve correction before the critical spring-fall construction season kicks in meaning the time lost is done so in a less productive time of year.

7) Option 5 Default: Time exposure is largely consistent with Option 3 as all the same steps are required to demobilize, procure, and mobilize a replacement contractor, while at the same time working through the remedies available under the Agreement with Astaldi. It also assumes that the replacement contractor will hit the same production targets as the base case, which is considered aggressive given the learning curve that would be applicable.

8) Option 6 Mutual Termination: The worst case time exposure is tempered from Option 3 due to an orderly transition from Astaldi to the successor contractor. Demobilization is undertaken in an orderly fashion, including transition of key infrastructure assets and sub-contractor arrangements (i.e. LRM) to successive contractor. Despite the transition, an aggressive assumption was made that an expedited ramp-up of the successive contractor in order to support the production rates established under the base case.

9) Production rates of a prudent contractor are, in the opinion of Nalcor and its advisors, those rates obtained by Astaldi during the second half of 2015. (Ref: LCMC Cost to Complete

Forecast) (Ref: Westney August 2015) The PCS supporting February 2019 first power (base case) was based on rates that are considered achievable by a prudent contractor unrestrained by cash flow issues. These rates are discussed in greater detail under the discussion surrounding the cost to complete estimate in Note 15.

10) Project team and site operating costs reflect both the salaries, fees, expenses associated with the Project Delivery Team required to support the final delivery of Muskrat Falls, excluding staff assigned directly to LTA or LIL. Monthly costs reflect the current spend rate, and no provision has been set for annual cost escalation. Site Operating costs reflect the costs for services required to maintain / operate the Muskrat Falls Site (i.e. keeping it open for business), including fixed and variable costs. (Ref: Site Carrying Costs) Range two includes operating costs of accommodations complex as well as travel costs for Astaldi workers currently reimbursed under the Agreement. These monthly operating costs would be maintained irrespective of timeline extension. No allowance has been made for repair, modification or life extension of any site infrastructure.

11) Option 4 Integration: Additional owner's team costs will be required in order to ensure LCMC's obligations and interests are fulfilled as the current site team staffing levels are not contusive with the resourcing that will be required should this alternative be selected. Early estimates are for a 30% increase in MF project site team totaling some ~ $1 million /month.

12) Terms of the bond call for fixed semi-annual $150 million payments beginning in December 2018. These terms are fixed regardless of how the Project is executed and when the Project is completed. The impact is on the source of the cash flow i.e. whether it is from capital or operations.

13) The cost of this impact is dependent on both the length of the delay and the seasonality of the delay. Detailed analysis by Nalcor Energy's Investment Evaluation team was conducted in the fall of 2015 and is currently being updated to reflect the latest information on expected schedule delays and on expected project cost impacts. (Ref: Investment Evaluation Revenue Opportunity Cost Analysis [in progress])

14) In all cases, continuing with Astaldi is the best option for minimizing the impacts on other contract packages. This is driven by increased certainty with delivery timelines. The worst case occurs when schedule is longer and less certain. Nalcor cannot, with certainty predict the interface schedule impacts but can use parameters such as labour costs per package, storage requirements and other considerations to estimate additional cost exposures. The numbers presented in the table are based on (Ref: Interface Contract Cost Exposures and are rounded to the nearest $5 million. The affected contracts are listed below.
    a. CH0030
    b. CH0032
    c. CH0031
    d. CH0009
    e. Others – Elevators, powerhouse cranes and GSU transformers, Powerhouse Interconnect scope.

15) All Base Case cost to complete calculations are done using an approximation of Astaldi's forecast to complete as provided to LCMC by Astaldi in December 2015. (Ref: Astaldi Cost

to Complete Congest) [redacted] Approximately 8 million hours are forecasted to complete the remaining 295,000 m3 of concrete or 27 hrs/m3 all in (direct and indirect costs). This compares with a 2015 rate of 29 hrs/m3 all in for 120,000 m3 of concrete. Based on this forecast, the total hours to complete are estimated at ~ 13 million. At an average cost of $80 per hour, this equates to a total labour cost at completion of ~$1.04 billion or twice the original contract value. LCMC analysis shows risk of a lower productivity and thus higher cost but it is within a reasonable percentage of Astaldi's view. (Ref: LCMC Cost to Complete Forecast) LCMC believes that Astaldi's rate can be achieved with the realization of efficiencies related to removal of sub-contractors for rebar and electrical, the completion of the ICS removal, the completion of site installation, better management of indirect hours and overall better labour management.

16) LCMC believes that the basis of the compensation for the replacement contractor to conclude the balance of scope will be at-cost plus a fixed fee equating to 10 to 15% of the cost to complete. Selection criteria for replacement contractor will be very stringent while replacement contractors will be very concerned about reputation damage assuming the partial completed plant, thus demanding cost plus fixed fee. 10 to 15% fee is considered reasonable but not conservative in light of other profit ranges seen on other reimbursable projects (e.g. Hebron's KKC or Vale's KBAC). The total amount allocated will also vary dependent upon the assumption of timing of a switch out. The less work remaining, the lower the premium to be paid.

17) $200 million in LCs with varying levels of net collection assumed depending on the particular scenario in question.(Ref: Letter of Credit [A and B]) The amounts shown reflect actual amounts that can be collected under the LOC's. The treatment of collection for the LOC associated with the Advance repayment under accounting rules as an offset to the Advance is not considered in this exercise. The end result would likely be that the scenarios where securities are collected are conservative and would be worse than presented.

18) $150 million surety bond in place with a wider range of assumed amount collected based on the various scenarios. (Ref: Performance Bond) The likelihood of collection is higher with insolvency and abandonment than termination for cause.

19) $75 million in LDs with $20 million already collectable (but not collected yet). It is expected that all of the LDs will become collectable based on Astaldi's performance to date. This is a conservative view as actual collection may not prove practical, making most termination options worse.

[redacted]

[redacted]

21) LCP's contribution to Astaldi as part of Scenario 2, for the purposes of this exercise, is purely a number used for comparative purposes and is based on the minimum amount believed to be accepted by Astaldi at this time. This is solely based on the opinion of the negotiating team and is a fluid number that will adjust up or down based on four factors, 1) Astaldi's ability to pay, 2) Nalcor's view of its claim exposure, 3) Nalcor's view of the fact that time and progress interruption has value and 4) the cost of any potential alternatives to Nalcor.

22) Assumes collection on Parent Company Guarantee . The value is capped at 50% of the contract value with certain restrictions that remove the cap, like abandonment (thus the reason for + under certain default situations). It is offset by the value of any other collections like securities, LD's, etc. This financial security is assumed to be $0 in an insolvency situation. This is a conservative view as actual collection may not prove practical, making most termination options worse.

23) This row calculates the range of total costs to LCP under each scenario

24) This option is currently not seen as being available due to the performance levels being achieved by Astaldi (Ref: Westney August 2015) [redacted]

Pages 64 – 126 have been fully redacted.

Westney Consulting Group

Powerhouse Contractor Production Review for the Lower Churchill Project

Site Visit: 20-23 July 2015

Date Issued: 4 August 2015

nalcor energy

Contents

Details	Page
Executive summary	2
Background and objectives	3
Review of production rates	4
Summary of key improvements observed since our last visit	5
Overall findings against critical areas for sustained improvement	6
Recommendations for continued improvement	7
Appendix	8
Details of Westney's review approach	9
Detailed findings	10-12
Westney CV's	13-17

Executive summary

1. **Astaldi has made significant progress in areas critical for sustained production to project completion**, including:
   - Organization structure and project leadership
   - Project planning
   - Overall ability to meet current schedule

2. **Production rates have improved from our last visit** - becoming closer to plan and exceeding Westney's expectations

3. **Improvements are easily observed at the site**, including increased management presence at the work-face leading well organized, motivated crews

4. **No significant deficiencies were identified** against performance factors benchmarked

5. **Astaldi is receptive to productivity improvement opportunities recommended and is looking to continuously improve**

Westney is supporting Nalcor to develop the path forward plan for the Lower Churchill Project

Primary focus of this report

Context

- Nalcor is in the midst of constructing the Lower Churchill Project, a 824 MW hydroelectric facility in Labrador, Canada
- The construction contractor, Astaldi, has performed below expectations, but has recently implemented several improvement measures
- Nalcor has engaged Westney Consulting Group to assess whether the improvement measures implemented are sufficient and sustainable, and to help ensure that project objectives are met

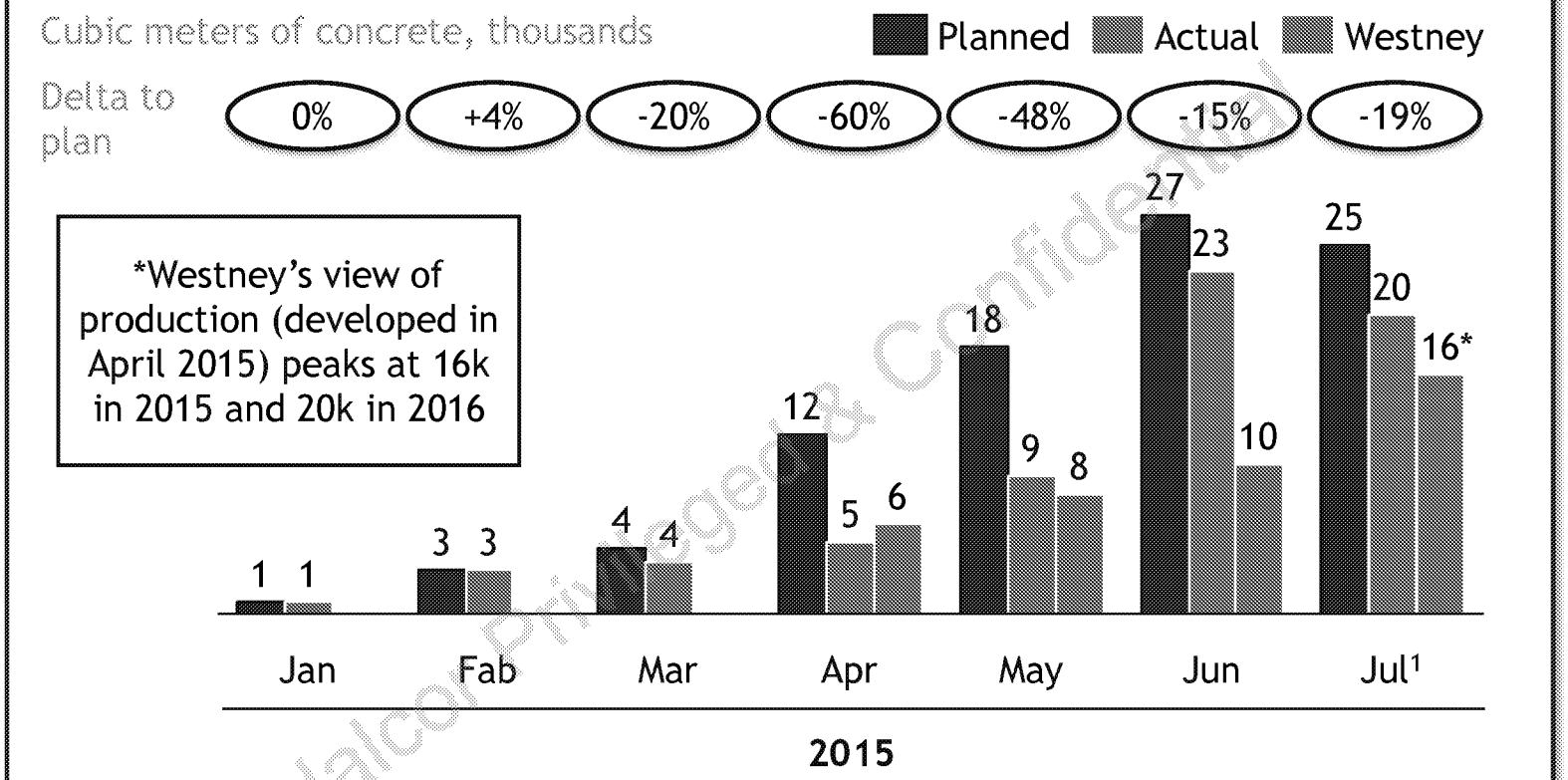
Objectives

Our effort is focused on:

1. Assessing the likelihood of Astaldi successfully completing the project
2. Identifying opportunities to improve construction productivity
3. Evaluating options / alternatives for completing the project

Focused improvements have resulted in production closer to plan and exceeding Westney's expectation

2015 concrete production rates



- **Personnel changes were completed in May**, including 3 experienced managers (superintendents, project manager) and new craft labor supervision
- **Management functions well and is focused on addressing production issues**

1 Production rate was 9,927 m^3 for the first 2 weeks of July. The remaining 2 weeks of July were assumed to have the same production.

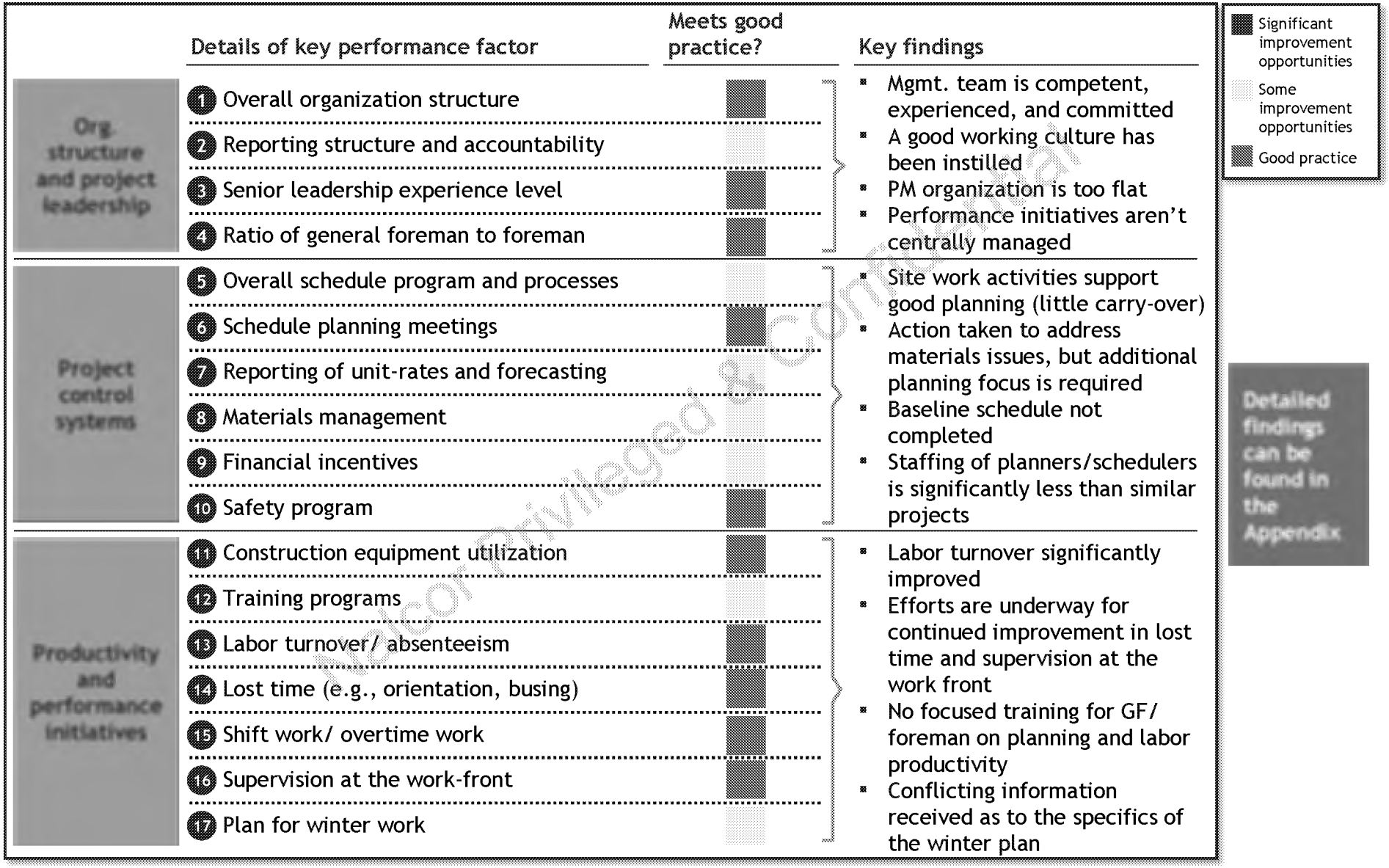
Source: Astaldi weekly progress reports

Several observations support the improvement realized

From…	…To
▪ **Significant crew "stand-around" time**	▪ **Well organized and motivated labor**, enabled by a good working culture instilled by management
▪ **Limited construction management presence in work areas** due to meetings	▪ **Increased management presence** enabled by improved organization and timing of management meetings
▪ **Disorganized laydown areas** impacting productivity	▪ **Well organized, easily accessible laydown areas**
▪ **Visible debris and clutter** creating unnecessary hazards	▪ **Greatly improved site cleanliness and overall industry standard safety practices**, including a safety recognition and awards program

The positive observations are indicators of the effectiveness of the construction management team and are fundamental drivers of productivity

No significant deficiencies were identified with Astaldi's current performance



Based on our conversations, Astaldi is receptive to recommendations for continued improvement

A few recommendations were suggested to Astaldi to address specific findings

	Details of key performance factor	Finding	Recommendation
Org. structure and project leadership	2 Reporting structure and accountability	▪ PM organization is too flat	▪ Reduce the number of direct reports to the PM from 14 to ~6-8
		▪ Performance initiatives aren't centrally managed	▪ Establish a staff position to manage the performance improvement initiatives
Project control systems	5 Overall schedule program and processes	▪ Staffing of planners/schedulers is significantly less than similar projects	▪ Staff additional work-face planners to work with the superintendents ▪ Split the current deputy PM/senior planner role into 2 roles
Productivity and performance initiatives	12 Training programs	▪ No focused training for GF/ foreman on planning and labor productivity	▪ Conduct specific training programs for craft supervision superintendents and GF focused on labor productivity

Additional suggestions included:
- Getting the craft more involved through a locally designed improvement program
- Completing weekly craft supervision surveys to identify impediments
- Implementing an awards program (e.g., entry in a monthly raffle) for achieving specific milestones

Appendix

Findings are based on interviews with stakeholders, field visits, and reviews of key documents

Overall approach

1. **Review key documents** (e.g., Astaldi contract, organizational chart, detailed schedule and 3-week lookahead)
2. **Conduct field visits**
3. **Interview stakeholders**
4. **Assess progress since last visit and identify deficiencies** in meeting the current schedule

Interviews completed

	Name	Role
Nalcor	Lance Clarke	...
	Tony Scott	...
	Jason Kean	...
	Mike Harris	Commercial manager
	Bruce Hallock	Disputes manager
	Ron Power	Project manager
	Bill Knox	Construction manager
	Ed Bush	Deputy PM
	Peter TseKouras	Area construction manager
	Andrew Twitty	Home office planner
	John Gouthro	Site planner
	John Mulcahy	Construction consultant
	Peter Mulcahy	Cost engineer
Astaldi	Giacomo Orsatti	Project director
	Don Delarosibil	Project manager
	Bassano Erasmo (Bruno)	GM construction
	Pete Knox	Construction manager
	Rick Lewis	Site services manager

Detailed findings (1/3)

Org. structure and project leadership

	Details of key performance factor	Meets good practice?	Key findings
1	Overall organization structure	■	▪ Significant changes in management personnel have been made, including 2 local superintendents, a senior construction project manger, and GF and foreman ▪ Management additions are experienced in Canada, know the Labrador labor market, and have worked together previously
2	Reporting structure and accountability	▒	▪ PM organization is too flat, with 14 direct reports currently, as compared to the standard practice of ~6-8 ▪ Performance initiatives aren't centrally managed
3	Senior leadership experience level	■	▪ Management team is competent, experienced, and committed ▪ A good working culture has been instilled
4	Ratio of general foreman to foreman	■	▪ PLA defines the ratios of GF/foreman, but in some cases Astaldi has reduced the ratio further to increase productivity

■ Significant improvement opportunities
▒ Some improvement opportunities
■ Good practice

■ Potential opportunity

Detailed findings (2/3)

Project control systems

	Details of key performance factor	Meets good practice?	Key findings
5	Overall schedule program and processes		▪ Site work activities support good planning (little carry-over) Baseline schedule not completed, and is critical for long range planning and materials requirements Staffing of planners/schedulers is significantly less than similar projects
6	Schedule planning meetings		▪ 3 key meetings are conducted 1) 6:00 AM coordination between area supervision 2) 12:00 PM meeting with senior project leadership and 3) Afternoon - GF meet with foreman to plan for the next day
7	Reporting of unit-rates and forecasting		Performance Factor table based on "earned value" does not reflect improvements and should be reviewed
8	Materials management		Action taken to address materials issues, but additional planning focus is required
9	Financial incentives		Financial incentives are not allowed for union labor (per the PLA), but a completion bonus is being considered ▪ Completion bonus used for "non-manual" staff
10	Safety program		▪ Astaldi has a quality safety program that includes an awards recognition program and a "field observations" card for recognizing good safety behavior "on-the-spot"

Significant improvement opportunities

Some improvement opportunities

Good practice

Potential opportunity

Detailed findings (3/3)

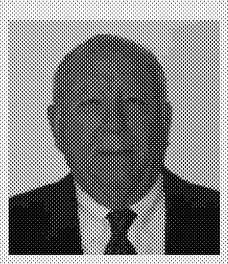
Significant improvement opportunities
Some improvement opportunities
Good practice

Potential opportunity

	Details of key performance factor	Meets good practice?	Key findings
Productivity and performance initiatives	11 Construction equipment utilization		▪ Sufficient equipment is on site ▪ Coordination of equipment is managed through site services
	12 Training programs		▪ Safety training programs are in place ▪ No focused training for GF/ foreman on planning and labor productivity
	13 Labor turnover/ absenteeism		▪ Labor turnover significantly improved, likely due to increased morale ▪ Previous turnover was ~12%
	14 Lost time (e.g., orientation, busing)		▪ Efforts are underway for continued improvement in lost time and supervision at the work front
	15 Shift work/ overtime work		▪ Shift work is being properly executed to support the day shift and utilization of construction equipment
	16 Supervision at the work-front		▪ Supervision at the work-front has improved and will remain a priority ▪ Very little "stand-around" time was observed
	17 Plan for winter work		▪ Conflicting information received as to the specifics of the winter plan ▪ The winter period could utilized for a management alignment session as well as an opportunity for craft training

Westney CV's

James P. (Pete) Oppenheim, Senior Executive Consultant



Pete has decades of experience from both the owner and contractor perspective. As an executive with MW Kellogg and later KBR, he served as Vice President and executive sponsor/project director for large and complex international projects such as LNG plants, major upstream developments, and infrastructure. He was also Vice President Houston Operations for Stone and Webster. Pete's earlier background as Manager of Estimating and Project Controls for MW Kellogg provided him with a deep understanding of cost and schedule management and risk analysis.

Profile

Education

- North Carolina State University: BS, Geological Engineering
- North Carolina State University: MS, Nuclear Engineering

Associations

- Society of American Military Engineers

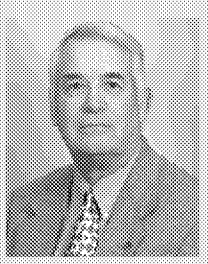
Service

- Served over 26 years in the U.S. Army Corps of Engineers with extensive experience directing engineering and design, planning, and contracting and construction management including the U.S. Army's base nuclear power facilities

Professional Experience

- Senior Executive Consultant, Westney Consulting Group, Inc.
- Sample Engagements with Westney include:
  - Multiple oil and gas projects including $10B refinery in the Middle East, LNG plant in Alaska
  - Multiple mining development projects including mines in Madagascar, Panama, two in Chile, and in Siberia
  - A nuclear power plant construction in Eastern US
- VP, Project Management, MW Kellogg
- VP, Houston Operations Center Stone & Webster
- Project Director on a large, complex LNG project in Africa

Dr. Richard Tucker, Senior Executive Consultant



Dr. Richard L. Tucker's career has been wide-ranging: project engineer for Engineering Science Consultants in Austin, Associate Dean of Engineering at The University of Texas at Arlington, and Vice President for Research at Luther Hill & Associates, prior to joining the faculty at UT Austin in 1976. He is Professor Emeritus in the Department of Civil Engineering and holds the Joe C. Walter Jr. Chair in Engineering. Dr. Tucker has also served 50+ clients in construction related capacities over the years.

Profile

Education

- Ph.D. in Civil Engineering, The University of Texas at Austin, 1963
- M.S. in Civil Engineering, The University of Texas at Austin, 1960
- B.S. in Civil Engineering, The University of Texas at Austin, 1958
- Hardin-Simmons University, Abilene, Texas, 1953-54

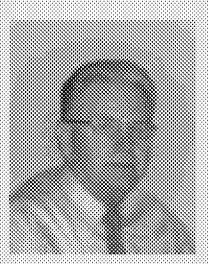
Associations

- Registered Professional Engineer, Texas Number 22114 (Inactive 2006 -)
- National Academy of Construction, General Secretary, 1999 – Present
- National Academy of Engineering
- ASCE, NSPE, ACI, PMI, SESA, PCI, ASEE, AACE, AIC, ASTM, SAME, IAARC

Professional Experience

- Joe C. Walter, Jr. Chair Emeritus, The University of Texas at Austin, 2003-date
- Professor of Civil Engineering, The University of Texas at Austin, 1976 - 2003
- Vice-President, Luther Hill & Associates, 1974 – 1976
- Professor of Civil Engineering and Associate Dean, The University of Texas at Arlington, 1962 – 1974
- Director, Center for Construction Industry Studies, UT Austin, 1986-2003 Founding Director, Construction Industry Institute, 1983 – 1998
- Founder, Association of Automation and Robotics in Construction, 1988; Development of First Graduate Programs, UT Arlington, 1969-1974;
- Development of CEPM Program, UT Austin, 1976 - 2003
- Development of Many Project Management Tools
- Supervised over 125 M.S. Theses and Doctoral Dissertations

Richard S. Harding, Senior Executive Consultant



Mr. Harding has had decades of experience from the contractor's perspective through his various roles at Bechtel. During his 41 years with Bechtel, Mr. Harding has performed numerous EPC/CM, direct hire, and project management assignments and held construction supervisory positions on a number of mining and metals processing facilities and civil infrastructure projects.

Profile

Education

- B.S. Civil / Structural Engineering, University of California, Berkeley

Associations

- Chairperson for the Corporate Project Management Committee (Bechtel)
- Permanent member of the Corporate Project Risk Assessment Team (PRAT) (Bechtel)

Professional Experience

- Senior Vice President, Bechtel Corporation
- Manager of Operations, Mining & Metals Global Business Unit, Bechtel
- President, Bechtel Construction
- Manager, Bechtel, Corporate Project Management Group

Relevant project experience in Canada

- Manager of Operations, multiple mining and metals projects
- Project Manager, $1 billion Lauralco aluminum project for Alumax in Quebec, Project Manager
- Project Manager, Syncrude Oil Sands Project
- Lead civil superintendent, Limestone Dam Project in Manitoba (lump-sum direct hire job)

Keith Dodson, Director

Keith brings 40 years of engineering, project, and construction management experience on all types of domestic and international projects at the executive level of both owner and contractor organizations. He joined Westney in 2003 to bring new approaches to risk management to the participants in major capital projects.

Profile

Education

- University of Texas: at Austin BS, Engineering Route to Business
- University of Houston: postgraduate and MBA studies
- Rice University: Graduate of Advanced Management Program

Associations

- Board - Engineering and Construction Conference
- Chairman - Construction Industry Institute (1991)
- The National Academy of Construction, Current member

Professional Experience

- Partner/Director, Westney Consulting Group, Inc.
  - » Leads Westney's Independent Value Assurance, Due Diligence, and Risk Analysis practices
- Sample Engagements with Westney include:
  - Multiple hydroelectric projects in US and Canada
  - Multiple petrochemical mega-projects world-wide
- President and CEO, Petrofac, Inc., Member Board of Petrofac, Ltd.
- Chief Operating Officer & Senior Vice President, Enron Engineering and Operations Company
- Senior Vice President and head of the Process Business Unit, Stone & Webster Engineering and Construction, Inc.
- Vice President, M. W. Kellogg Company, Vice Chairman and CEO of M.W. Kellogg, Ltd. London (JV with JGC)
- President & CEO, U.S. Operations, Davy McKee / John Brown
- President, Brown & Root E&C International

Cost Model for Schedule Delay at Muskrat Falls (Only)

Values in 1000s

	Monthly			Daily			Total daily	Assumptions
	MF	LIL	LTA	MF	LIL	LTA		
Salaries (Construction)								
Professional Fees (incl. Assignment Conditions) - LCMC Team - MF Site	2,361			78.7	0.0	0.0		As per MFL highest value (Aug-Sep 2016)
Spillway Operators	100			3.3	0.0	0.0		
Subtotal Salaries (Construction)	2,461	0	0	3.3	0.0	0.0	3.3	
Catering and Janitorial								
C1 Catering and Janitorial	2,939			98.0	0.0	0.0		80% of max capacity of 1800 Manday (Excluding 50% of C3)
C3		0	0	0.0	0.0	0.0		
Subtotal Catering and Janitorial	2,939	0	0	98.0	0.0	0.0	98.0	
Site Services (Excluding NS)	1.00	0.00	0.00					
Security Services	600			20.0	0.0	0.0		Actual Monthly cost (Excluding North Spur)
Fire Fighting Services	375							
Medical Services	250			8.3	0.0	0.0		Actual Monthly cost
Road Maintenance and Snow Clearing	500			16.7	0.0	0.0		500 K from Oct till April and 200 k the rest of the year
Fuel Dispensing	250	0	0	8.3	0.0	0.0		Estimated Average monthly cost
Garbage collection and waste Mgt.	360	0	0	12.0	0.0	0.0		Actual Monthly cost adjusted to 1800 Manday
Ground Transportation (Bussing)	833	0	0	27.8	0.0	0.0		Actual Monthly cost adjusted to 1800 Manday
Camp Maintenance	498	0	0	16.6	0.0	0.0		Based on a FFC of 23.9 M for 48 month
Wash Car Cleaning and Maintenance	500	0	0	16.7	0.0	0.0		25 washcars including 1 at the converter site and 1 at SY site
Laboratory Services	350	0	0	11.7	0.0	0.0		
Electricial Power Consumption (from NLH)	150	0	0	5.0	0.0	0.0		
LCMC Site Vehicles (O&M)	60			2.0	0.0	0.0		O&M for 41 vehicules for an average of 12000 / year. Round up to $60k to account for need to replace aging fleet.
Subtotal Services (Excluding NS)	4,726	0	0	145.0	0.0	0.0	145.0	
Miscellaneous (site)								
Misc Site Office Expenses	21			0.7	0.0	0.0		average of 250 K / year
Travel and Accommodations	0			0.0	0.0	0.0		Included in Salaries values
3rd party Consultants / Technical Studies	50			1.7	0.0	0.0		Estimated
Subtotal Miscellaneous (site)	71	0	0	2.4	0.0	0.0	2.4	
Office Support at St John's	52.7	36.3	11.0					
Professional Fees - LCMC Team - St. John's	4,498	0	0	149.9	0.0	0.0		100% of C1 (HO) + 50% of C3 (HO) + 75% of PM
LR and Communications	11	0	0	0.4	0.0	0.0		average of last 6 month
Office Lease - Torbay Road	160	0	0	5.3	0.0	0.0		160 K / Month
IT Services and Equipment	188	0	0	6.3	0.0	0.0		75% of the average of last 6 month
Corporate Overhead Charges	150	0	0	5.0	0.0	0.0		average of last 6 month
Office Supplies	34	0	0	1.1	0.0	0.0		75% of the average of last 6 month
Training	23	0	0	0.8	0.0	0.0		75% of the average of last 6 month
Mobile Phones	18	0	0	0.6	0.0	0.0		average of last 6 month
Business Travel (including site rotations)	259	0	0	8.6	0.0	0.0		75% of the average of last 6 month for MF, (50% for C3)
Subtotal Office Support at St John's	5,341	0	0	178.0	0.0	0.0	178.0	
TOTAL	**15,538**	**0**	**0**	**427**	**0**	**0**	**427**	

Assumptions:
1.) LTA and LIL are energized

15,538	camp at 80% capacity
12	186,455
15	233,069
18	279,683
21	326,297
24	372,911
27	419,525
30	466,139

Assessment of CH0007 Contractor Schedule Delay on Company's Other Contractors

Muskrat Falls Generation

March 2016

PRIVILEGED AND CONFIDENTIAL IN CONTEMPLATION OF LITIGATION

nalcor energy
LOWER CHURCHILL PROJECT

TABLE OF CONTENTS

PAGE

1 BACKGROUND 2

2 EXECUTION SCOPES 2

2.1 CH-0009 North and South Dams 2
2.1.1 Key Issues 2
2.1.2 Risks 3
2.1.3 Cost Exposure 3
2.2 CH-0030 Supply and install Turbines and generators 3
2.2.1 Key Issues 3
2.2.2 Risks 4
2.2.3 Cost Exposure 4
2.3 CH-0031 Balance of Plant 4
2.3.1 Key Issues 4
2.3.2 Risks 5
2.3.3 Cost Exposure 5
2.4 CH-0032 Supply and Install Hydro-Mechancial Equipment 5
2.4.1 Key Issues 5
2.4.2 Risks 8
2.4.3 Cost Exposure 8
2.5 CH-0033 Supply and Install Powerhouse Cranes 9
2.5.1 Key Issues 9
2.5.2 Risks 9
2.5.3 Cost Exposure 9
2.6 PH-0014 Supply of generator step-up transformer 9
2.6.1 Key Issues 9
2.6.2 Risks 10
2.6.3 Cost Exposure 10
2.7 PH-0015 supply of isolated phase buS 10
2.7.1 Key Issues 10
2.7.2 Risks 10
2.7.3 Cost Exposure 10
2.8 PH-0016 supply of generator circuit breakers 11
2.8.1 Key Issues 11
2.8.2 Risks 11
2.8.3 Cost Exposure 11
2.9 Site Services 11

3 ADDITIONAL TIME DELAY 12

1 BACKGROUND

The primary construction focus at Muskrat Falls the last 2 years has been related to civil scopes for contract CH-0007 Powerhouse, Intake, and Spillway ("Powerhouse contract"). This work has been executed by Astaldi Canada and the performance of the work has not aligned with the project baseline schedule. This performance has led to delays in the order of 12 to 18 months (largely related to Powerhouse construction, and for convenience called the "Powerhouse delay") and has had significant impacts on other execution and services packages. Since the other scopes and milestones are tied to the Powerhouse progress, there is a "knock on" effect to other contracts when the Powerhouse contract work is delayed. This document provides a broad overview of these impacts (unquantified accuracy – assumed Class 4 estimate) and provides both a qualitative and quantitative assessment of impacts due to delay. The costs presented relate to an assessment of the current issues and are dynamic in nature as the work progresses.

2 EXECUTION SCOPES

As indicated, delays on the Powerhouse contract has led to an overall delay the Target First Power Date from December 2017 by in approximately 12 to 18 months, with the current un-risked forecast date of February 2019.

Under the Muskrat Falls contracting and execution strategy, LCMC hold the role of integrator, and is responsible for construction coordination of the works of all contractors, including management of all interfaces between the various contractors. In this model, Muskrat Falls Corporation ("MFC") assumes the liability associated with interfaces of the package-to-package interfaces, including the impact for one contractor to meet their particular contractual obligations. The sub-sections below attempt to provide a view of the potential exposure on Company's Other Contractors due to the performance issues and time delay under the Powerhouse contract. It must be emphasised that this analysis is time-relative based upon the current knowledge and assumptions related to each of these packages and is without the benefit of seeking any input from Company's Other Contractors.

2.1 CH-0009 NORTH AND SOUTH DAMS

2.1.1 Key Issues

Following are the key issues for CH-0009 North and South Dams related to Powerhouse delay.

- A 12 to 18 month delay could extend the time required to be on site which would directly affect the indirect cost. The Dams Contractor would need to stay on site to remove the Tailrace Rock Plug, Tailrace Stabilization and Rock Surface Protection. All other activities could be completed, however, assuming a 12 to 18 month delay in final completion of the Powerhouse would result in a delay in removal of the rock plug.

- The main issue associated with River Diversion is the Dams Contractor will need to start removing Cofferdam No. 2 and the RCC Cofferdam on 2-May-2016 to meet the Diversion Milestone date of 15-Jul-2016. If this date is delayed, river closure will be delayed resulting in

less time in the Fall to conduct North Dam foundation preparation. If foundation preparation is not completed in 2016 it will delay the start of RCC Work and likely prevent the RCC placement to be completed in the 2017 season.

- The Civil Contractor is currently planning a high production of concrete for the Powerhouse in 2016. The traffic associated with delivering concrete to the Powerhouse will have a direct impact on the production associated with excavating and constructing the South Dam. The Dams Contractor will need to perform traffic control and maintain traffic flow through the South Dam during the 2016 season. This issue could potentially extend into the 2017 construction season. Since the labour is cost reimbursable, the reduced productivity will have a direct cost impact on the Company for construction of the South Dam.

2.1.2 Risks

Following are the key risks for CH-0009 North and South Dams related to Powerhouse delay.

- If construction of Powerhouse is not completed on time, the Dams Contractor will not be able to remove the tailrace rock plug at the milestone date.

- If River Diversion is delayed by 30 days, then foundation preparation for the North Dam will be delayed.

2.1.3 Cost Exposure

Based on the issues noted above, cost impacts to this package are quantified as follows.

- Additional Indirects for a 3 Month Period.
  - Management $5.8 M
  - Travel and Lodging $0.6 M
  - Site Installations $2.3 M

- Direct Work Items
  - Demob/ Remob Grouting $0.3 M
  - Demob/ Remob Drilling and Blasting $0.2 M
  - Labour Increase $0.1 M

The cost impact associated with the Dams Contractor would be approximately $9,300,000.

2.2 CH-0030 SUPPLY AND INSTALL TURBINES AND GENERATORS

2.2.1 Key Issues

Following are the key issues for CH-0030 Supply and Install Turbines and Generators related to Powerhouse delay.

- Long term preservation/ storage of equipment.

- Construction plans/ sequence deviating from T&G Contract assumptions (i.e. Powerhouse structure erection & completeness, multiple crane testing, hoarding/ heating required to compensate).

- Mobilization delayed resulting in additional costs for deliveries to site.

- Possible loss of 2 years of a 5 year warranty on equipment.

2.2.2 Risks

Following are the key risks for CH-0030 Supply and Install Turbines and Generators related to Powerhouse delay.

- Damage to Equipment while in extended storage.

- Extension to Installation Schedule

2.2.3 Cost Exposure

Total delay to CH-0030 Supply and Install Turbines and Generators is approximately 27 months, of which 9 of these months is due to the difference in Contract Milestones and 18 months additional due to Powerhouse Delay.

- Additional Storage $5.0 to $7.5M
- Offloading $1.0 M
- Heating and Hoarding Requirements $2.0 to $3.0 M
- Loss of 2 Years Warranty $5.0 to $6.5 M
- Labor Escalation due to time delay $2.0 to $3.0 M
- Schedule Extension – Contractor's Overhead $3.0 to $4.0 M
- Contractor Claims re NPT and Trade Stacking $2.0 to $3.0 M

The cost impact associated with the Supply and Install Turbines and Generators could vary between $20,000,000 to $28,000,000.

2.3 CH-0031 BALANCE OF PLANT

2.3.1 Key Issues

The CH-0031 Balance of Plant Contract is still in the bidder selection phase so the final contract price is not yet determined. However, the key issue with this package is related to the Powerhouse structure not being ready and the CH-0031 Balance of Plant Contractor not having an enclosed space leading to the potential for increased cost in execution.

2.3.2 Risks

Following are the key risks for CH-0031 Balance of Plant related to Powerhouse delay.

- Further delays in the overall civil works and thus the CH-0031 Balance of Plant bidding process could lead to the loss of one or more bidders which could substantially impact the current contract estimates or may lead to a requirement to rebid the package and/or perform a repackaging exercise potentially leading to further cost and schedule increases.

- The availability of labor resources may be negatively impacted.

- There remains a risk associated with the ability to secure a unit rate or lump sum agreement for this work considering the risk appetite of bidders will be negatively conditioned by the poor performance of Astaldi, thus limiting appetite for such commercial structures.

2.3.3 Cost Exposure

Based on the issues noted above, cost impacts to this package are quantified as follows.

- Escalation of material and labour $7.5 to $8.5 M
- Heating and Hoarding Requirements $5.0 to $6.0 M
- Compressed Night Shift Work Face $3.0 to $4.5 M
- Labor Escalation due to time delay $3.0 to $5.0 M

The cost impact associated with the Balance of Plant would be expected to be between approximately $18,500,000 and $24,000,000, depending on the actual escalation of material and labour.

2.4 CH-0032 SUPPLY AND INSTALL HYDRO-MECHANCIAL EQUIPMENT

2.4.1 Key Issues

Following are the key issues for CH-0032 Supply and Install Hydro-Mechanical Equipment related to Powerhouse Delay.

- Late completion of the Spillway Concrete Structure. The Spillway was to be handed over to the Hydro-Mechanical Contractor as per the two interface milestones, I1A, I1B noted below. Civil delays have caused a shift of key spillway construction activities into the winter season and compressed the overall time available for spillway mechanical installation.

- Status of the structure is as follows:
  - I1A is still not fully complete (bridge deck has not cured to full strength).
  - I1A Area was partially handed over 1-Nov-2015. Upstream work area was shared with Astaldi from Nov-2015 to Jan-2016 to allow bridge work and other punch items etc.
  - I1B not complete - elevated deck to install spillway electrical building not complete, discharge liner not complete, and rails for TCM not installed.

- Late completion of Draft Tube structure. The following interface milestones have been missed.
  - Service Bay Draft Tube Gallery Ready for start of Hydromechanical Installation.
  - Unit 1 – Draft Tube Structure Ready for start of Hydromechanical Installation.
  - Unit 2 – Draft Tube Structure Ready for start of Hydromechanical Installation.
  - Unit 3 - Draft Tube Structure Ready for start of Hydromechanical Installation.
  - Unit 4 – Draft Tube Structure Ready for start of Hydromechanical Installation.

Interface I1A, 16 Feb 2015

Spillway and Related Works required for upstream guides installation and concreting, including:

- Completion of Spillway Invert;
- Completion of Spillway piers and walls (upstream 2/3 portion only), including upstream bridge;
- Spillway Upstream Channel free for Hydro-Mechanical Contractor CH0032 occupation.

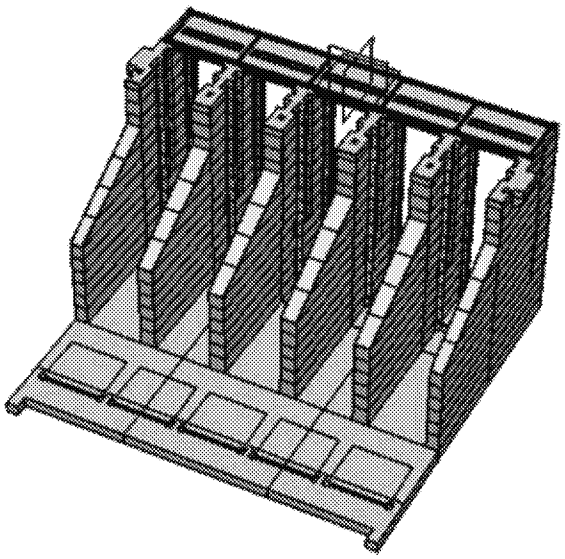


Figure 1 Spillway – Upstream Construction

Interface I1B, 1 Aug 2015

Spillway and related works required for downstream stoplog guides, gates and hoists installation, including:

- Completion of Spillway piers and walls (downstream 1/3) including both Downstream Bridges and Access Ramp Retaining Wall;
- Completion of North Transition Dam;
- Completion of Northern 2 Monoliths of Center Transition Dam including the Electrical Building Platform;
- Completion of Spillway concrete Discharge Channel Phase 1;
- Completion of Separation Wall;
- Spillway Discharge Channel free for CH0032 occupation.

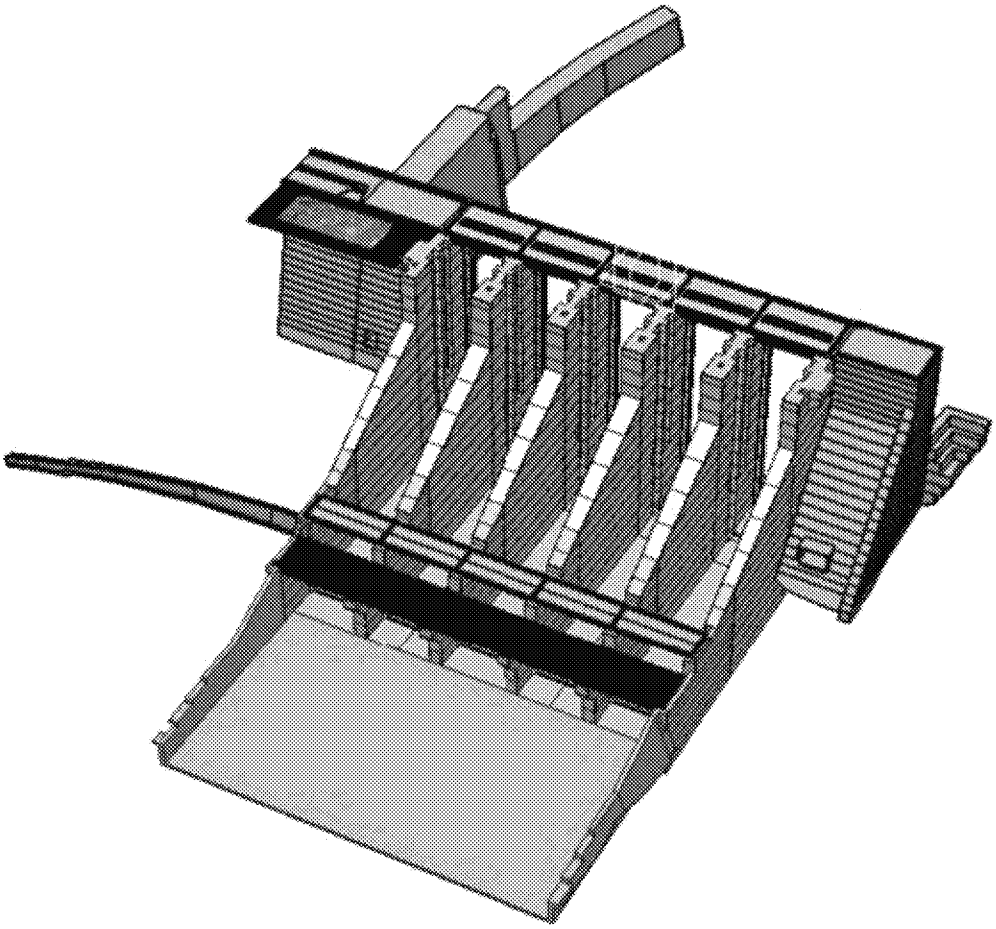


Figure 2 Spillway – Downstream Construction

2.4.2 Risks

Following are the key risks for CH-0032 Supply and Install Hydro-Mechanical Equipment related to Powerhouse delay.

- There are a number of change requests by contractor that have arisen from the delay that have been rejected by company. These are potential dispute items such as storage of second stage embedded parts and delay in accessing downstream spillway for delivery of guides.
- Acceleration costs are not agreed with Contractor.
- Missing Diversion for 2016 is a risk due to the requirement to compress the overall CH-0032 scope and execute work in the winter season.
- Additional long term storage and preservation for spillway and powerhouse equipment.
- Additional costs for site services (e.g. wash cars) associated with civil delay.

2.4.3 Cost Exposure

The following is a list of change requests/ change orders that have been issued to the Supply and Install Hydro-Mechanical Equipment Contractor in relation to the Powerhouse Delay.

- CHR-1015 - Alternative Power Supply for each spillway gate (required due to delay in spillway building elevated deck) $343,087.
- CHR-1005 - Storage of Primary Anchors (Astaldi has been advised of intent to backcharge) $123,000.
- CHR-3002 - Dunnage on upstream bridge (required due to incomplete cure on upstream bridge) $143,000
- Change Order 10 - Acceleration of spillway installation schedule, winter conditions etc: $3,370,314 + separate CHO to be issued for $2,000,000 upon diversion readiness 15-Jun-2016 for total of $5,370,314.

This totals to approximately $6,000,000 in changes that have already been applied to this contract directly related to Powerhouse Delay. However, there are other expected impacts based on issues noted above as follows.

- Additional Storage $1.0 M
- Additional Wash Car cost $1.5 to $2.0 M
- Labor Escalation due to time delay $2.0 to $3.0 M
- Schedule Extension – Contractor's Overhead $2.0 to $4.0 M

- Contractor Claims re NPT and Trade Stacking $2.0 to $3.0 M

Factoring in these additional costs provides a total impact of $8,500,000 to $13,000,000.

2.5 CH-0033 SUPPLY AND INSTALL POWERHOUSE CRANES

2.5.1 Key Issues

Following are the key issues for CH-0033 Supply and Install Powerhouse Cranes related to Powerhouse delay.

- Long Term Preservation/Storage of equipment.
- Warranty

2.5.2 Risks

Following are the key risks for CH-0033 Supply and Install Powerhouse Cranes related to Powerhouse delay.

- Damage to equipment while in extended storage
- Extension to Installation Schedule

2.5.3 Cost Exposure

Based on the issues and risks noted above, cost impacts to this package are quantified as follows.

- Long term storage $270,000
- Labor Escalation due to time delay $25,000
- Schedule Extension – Contractor's Overhead $50,000

2.6 PH-0014 SUPPLY OF GENERATOR STEP-UP TRANSFORMER

2.6.1 Key Issues

Following are the key issues for PH-0014 Supply of Generator Step-Up Transformer related to Powerhouse delay.

- Long Term Preservation may lead to a potential impact to equipment service life.
- Warranty - The warranty period in respect of the Goods is that period having a duration of sixty (60) months from first operation, or sixty six (66) months from delivery or storage at Supplier's

manufacturing facility or warehouse when such storage is requested by Company , whichever occurs first ("Warranty Period").

2.6.2 Risks

Following are the key risks for PH-0014 Supply of Generator Step-Up Transformer related to Powerhouse delay.

- Possibly of equipment damage during long term storage.

2.6.3 Cost Exposure

Based on the issues and risks noted above, cost impacts to this package are quantified as follows.

- Long term storage $160,000
- Labor Escalation due to time delay $10,000
- Schedule Extension – Contractor's Overhead $25,000

2.7 PH-0015 SUPPLY OF ISOLATED PHASE BUS

2.7.1 Key Issues

Following are the key issues for PH-0015 Supply of Isolated Phase Bus related to Powerhouse delay.

- Long Term Preservation may lead to a potential impact to equipment service life.
- The warranty period in respect of the Goods is that period having a duration of sixty (60) months from first operation, or sixty six (66) months from delivery or storage at Supplier's manufacturing facility or warehouse when such storage is requested by Company, whichever occurs first ("Warranty Period").

2.7.2 Risks

Following are the key risks for PH-0015 Supply of Isolated Phase Bus related to Powerhouse delay.

- Possibly of equipment damage during long term storage.

2.7.3 Cost Exposure

Based on the issues and risks noted above, cost impacts to this package are quantified as follows.

- Long term storage $180,000

2.8 PH-0016 SUPPLY OF GENERATOR CIRCUIT BREAKERS

2.8.1 Key Issues

Following are the key issues for PH-0016 Supply of Generator Circuit Breakers related to Powerhouse delay.

- Long Term Preservation may lead to a potential impact to equipment service life.
- The warranty period in respect of the Goods is that period having a duration of sixty (60) months from first operation, or sixty six (66) months from delivery or storage at Supplier's manufacturing facility or warehouse when such storage is requested by Company, whichever occurs first ("Warranty Period").

2.8.2 Risks

Following are the key risks for PH-0016 Supply of Generator Circuit Breakers related to Powerhouse delay.

- Long term storage and long term preservation requirements.
- Damage to equipment while in long term storage.
- Insulating gas SF6 – environmental concern/monitoring.
- Heated/environmentally controlled storage.

2.8.3 Cost Exposure

Based on the issues and risks noted above, cost impacts to this package are quantified as follows.

- Long term storage $100,000

2.9 SITE SERVICES

The delivery of services in support of managing the site and supporting the execution scopes will not be directly impacted by delay on the Powerhouse contract. The key issue related to these scopes is the required extension in duration of the service, thus leading to an increase in cost for the services. Currently, the Site Services packages are being forecasted to Jul-2018 to match the DG3 Schedule for full power. Cost impact of these services are captured in the carrying cost associated with the LCMC's extension of project, construction and site services.

- SH-0018 – Provision of Catering, Housekeeping, and Janitorial services

- SH-0019 – Provision of Security Services
- SH-0020 – Provision of Medical Services
- SH-0022 – Provision of Fuel Supply and Dispensing Services
- SH0040 – Provision of Garbage Removal and Disposal Services
- SH0041 – Provision of Ground Transpiration Services
- SH0051 – Provision of Building Maintenance Services
- SM0705 – Provision of Laboratory Services

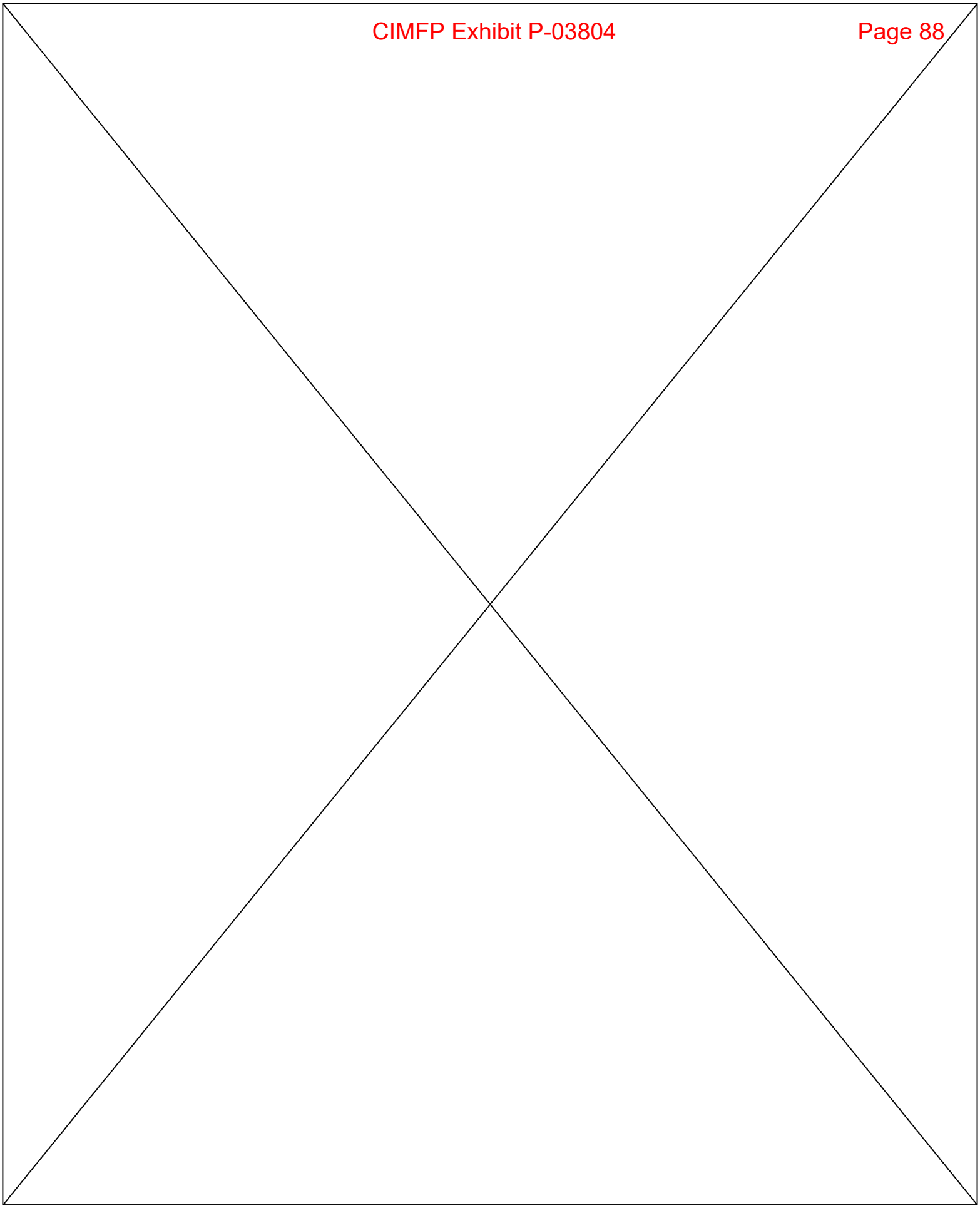
3 ADDITIONAL TIME DELAY

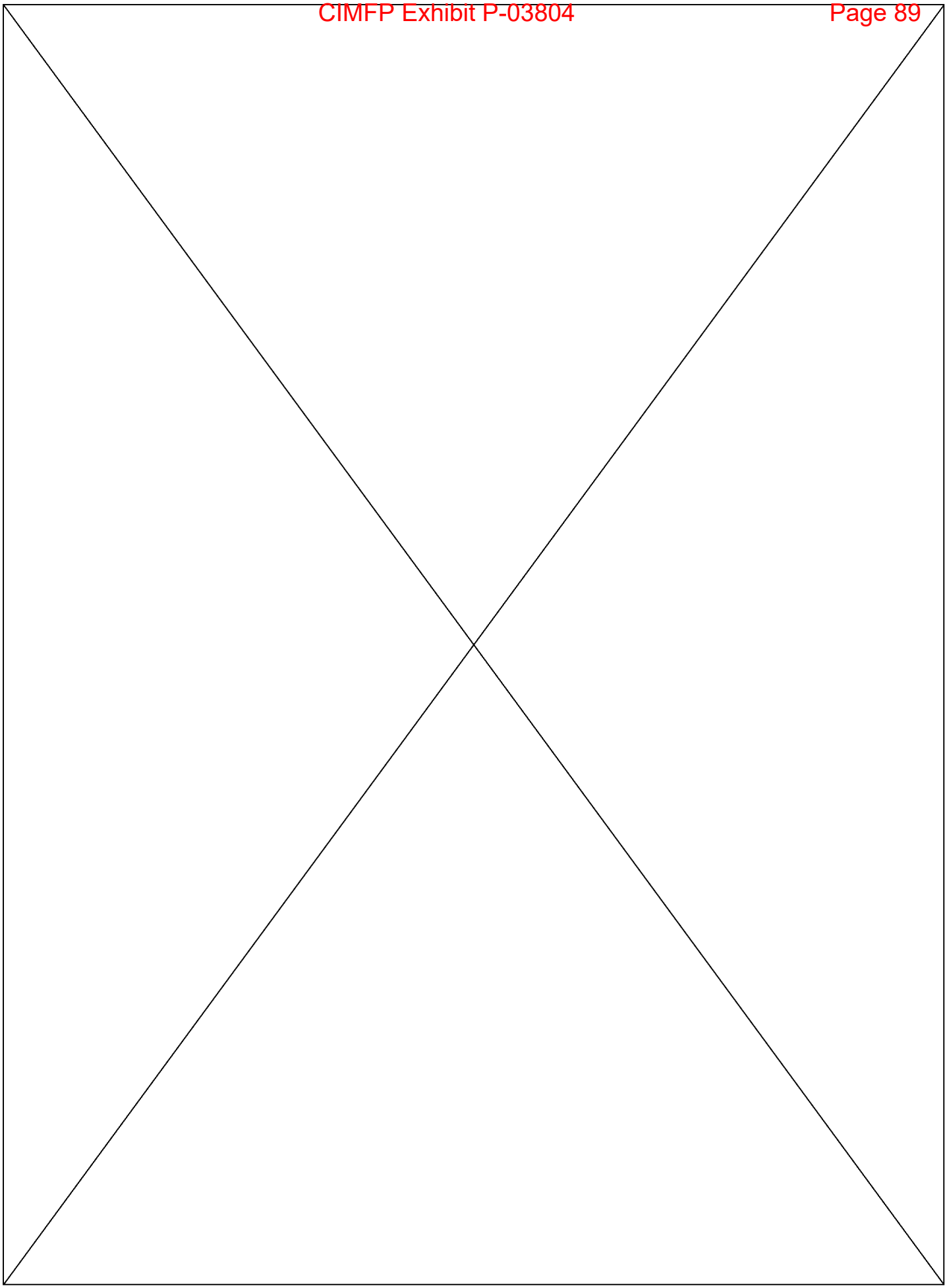
For purposes of this analysis, additional time delay beyond the 12-18 month window characterized in this report are deemed to be primarily attributable to the following:

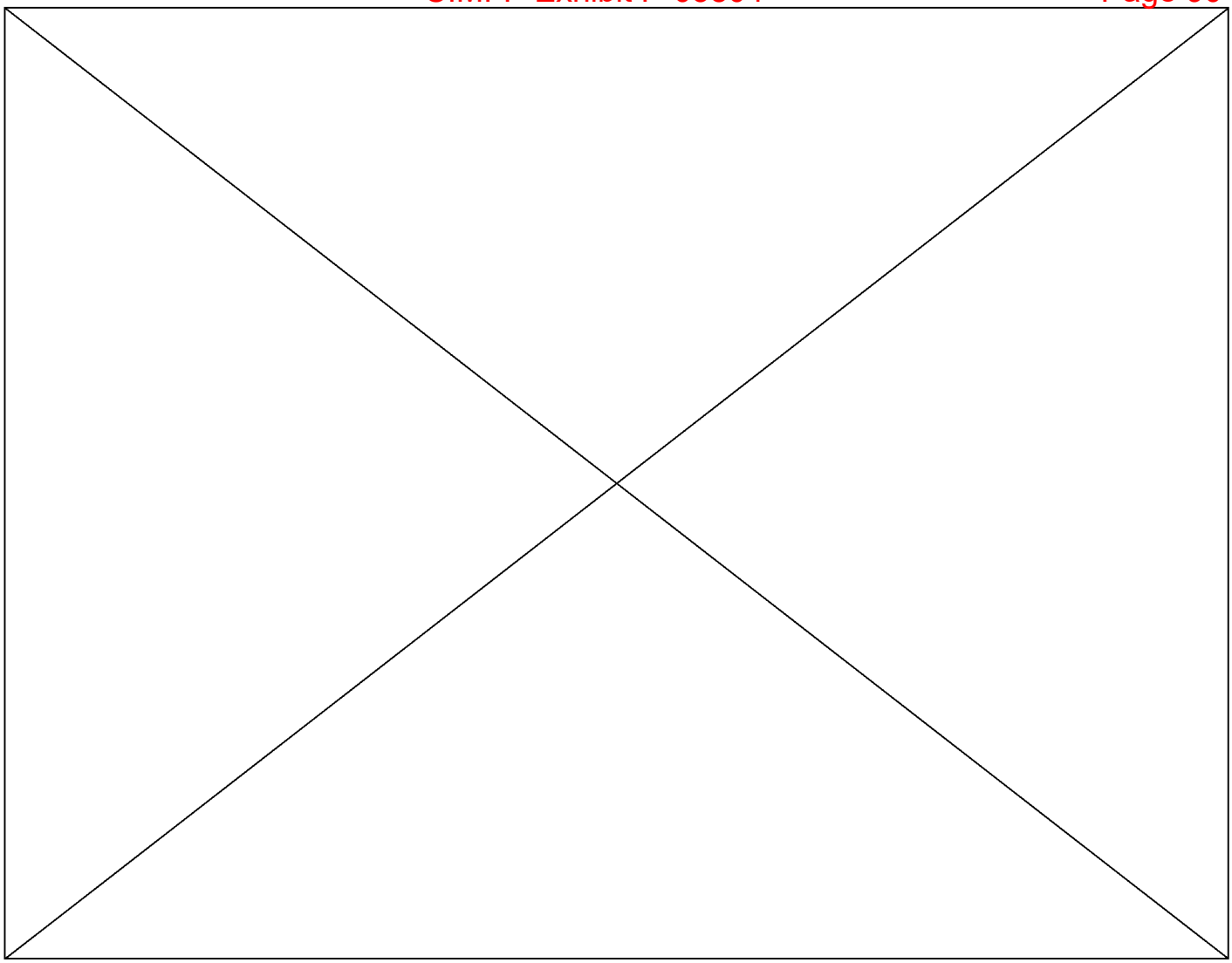
- Preservation, Storage and Maintenance of Equipment
- Provision of Site and Office Based Personnel to Support the Work
- Warranties
- Securities
- Variation in Execution Timelines
- Material Escalation
- Labour Escalation
- Increase in Contractor indirect charges

The value of these items, in relation to the overall delay is approximately $3,000,000 per month.

Pages 159 – 209 have been fully redacted.







7.0 Conclusions and Recommendations

When full consideration is given to the five key factors described in Section 2.0 the conclusions start to become clear. To re-iterate, the five are:

[redacted]

2. **Mitigation of potential lost time and execution issues due to an uncooperative contractor:** The lost time exposure and costly execution issues, such as interface problems, due to a poor contractor relationship is a reality in situations where the contractor faces massive losses with little or no hope of recouping those funds. Although difficult to monetize the issues can result in the loss of months and hundreds of millions in opportunity quite easily.
3. **Cost to complete over and above Astaldi contract:** The cost to complete the scope of work over and above the contract value is forecast to be in the $600-800 million range. A considerable amount that brings other factors into play when compared to a normal claim situation.
4. **Astaldi's financial strength, ie their ability to pay:** The cost to complete gap brings Astaldi's financial status into play as a consideration. Although it appears they are managing some of their challenges they are in a position that is concerning from a liquidity perspective that in the least brings into question the source of funds they will need to complete Muskrat falls and in the worse case could trigger some solvency concerns.
5. **The cost of Alternative execution approaches given the size of the issue:** In most commercial situations in construction, alternative execution options are rarely a necessity. In this case however, with the amount of work to complete, the cost of the gap and Astaldi's liquidity unknowns understanding alternative approaches is a must. What is clear is that alternatives "without" Astaldi are not favourable to Nalcor in terms of probable time and cost outcomes.

Although LCMC's contractual position is considered to be strong, the implications of not supporting Astaldi could result in very large exposure to the Project, as confirmed by the Westney review. The possible paths forward evaluated in response to this situation are summarized in Table 7-1.

Table 7-1: Paths Forward

With Astaldi Options:	Without Astaldi Options:
Provide no financial assistance-Resulting in Astaldi's Insolvency	Terminate Contract with Cause
Provide no financial assistance-Not Resulting in Astaldi's Insolvency	Terminate Contract without Cause (possible subcategory of mutual termination)
Negotiate Financial Assistance	Astaldi Defaults on Contract,i.e. abandonment
Integrated Team (Astaldi/Nalcor)	

A thorough analysis of each of these alternatives on the merits of schedule, cost, third party impacts, and risk was performed by LCMC. A summary of conclusions reached following this analysis is as follows.

Option 1a) Status Quo Resulting in Astaldi's Insolvency: Under this option, it is assumed that Nalcor takes no action under the assumption that Astaldi will fulfill their contractual obligations and absorb all losses, resulting in the eventual insolvency of Astaldi Canada. Cash flow constraints will expose the project to disruptive factors driving the schedule including delayed and deferred decision making and production slowdown. Creditor constraints will drive decision making in favour of creditor protection versus project execution. The assumed delay is 21-27 months from the base case schedule.

Option 1b) Status Quo Not Resulting in Astaldi's Insolvency: Under this option, it is assumed that Nalcor takes no action under the assumption that Astaldi will fulfill their contractual obligations and absorb all losses. It is also assumed that Astaldi Canada will be able to absorb these losses and remain solvent. The outcome is similar to 1a) above wherein work is slowed considerably by cash flow constraints and progress is no longer driven by what is technically feasible. The key assumption here is that Astaldi finishes the contract, albeit over a longer period and with considerable distraction. The assumed delay is 24 months or greater from the base case schedule.

Option 2) Revise Contract with Financial Assistance: Under this option, it is assumed that Nalcor and Astaldi Canada complete negotiations and enter into an agreement to amend the contract. The negotiated outcome would ensure focus on completion with appropriate incentives that would make the window of completion viable. The assumed delay is 12-18 months from the base case schedule.

Option 3) Terminate with Cause: Under this option, it is assumed that Nalcor will terminate the contract with Astaldi for cause and bring in another contractor to complete the scope of work. Nalcor will then proceed to collect on the contractual securities in place. LCMC will be responsible for the full cost to complete and to find a replacement contractor. This option is currently not seen as being available due to the performance levels achieved by Astaldi in 2015.

Option 4) Integrated Team: Under this option, it is assumed that Nalcor will provide management support to Astaldi and form an integrated management team to oversee completion of the CH0007 work scope. Delay is expected with additional time added for transition to a new organization, with time impact (i.e. production losses) varying depending on ease of integration. The assumed delay is 15-21 months from the base case schedule. Under this option Nalcor will assume completion risk.

Option 5) Astaldi Defaults: Under this option, it is assumed that Astaldi defaults on their contractual obligations and abandons the job, or other default, resulting in the need to bring in another contractor to complete the scope of work. Nalcor will then proceed to collect on the contractual securities in place. Delays will be realized in the demobilizing Astaldi, establishing a contractor for the replacement contractor, mobilizing a new contractor, ramp up of management and labour resources, and a learning curve exposure period. The assumed delay is 21-27 months from the base case schedule assuming that infrastructure assets and key subcontractor arrangements are maintained. If this is not the case then further time exposure exists for the duration to remobilize new contractor.

Option 6) Mutual Termination: Under this option, it is assumed that Nalcor and Astaldi agree to mutually terminate the contract. As part of the mutual termination agreement, it is assumed that securities will be removed and an overall mutually agreeable settlement will be agreed to. Schedule delays are tempered due to an orderly transition from Astaldi to the successor contractor. The assumed delay is 15-24 months from the base case schedule. Termination without cause would be an extreme version of this scenario where unilateral decision was taken to remove Astaldi without contractual justification. This case was removed as an option as it is worse than a mutual release.

Preferred Alternative

In light of the conclusions developed by Westney and LCMC's internal assessment of the paths forward, Option 2 was decisively selected as the preferred alternative.

When reviewing the Alternatives the analysis clearly shows that Options "Without Astaldi" are less favourable financially than "With Astaldi". This narrows the decision to the "With Astaldi" options listed. Evaluation of those alternatives point to a clear preference from the project team's perspective, supported by Westney's analysis and the opinion of the Independent Engineer for Canada, to "Negotiate with Astaldi". Clearly such a negotiation would have a tipping point where other alternatives would become just as beneficial. This point or range would be determined as a part of the Negotiating Strategy, a draft of which is included in the last section of this document.

The "Negotiate with Astaldi" approach has clear monetary value over switch out options and comes with the following pros over a "No Negotiation" option.

Pros

- Much decreased likelihood of Astaldi default and associated higher cost exposures of switch out – equivalent to an insurance policy (No Negotiation increases the likelihood of default or termination for cause due to execution issues)
- Best opportunity to avoid exposure to the "Total cost to complete"
- Maintains our contractual rights with Astaldi- Deal done on our terms
- Decreases likelihood of slowed powerhouse progress and control of project path forward remains with Nalcor
- Decreases likelihood of completion date beyond 18 months and increasing associated costs – comes with more completion certainty
- Decreases risk of justified claim creation by Astaldi- focus will be on meeting dates and collecting funds versus claims
- Eliminates any historical claim risk
- Better cooperation from contractor lowers probability of new risks, disruptions and associated costs
- Bolstering of owners team, although necessary, will be less

The projected outcomes of moving forward with Option 2 are as follows:

Preferred Alternative: Option 2 Project Outcomes		
Criteria		**Outcome**
Time (beyond original scheduled first power)		12 – 18 months
Cost	Project Team carrying costs (Including camp and travel costs)	$150-225 M ($190-280 M)
	IDC – Includes bond payments (Dec/18, Jun/19, and Dec/19) and equity costs related to these payments	2-3 bond payments @ ~ $150 M each
	Third party direct cost impacts (e.g. CH0009, CH0030, CH0031, CH0032)	$60-80 M
	Assumed cost to Astaldi to complete CH0007 scope	$650 M
	Assumed LCMC contribution to Astaldi to complete CH0007 scope	$250-300 M
	CH0007 plus time cost	$500-660 M
Risk		Much greater certainty in outcome and total costs. Lowest risk option

The outcomes of the cost, schedule, and risk evaluations for the proposed alternatives align such that **Option 2) Amend Contract with Financial Assistance** is undoubtedly the preferred option. LCMC's outcomes are supported by the Westney review, which suggested that a negotiated path forward would mean:

- LCMC avoids paying the full cost to complete the CH0007 scope;
- Astaldi's viability is ensured;
- A predictive outcome with the most certainty and least exposure.

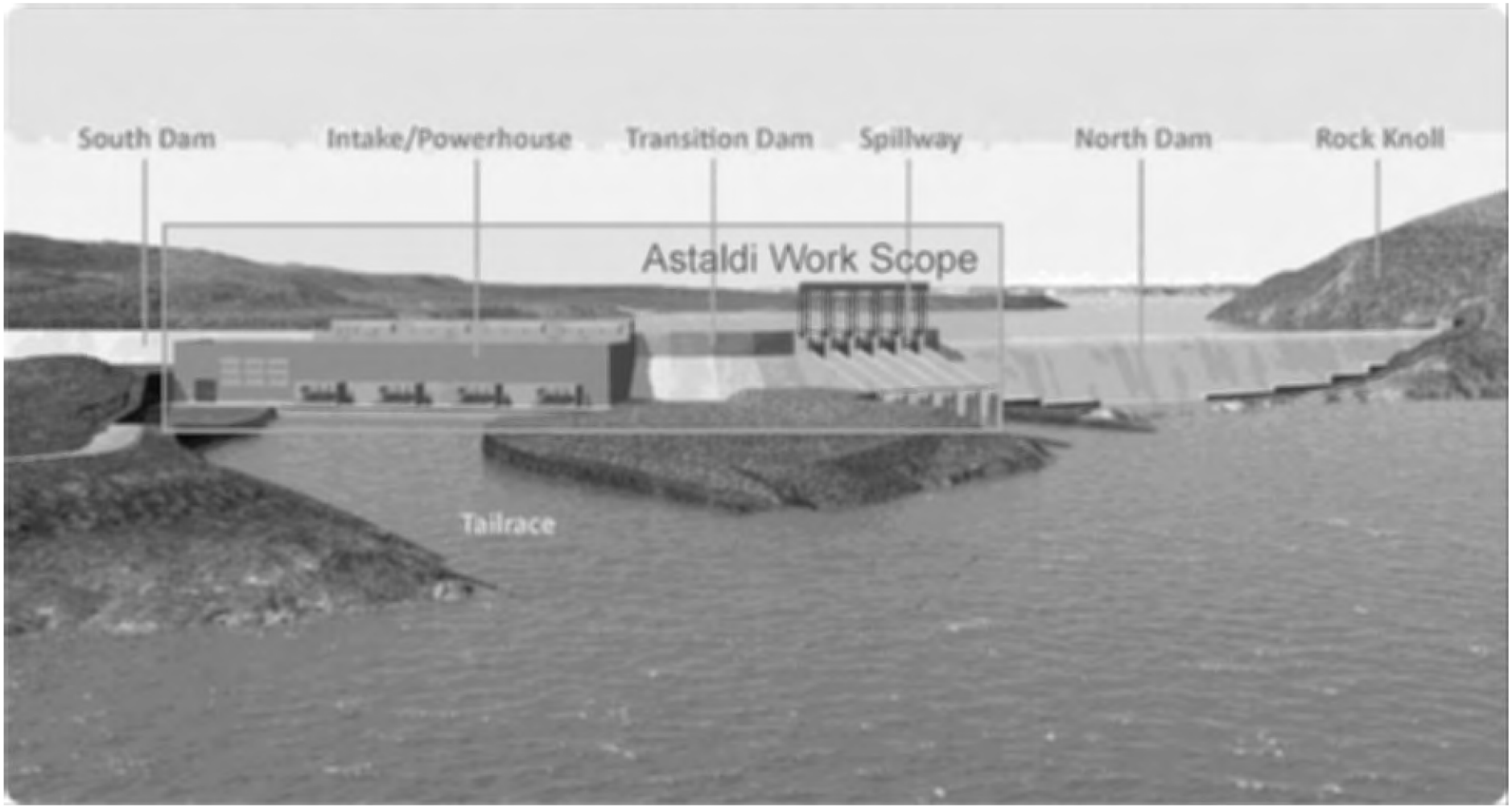
Muskrat Falls Update

January 2016

DRAFT CABINET PRESENTATION

nalcor energy
LOWER CHURCHILL PROJECT

Muskrat Falls Generating Facility



Astaldi in Context

Lower Churchill Project

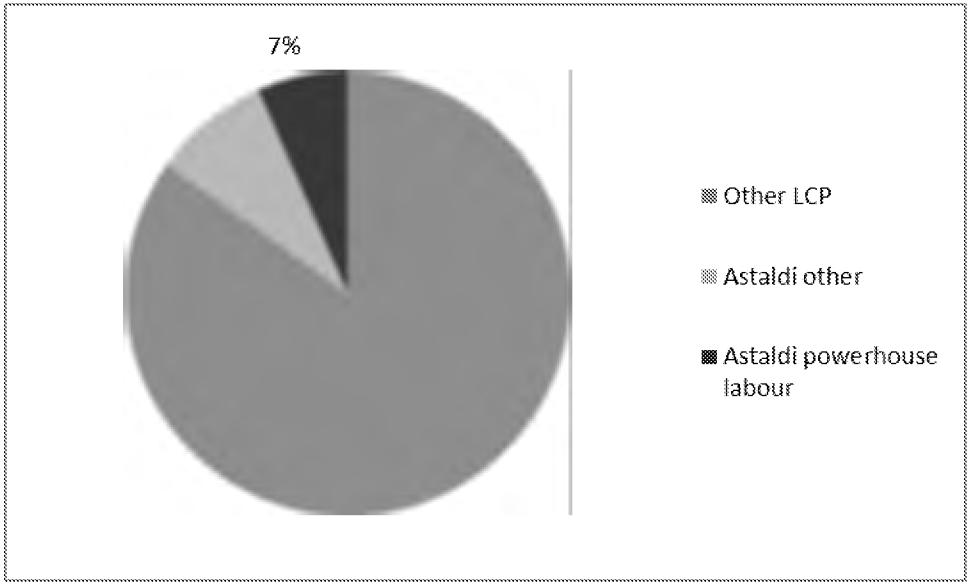
Component	Amount ($M)
Transmission line	2,160
DC specialties	1,156
MF Generation	3,068
Other	1,082
Contingency	187
Total	**7,653**

MF Generation

MF Component	Amount ($M)
Infrastructure and Services	550
Electrical/ Mechanical & Hydro-Mechanical	622
Civil works	739
Astaldi Scope	1,157
Total	**3,068**

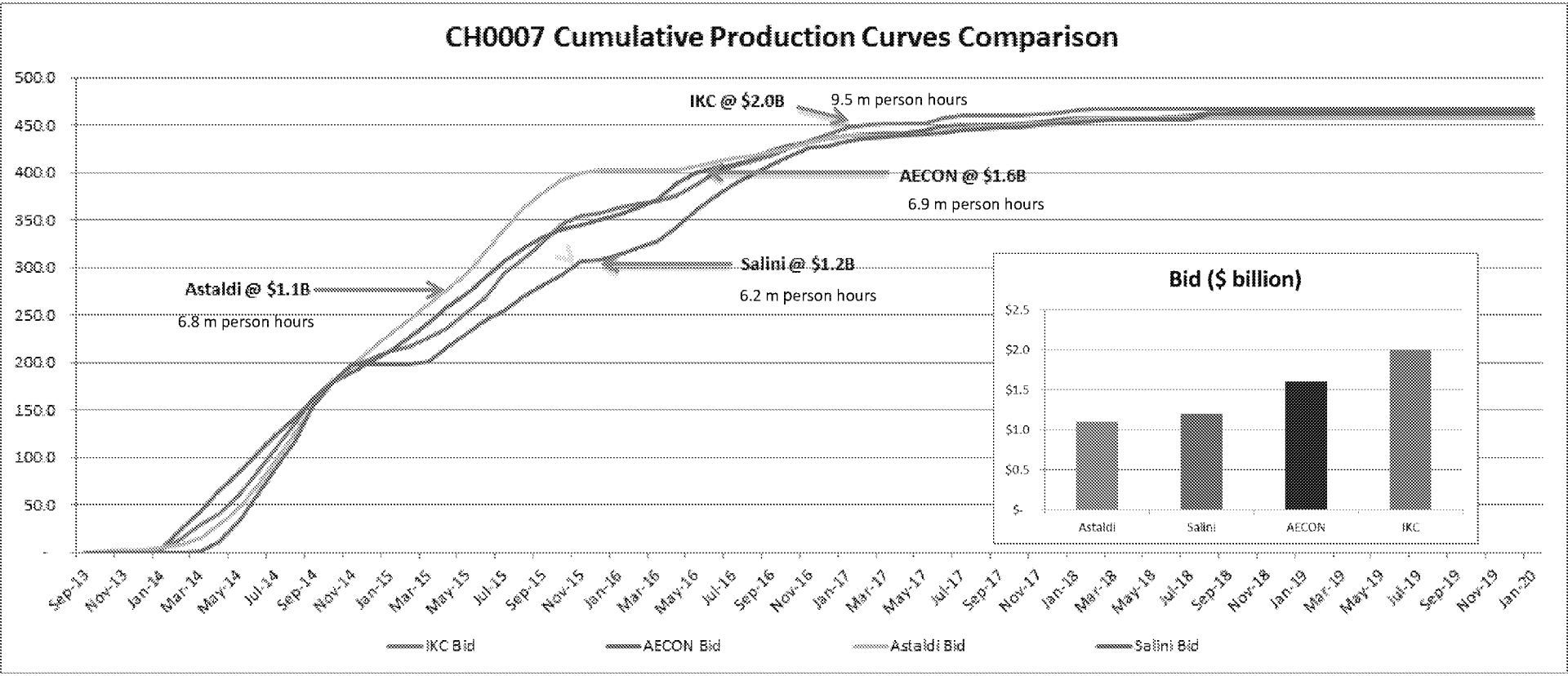
Astaldi Scope

Astaldi Component	Amount ($M)
Mob/Demob. and Infrastructure	233
Powerhouse Unit rated items (Fixed price)	201
Powerhouse Labour	504
Spillway and transition dams	219
Total	**1,157**



Benchmarking Astaldi with Competition

Privileged and Confidential in Contemplation of Litigation



Astaldi Performance to Date

- Exceedingly slow start in 2013-14
  - Astaldi ramp-up pace and missteps
  - Integrated Cover System (ICS) execution and consequential removal issues
  - Labor contract management opportunities missed
  - Astaldi mismanagement of the workforce allocation between production and support workers, particularly during 2014
  - Astaldi not realizing the productivity expectations in their bid
- Significant turnaround Summer 2015, as a result of the Project Team's work with the Contractor,
  - 150,000 cubic meters placed to date
  - performing much better at this point,
  - established, functioning team
  - potential for additional improvement

Nalcor Actions to Address Astaldi Issues

- Engagement at highest levels of Astaldi and Nalcor continuously over last 24 months – minimum of 18 Meetings at Senior levels including 6 CEO meetings
- Nalcor support and leadership in implementing performance improving initiatives and organizational improvements
  - Planning and Execution
  - Labour Management
  - Leadership and supervision, etc.
- Nalcor provided key Construction Management personnel to Astaldi
- Nalcor Site Team augmented with senior Project Management personnel to provide on site decision making and support to Astaldi
- 2015 Status
  - Astaldi concrete production rate vastly improved and Construction management team fully functional.
  - Nalcor continues to provide support, guidance and leadership

Current Situation

- Astaldi has not yet filed a formal claim, but has been constantly explaining their cost and solvency issues to us, and seeking to negotiate a solution.
- They have a very significant problem.
- We have continued to work in a collaborative manner with both parties focused on improving project execution, which is occurring.
- This has been the preferred mode of interaction to date, because premature submission of a formal claim in a contractual relationship of this magnitude would signal a change in working relationship which could adversely impact the optimum project execution by reducing the benefits of seeking continuous improvement opportunities in a collaborative fashion.
- Astaldi has now reached a point where they need to address issues which are fundamentally impacting their company's future.

Nalcor Analysis Completed

- Forensic audit on Astaldi cost, at their premises
- Cross industry project performance analysis of Astaldi global projects by third party
- Astaldi financial corporate performance including liquidity analysis
- Three separate reviews used to forecast likely ranges of cost and schedule to complete for Astaldi
- Historical data and fact capture done by claims and legal team to prepare for potential dispute and provide knowledge for negotiations
- Ongoing monitoring and analysis done of Astaldi's current operations and improvement to ensure ability and likelihood to complete
- Utilizing combination of internal expertise supported by external experts as outlined on following slide ……..

Nalcor Expertise Utilized

- Westney – Mega Project Risk consultants and Project Management Advisors
  - Examples of the expertise at this firm includes:
    - Retired CEO of one of the worlds largest construction companies
    - Retired senior VP of one of the worlds largest engineering and construction companies
    - Retired US Army corp of engineers Colonel
    - Founder of US Construction industry institute
  - [redacted]
- Cleveland and Assoc.
  - Forensic Accountant with Construction Expertise
- McInnes Cooper – Construction lawyers
  - Various subconsultants
- Long International
  - Construction Claims advisors
- Internal Team members with combined Mega Project experience of hundreds of years including:
  - Commercial Experts
  - Data analysts
  - Construction experts
  - Project Management Experts

What is the Contract Status?

- The contract with Astaldi is solid
- From a pure contractual perspective, the issues that have occurred are the result of Astaldi's actions and are the responsibility of Astaldi
- There are a combination of performance guarantee provisions in the contract
  - $200 million Letters of Credit
  - $150 million Performance Bond
  - Parent Company Guarantee Italy Head Office
  - $75 million Liquidated Damages provisions

Why Negotiate with Astaldi?

- Although our pure contractual position is strong, the implications of not supporting Astaldi could result in very large exposure to the Project if Astaldi is not able to complete the job due to insolvency or even if Astaldi does not complete the job in a timely manner due to cash flow issues.
- The risk of these exposures is high, and just ignoring them because the contract position is strong is not a prudent or acceptable way forward.
- The burden of these risks will fall back to the Project by default if Astaldi is actually unable to manage them.
- The most effective way to minimize the risk and exposure when we can see it ahead of us is to do it up front, as early as reasonably possible, when we have the highest ability to contain it.

Potential Outcomes, No Solution

- Estimated cost to complete for the contractor represents a very significant increase over the contract value.
- If we do not seek a negotiated solution, this will result in two potential outcomes;

Outcome A

- In-depth analysis, coupled with Astaldi's direct feedback to Nalcor, indicates a significant probability that this situation could result in Astaldi insolvency and potentially cause default
- At that point we would bring in a new contractor to complete the job, resulting in significantly more cost to the Project to complete, and a higher probability of even more schedule delay

Outcome B

- At the very least, Astaldi's cash flow issues will result in significantly slowing concrete placement and frustrating tactics
- Focus will shift from effective project completion to Astaldi cash and solvency needs
- Massive claim will be filed by Astaldi
- Significant even higher knock-on effects to project cost and schedule

Preferred Outcome

- The preferred option is to continue to work with Astaldi who are performing much better at this point, assist them with some of their cost issues to a point, thereby significantly increasing the certainty of finishing the job with the least amount of cost and schedule growth to the project

Astaldi's Cost Issue + Schedule Impact

- Additional cost to Astaldi over contract bid to complete (as estimated by Astaldi) is $600 - $650 million, not including profit. (this range could be higher, 600 - $800 million).
- Detailed discussions between Project Team and Contractor has identified a schedule delay impact of 12-18 month to powerhouse completion, provided we continue to work collaboratively

Commercial Principles

- Must continue to work diligently - Threats to stop = default
- Must perform as good as another contractor
- Must continue to work on efficiency (Realistic Plan)
- Must achieve acceptable Quality
- Astaldi must take exposure equivalent to at least our value of time
- Astaldi must take exposure that equals at least their security (Not PG)
- We will not be exposed to any losses last year for poor performance
- Will not give up our strong contract position
- Must get something physical for any additional investment
- Must have full waiver of claims

How to protect any further payment?

Question

- Provided we reach an agreement to provide more to Astaldi, how do we ensure such value is protected in the event Astaldi does not perform and/or becomes insolvent anyway?

Answer

1. Any additional value provided to Astaldi would be tied to actual, physical performance, and would not be paid unless we could see corresponding progress as agreed – no cash out until we see the agreed progress
2. The amounts and timing of value provided would be structured to assist their cash flow and solvency profile

Options Analysis Outline

- Elements to consider
  - Schedule increase implications on powerhouse
  - Components of estimated all-in additional cost to Project;
    - Cost of delay to Project to keep support facilities operating
    - Cost to compensate other contractors for related changes
    - Cost to assist Astaldi, if this option proceeds
    - Cost to replace Astaldi with another contractor, if this option proceeds
    - Offset value of drawing on Astaldi contract performance guarantees
  - Relative level of certainty and risk associated with each option
- Implications on trade-off regarding IDC vs Bond Payment separate from this summary

Potential Parameter of a Settlement

Option 2 - Continue with Astaldi as is, with assistance;

- Outcome
  - Estimated net additional cost to Project $430-575 million
  - Assumes a net amount of cost assistance from Project to Astaldi in $250-300 million range (note - not certain this will be accepted)
  - Estimated schedule increase: 12-18 months
  - Much higher certainty, less risk with this option, if successful
- Structured to ensure payment tied to measureable production
  - Unit Rates tied to Concrete Production
  - Key Milestone Payments
  - Stretch Targets
  - Performance Security Maintained
- Note, not certain if this will close a deal with Astaldi

Westney Consulting Group

Lower Churchill Project – Muskrat Falls Generation (MFG) Astaldi Analysis and Path Forward

Drafted for Cabinet Presentation

February 2016

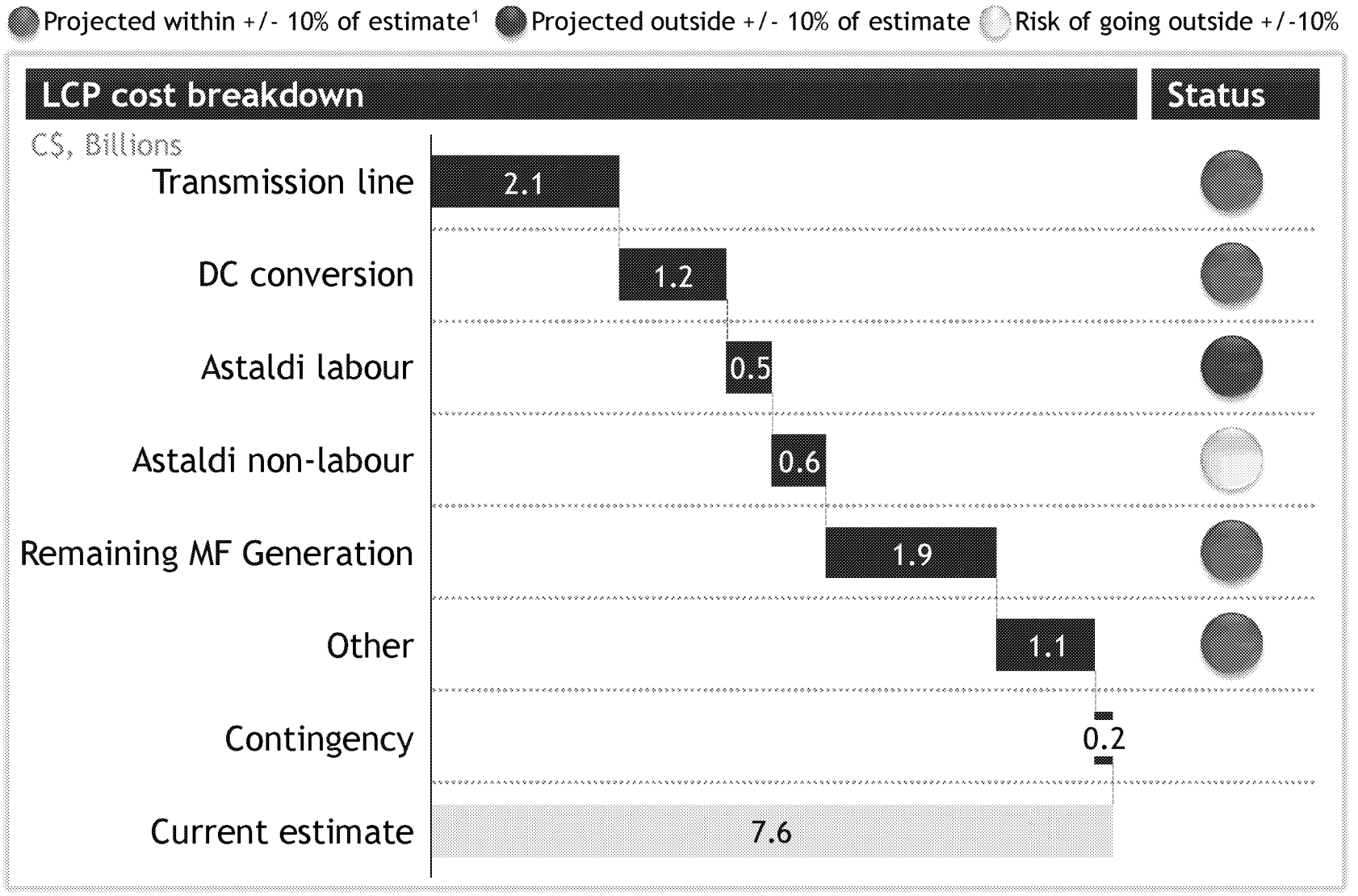
PRIVILEGED AND CONFIDENTIAL IN CONTEMPLATION OF LITIGATION

Key messages

1. The situation with Astaldi is an outlier and would not be considered in normal project contingency
2. The selection of Astladi was appropriate at the time
3. [redacted] shows that Astaldi now has liquidity and credit issues, putting contract enforceability in question
4. Astaldi has overcome execution issues and is not insolvent, despite financial challenges – making termination for cause very risky
5. There is a cost and schedule gap between the Astaldi contract and current projections[1]
6. Negotiating with Astaldi provides the best opportunity for a predictive outcome; disruption of continuity/replacement will cause a significant negative impact
7. Even with additional funding, Astaldi will still face a large loss, and any additional funds will primarily be reinvested in NL
8. The timing of a path forward decision is critical for several reasons (e.g., seasonality of production, labor max cap summer 2016, Astaldi financial reporting dates)

[1] Details of cost and schedule gap for MF to be included in Westney's report titled "LCP Cost and Schedule Risk Assessment – Muskrat Falls Generation", to be issued Feb. 2016

The labour portion of the Astaldi powerhouse contract is the only area of the LCP with significant concern of cost overrun



[1] Exposures outside of Astaldi labor are within mega-project industry norms

The Astaldi bid appeared to be very beneficial and compliant with requirements

Positive factors of the Astaldi bid

	Details
1 Support from other competitive bids	▪ Multiple bids contained similar work-hour and production estimates ▪ Two bids were within 10% of each other ▪ An aggressive production plan was proposed via a new methodology[1], but plan was consistent with second bidder
2 Good credit ratings	▪ Rated a "B+" credit risk by Standard and Poor's ▪ Rated a "B+" credit risk by Moody's
3 Significant financial guarantees	▪ Aggregate limit of liability at 50% of contract value ▪ Parent company guarantee ▪ Milestone LDs of ~$75 million ▪ Letters of credit ~$200 million ▪ Performance bond ~$150 million

[1] Integrated cover system (ICS) built over the powerhouse to enable year-round concrete installation

It is important to fully understand the current situation facing the MFG project

1 Astaldi has faltered, but has not breached the contract sufficient for termination

- Initial plan failed, and a year of schedule was lost
  - Completion LDs subject to forfeit
- Current performance is consistent with industry standards
  - Experienced CM is in place and planning has improved
  - Summer 2015 installation rates exceeded expectations
  - Termination for cause is likely to be successfully challenged

2 Astaldi is in dire financial straits, but has not failed

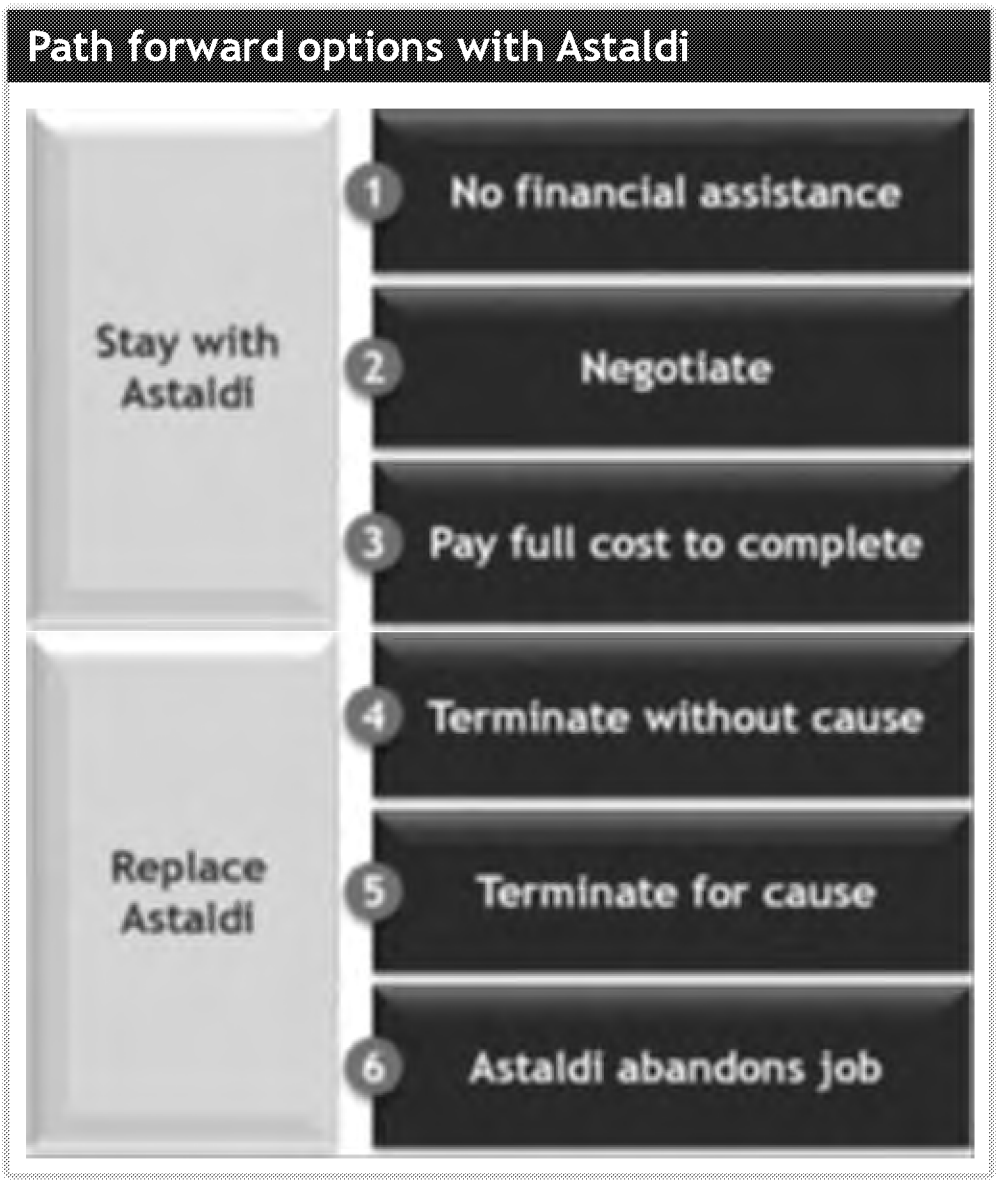
- Astaldi has serious liquidity issues
- Astaldi's credit rating downgraded by S&P's and Moody's to "B+ negative"
- Share price has fallen from 11 EUR to <4 EUR in the last 6 months
- Key guarantees are in jeopardy due to questionable creditworthiness of Astaldi as a counterparty

3 Terminating Astaldi has significant risks

- Astaldi is not in performance or financial breach
- There is a significant cost associated with disruption of continuity/ replacement, including loss of personnel and loss of or damage to equipment

Status quo and indecision will bring high cost exposure

We see 6 potential options to complete the MFG project



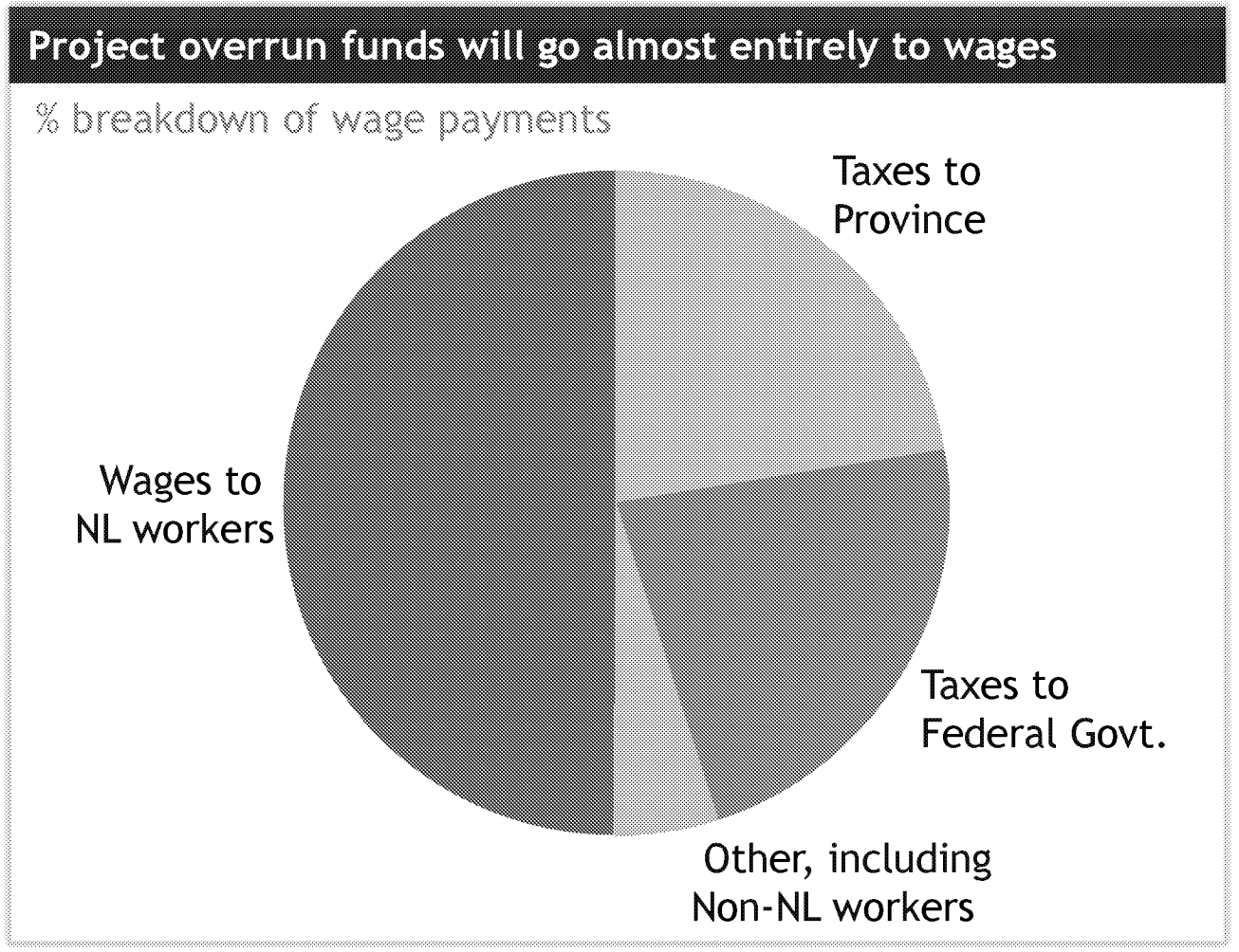
There are 3 principles that should guide any negotiation with Astaldi

Principles that should guide negotiations with Astaldi

	Details
1 Astaldi should take on a significant portion of the loss	▪ Have Astaldi take responsibility for the costs associated with their failed plan ▪ Additionally, have Astaldi share in the required costs to project completion
2 There must be a continued focus on performance	▪ Performance must meet or exceed current production, with a focus on improvement ▪ Additional funds should be paid consistent with performance (e.g., after concrete installation)
3 Additional risk exposure should be limited to the extent possible	▪ Basic contract terms should remain in place with adjustments to reflect Astaldi's current financial situation (e.g., potential ownership change) ▪ Securities should remain in place ▪ Attempt to have Astaldi take additional risk exposure limiting Nalcor's

A significant portion of the additional funds (either provided by Astaldi or MFC) will stay in the province

ILLUSTRATIVE



Closing

1. The timing of a path forward decision with Astaldi is critical
2. Negotiation with Astaldi provides the best opportunity for a predictive outcome
3. Astaldi will still face a large loss, even with additional funding
4. Additional funds will predominately go back to NL in the form of wages

Disclaimer

DRAFT

The analysis in this report was developed by Westney Consulting Group (Westney) in concert with the project team using project documents and interviews.

Westney has had varying levels of involvement on this project since 2008, providing us with good general knowledge of the project.

For probabilistic analysis, the Westney Risk Resolution® process and proprietary distributions were used.

Any expressed opinions or recommendations expressed by Westney herein are the product of the experience of the Westney consultant(s) and are provided as input and information for decisions; any reliance upon or decisions made from the information is the sole judgment/ decision of the user of the information.

Westney Consulting Group

DRAFT

Pertinent Details Informing the Path Forward with Astaldi

Discussion document

March 9, 2016

PRIVILEGED AND CONFIDENTIAL IN CONTEMPLATION OF LITIGATION

What we'd like to cover today

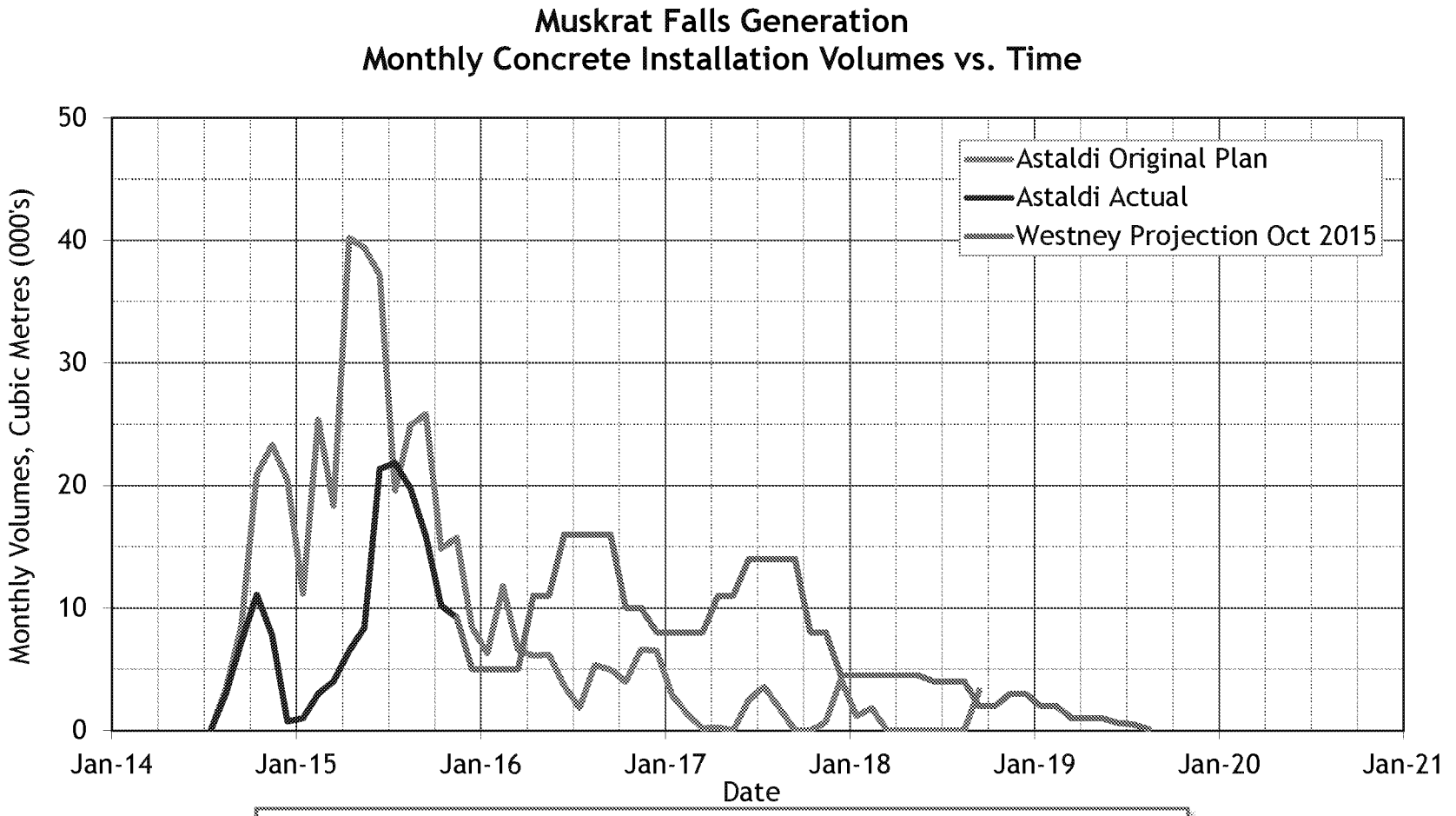
DRAFT

Key messages	Supporting information
1 **A quality Astaldi site team is in place**	▪ Key findings and analyses from Westney's work during the summer of 2015
2 **Work-hours remaining for concrete installation is the largest cost-risk**, with the worst-case likely occurring if Astaldi is replaced	▪ Concrete installation and work-hour comparison (Astaldi vs. Westney view) ▪ Details on remaining pours vs. pours to-date
3 **Schedule risk** (and associated cost) **are directly tied to the rate of concrete installation**	▪ Westney time-risk model
4 **Additional costs will be incurred if Astaldi is replaced** (beyond work-hours)	▪ Breakdown of additional costs likely to be incurred if Astaldi is replaced
5 [redacted]	

1 Astaldi was unable to achieve the initial execution plan

DRAFT

Comparison of monthly concrete production



- Concrete production rates assumed were unrealistic
- Astaldi's plan to use an Integrated Cover System (ICS) to enable winter season production failed

1 Experienced team led effort in June 2015 to assess Astaldi's execution capability

DRAFT

Context

- In June 2015, LCMC asked Westney to assess whether the improvement measures implemented by Astaldi were sufficient and sustainable
- To accomplish this, Westney put together a team of experts to look at all aspects of effective construction, including:
  - Organization structure and project leadership
  - Project control systems
  - Productivity and performance initiatives
- The Westney team included[1]:
  - Richard (Dick) Harding, former President, Bechtel Construction
  - Pete Oppenheim, Colonel US Corps of Engineers, VP KBR
  - Richard Tucker, PhD in Civil Engineering and founder of the Construction Industry Institute

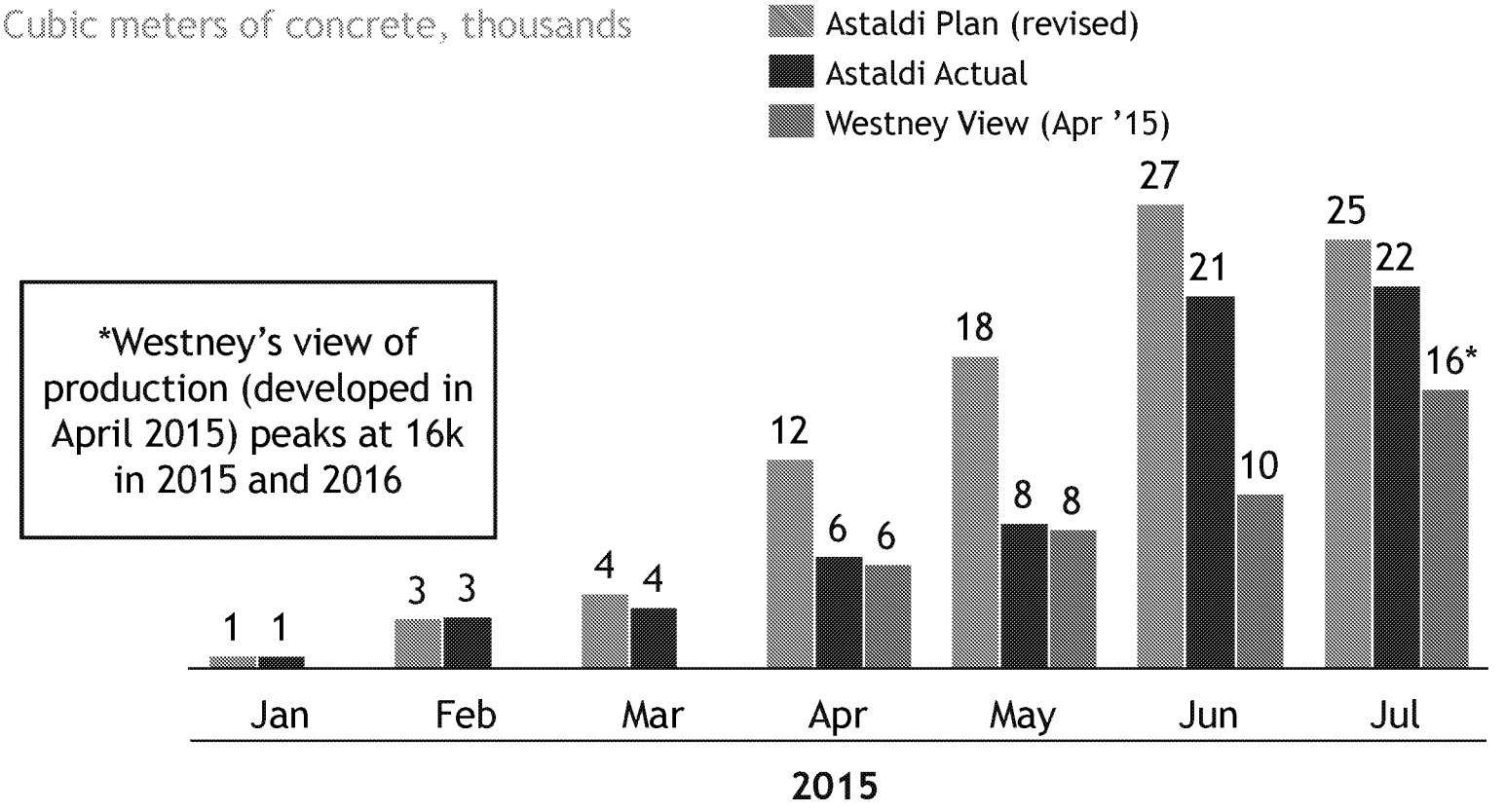
The next 3 slides are outputs from the June 2015 Astaldi construction assessment

1 June 2015 construction assessment revealed significant concrete installation improvement

DRAFT

JUNE 2015 ASTALDI ASSESSMENT

2015 concrete installation as seen in June/July 2015 assessment



- **Significant changes** (e.g., new managers, new craft labor supervision) **helped drive production improvement**
- **Performance was sustained throughout 2015**

Source: Astaldi weekly progress reports

1 Several observations supported the improvement realized

DRAFT

JUNE 2015 ASTALDI ASSESSMENT

From…	…To
▪ **Significant crew "stand-around" time**	▪ **Well organized and motivated labor**, enabled by a good working culture instilled by management
▪ **Limited construction management presence in work areas** due to meetings	▪ **Increased management presence** enabled by improved organization and timing of management meetings
▪ **Disorganized laydown areas** impacting productivity	▪ **Well organized, easily accessible laydown areas**
▪ **Visible debris and clutter** creating unnecessary hazards	▪ **Greatly improved site cleanliness and overall industry standard safety practices**, including a safety recognition and awards program

The positive observations are indicators of the effectiveness of the construction management team and are fundamental drivers of productivity

1 No significant deficiencies were identified with Astaldi's performance

DRAFT

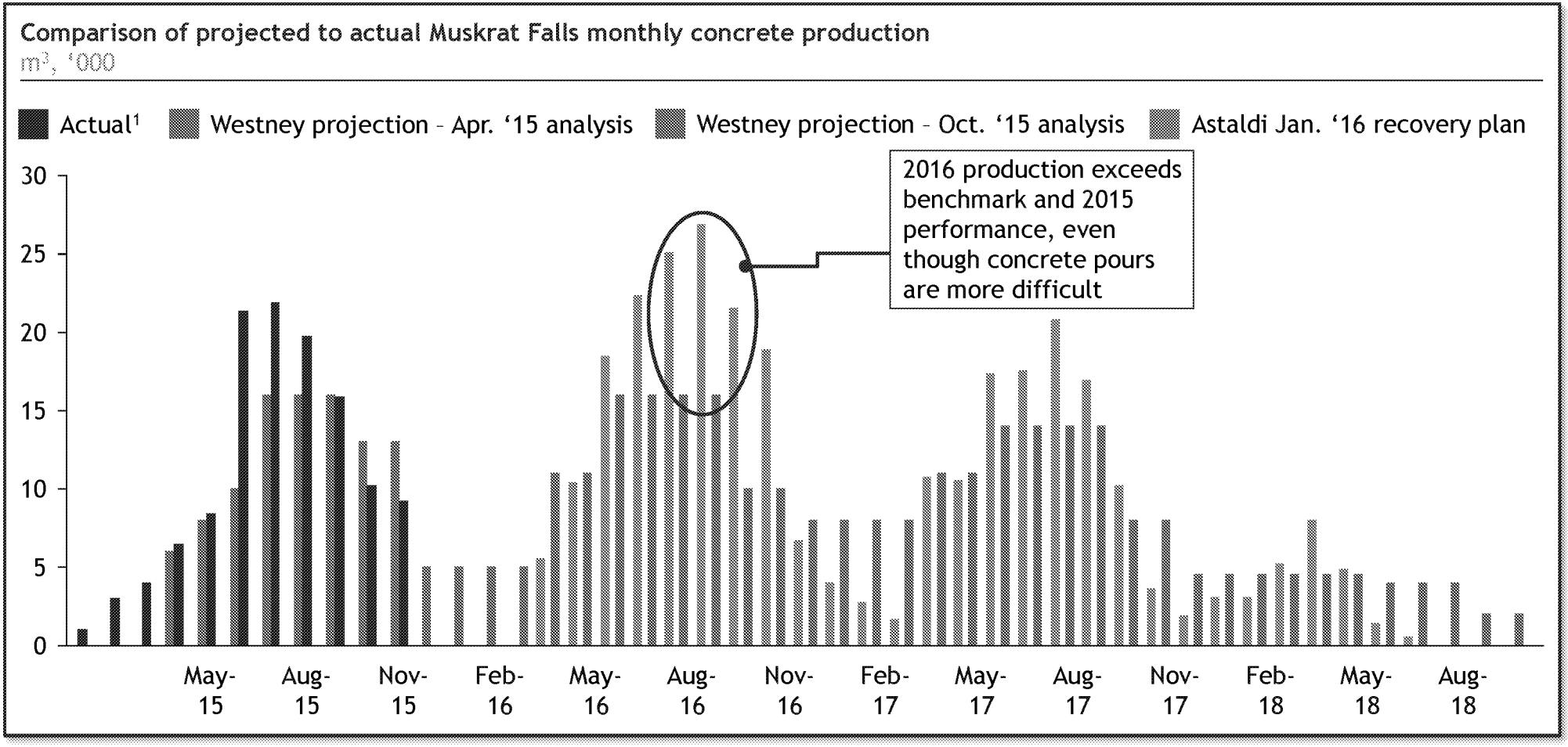
JUNE 2015 ASTALDI ASSESSMENT

	Details of key performance factor	Meets good practice?	Key findings
Org. structure and project leadership	1 Overall organization structure	Good practice	▪ Mgmt. team is competent, experienced, and committed ▪ A good working culture has been instilled ▪ PM organization is too flat ▪ Performance initiatives aren't centrally managed
	2 Reporting structure and accountability	Good practice	
	3 Senior leadership experience level	Good practice	
	4 Ratio of general foreman to foreman	Good practice	
Project control systems	5 Overall schedule program and processes	Some improvement opportunities	▪ Site work activities support good planning (little carry-over) ▪ Action taken to address materials issues, but additional planning focus is required ▪ Baseline schedule not completed ▪ Staffing of planners/schedulers is significantly less than similar projects
	6 Schedule planning meetings	Good practice	
	7 Reporting of unit-rates and forecasting	Some improvement opportunities	
	8 Materials management	Some improvement opportunities	
	9 Financial incentives	Some improvement opportunities	
	10 Safety program	Good practice	
Productivity and performance initiatives	11 Construction equipment utilization	Good practice	▪ Labor turnover significantly improved ▪ Efforts are underway for continued improvement in lost time and supervision at the work front ▪ No focused training for GF/ foreman on planning and labor productivity ▪ Conflicting information received as to the specifics of the winter plan
	12 Training programs	Some improvement opportunities	
	13 Labor turnover/ absenteeism	Good practice	
	14 Lost time (e.g., orientation, busing)	Good practice	
	15 Shift work/ overtime work	Good practice	
	16 Supervision at the work-front	Good practice	
	17 Plan for winter work	Some improvement opportunities	

Significant improvement opportunities
Some improvement opportunities
Good practice

2 Assumptions regarding concrete installation quantities are likely optimistic

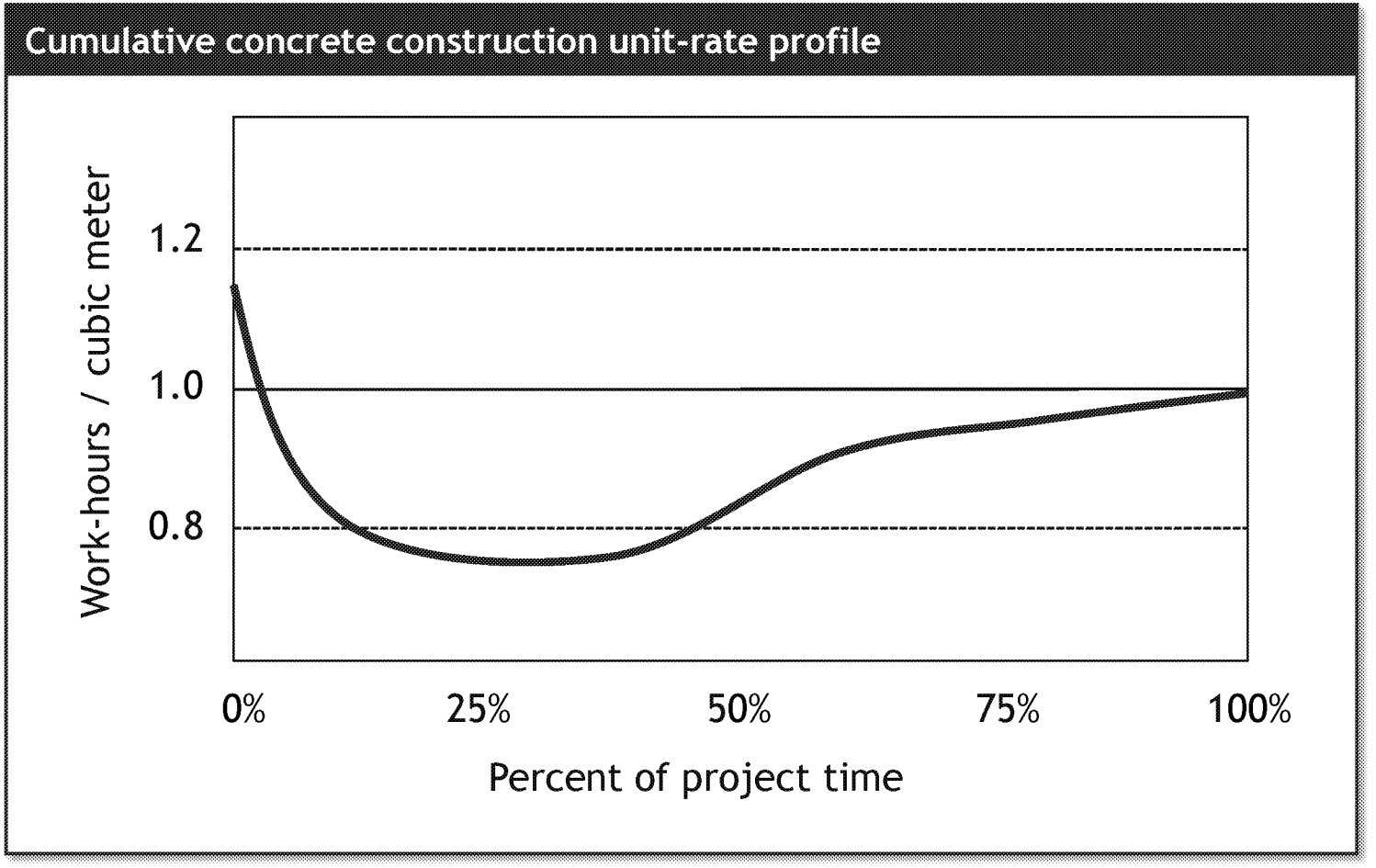
DRAFT



1 From Astaldi's weekly production reporting

2 Work hours/m³ tend to decrease (improve) during the first ~25-50% of a project, then increase as the pours get more difficult

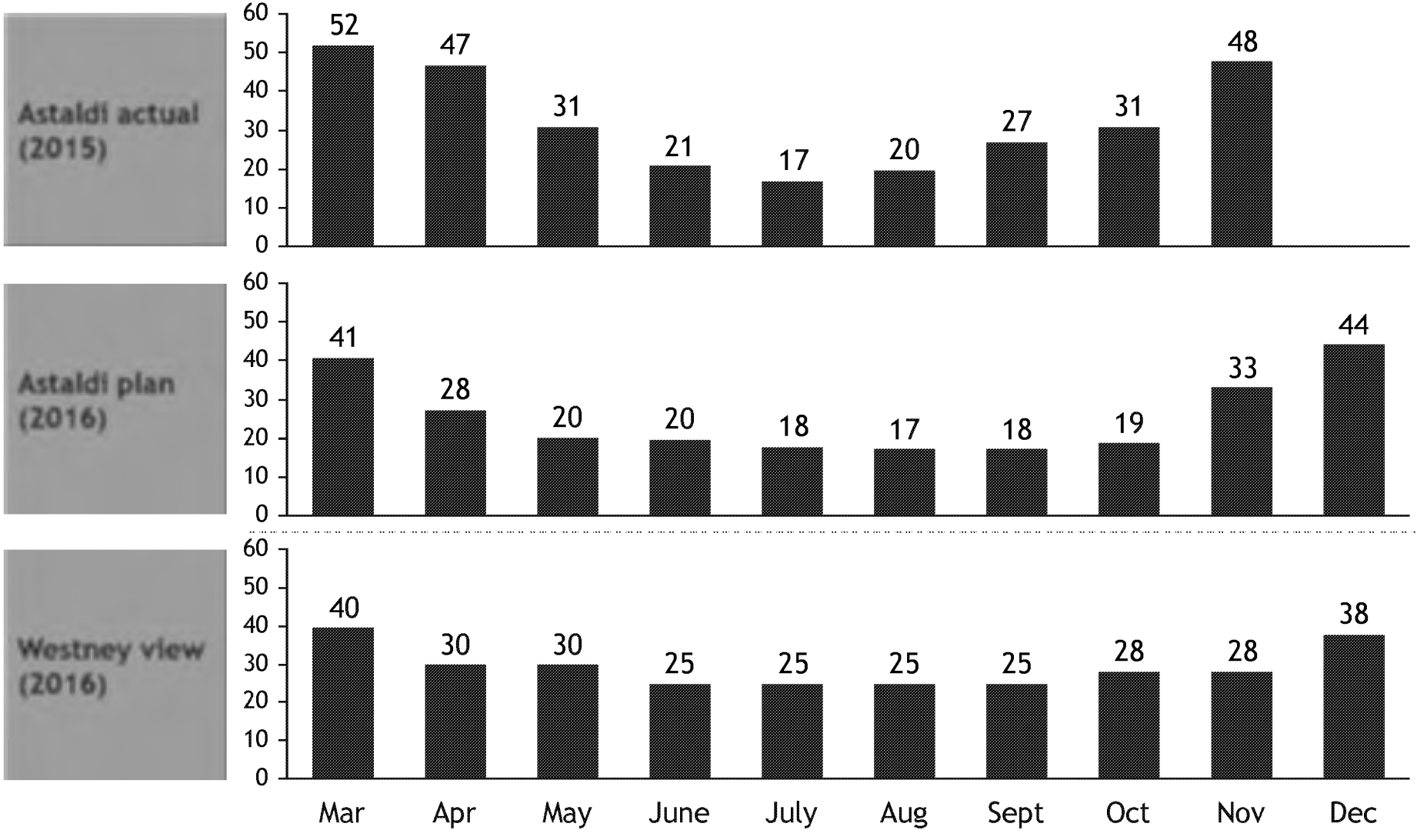
DRAFT



2 Astaldi's 2016 plan is more aggressive than 2015 actual performance…

Comparison of concrete installation

Work-hours/cubic meter (direct and indirect labor)

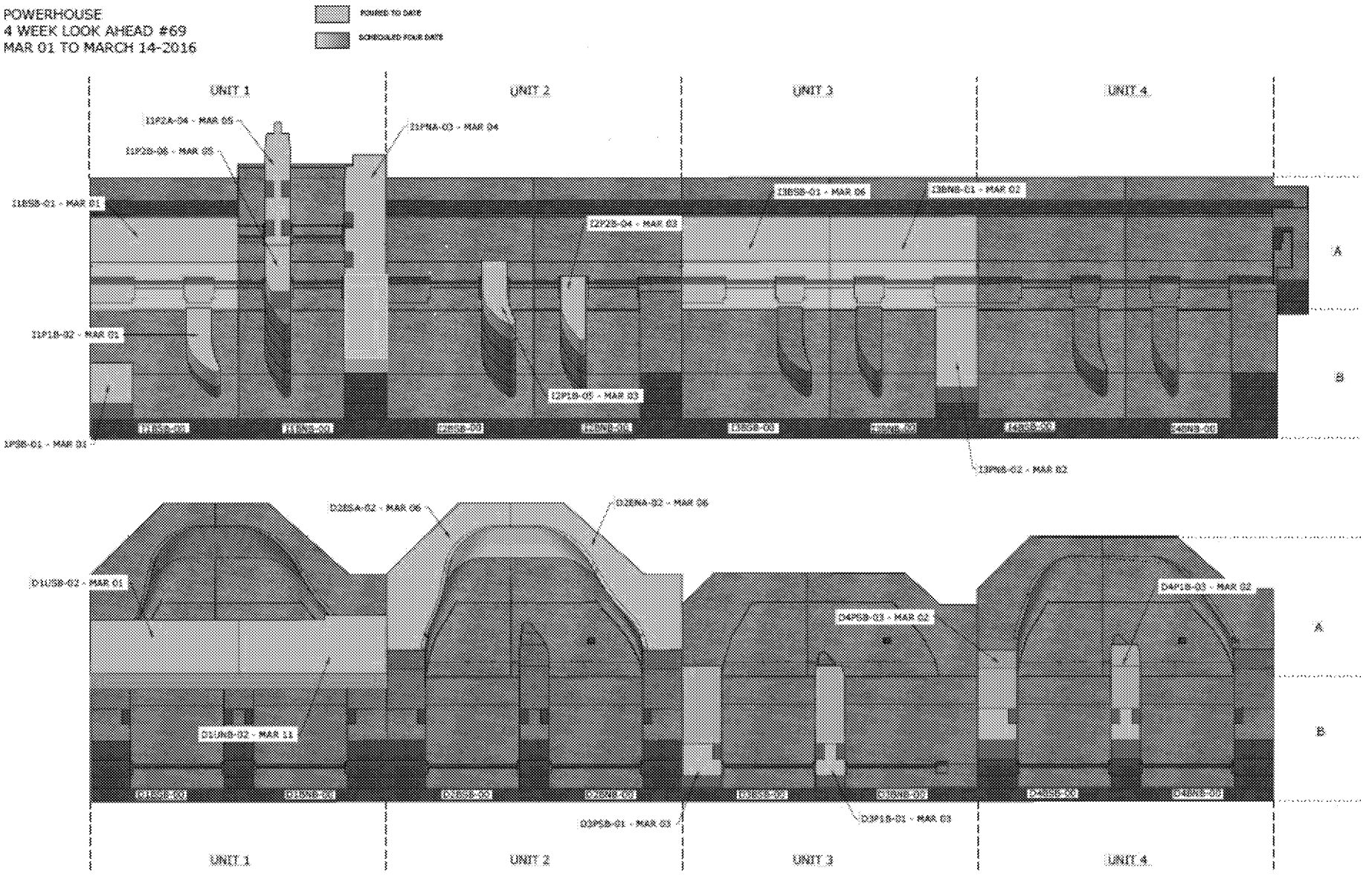


2 ...even though the pours are more difficult

MFG concrete pour analysis

	2014	2015	Remaining
Concrete volume (m^3)	29,991	102,257	295,631
Number of pours	64	466	1,436
Average pour volume (m^3)	469	258	206

2 Example of pour difficulty



2 Risk frame: Work-hours "to-go"

DRAFT

Description

- Astaldi's unit-rates for concrete installation are aggressive and (in Westney's view) do not account for the increasing difficulty of the remaining work
- The average work-hour per m^3 for remaining work is ~24 wk-hs/m^3, while a more realistic view is ~35 wk-hs/m^3 (with rates for other observed projects in Canada going even higher); worst-case is likely ~40 wk-hs/m^3
- Given the ~295,000 m3 of concrete remaining, Astaldi's forecast is ~7.0 million wk-hrs
- Westney's "point estimate" of remaining work-hours is ~8.6 million wk-hrs, with a range of 7 million to 11.8 million wk-hrs

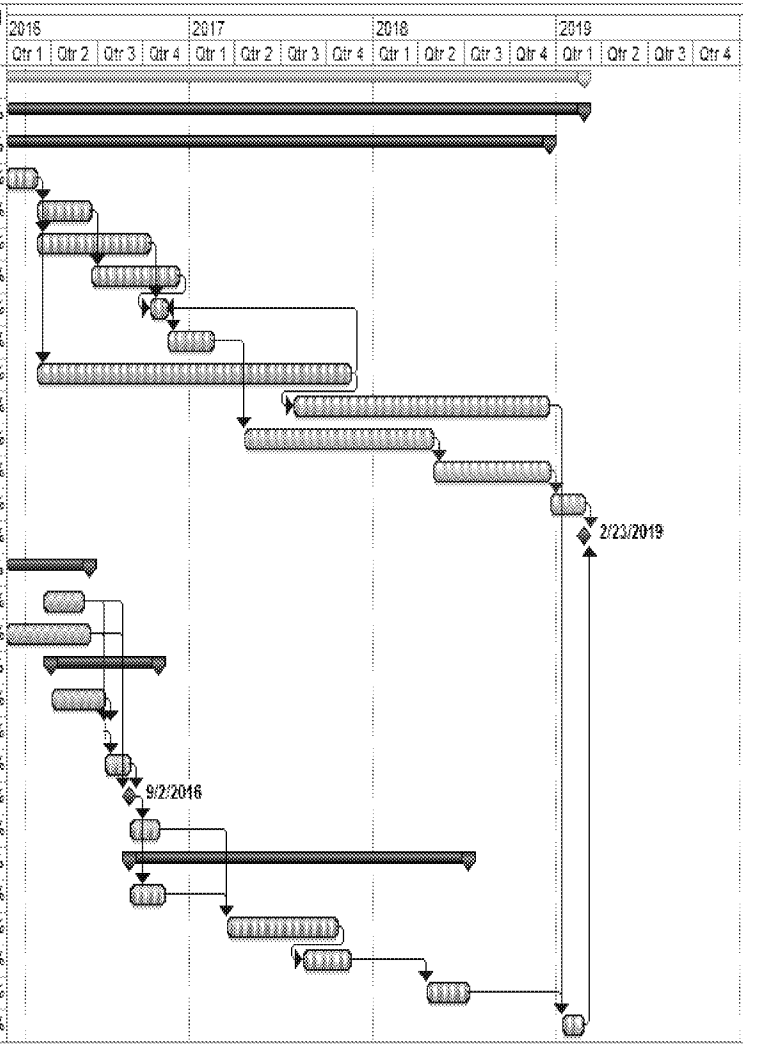
Potential mitigation

- Maintain productivity via the negotiated agreement with Astaldi linked to performance-based incentives
- Work with Astaldi to implement measures to improve productivity, including labor relations management

3 MFG time-risk model for first power

DRAFT

ID	Name	Duration	Start	Finish	Predecessors	@RISK: Critical Index
0	**Muskrat Falls Generation - First Power**	**1150 d**	**1/1/16**	**2/23/19**		
1	**Power House**	**1150 d**	**1/1/16**	**2/23/19**		**100.00%**
2	**Construction**	**1083 d**	**1/1/16**	**12/18/18**		**94.12%**
3	Dismantle Integrated Cover System (ICS)	61 d	1/1/16	3/1/16		94.12%
4	Complete Foundations and Concrete for PH Service Bay	109 d	3/2/16	6/18/16	3	38.06%
5	Complete PH Structure Fnds. For Biding. Steel Erection - Unit 1 (El. 8.5 m & 15.5 m	225 d	3/2/16	10/12/16	3	27.44%
6	Service Bay Steel Erection and Enclosure / Install OH Crane	175 d	6/19/16	12/10/16	4	38.06%
7	Steel Erection for Unit 1 incl. Mezzanine/Lighting	33 d	10/13/16	11/14/16	5,6FS-34%,9FF-75%	65.50%
8	Concrete for the Tailrace Structure - Unit 1	95 d	11/15/16	2/17/17	7	65.50%
9	Complete Concrete for Intake Structure to PH	523 d	3/2/16	11/14/17	3	28.62%
10	Install Embeds/Gates/Hoist Bldng. for Intake Structure (incl. final elec. & controls)	506 d	7/25/17	12/15/18	9FS-18%	28.62%
11	Unit 1 Phase II Concrete to Pit Free (allowed to start earlier)	375 d	4/18/17	4/27/18	8	65.50%
12	Install T/G & Auxiliary Equipment for Unit 1	235 d	4/28/18	12/18/18	11	65.50%
13	Pre-op Testing for Unit 1	67 d	12/19/18	2/23/19	12	65.50%
14	**Ready for First Power**	**0 d**	**2/23/19**	**2/23/19**	13,29	**100.00%**
15	**Spillway**	**167 d**	**1/1/16**	**6/15/16**		**0.36%**
16	Construct Spillway Downstream Channel Liner	80 d	3/15/16	6/2/16		0.22%
17	Install & Test Spillway Gates to Allow River Diversion (Dry & Local Control Only)	167 d	1/1/16	6/15/16		0.14%
18	**River Diversion/Closure**	**214 d**	**4/1/16**	**10/31/16**		**0.98%**
19	Erect Temporary Bridge over Spillway (for cofferdam construction)	105 d	4/1/16	7/14/16		0.23%
20	Start Cofferdam (allowed July 1 - August 31)	1 d	7/15/16	7/15/16	16FS-14 d,17FS-14 d,19	1.73%
21	Construct Upstream Cofferdam to El. 17m (river diverted through spillway)	49 d	7/16/16	9/2/16	20	1.73%
22	River Closed/Diverted through (open) Spillway	0 d	9/2/16	9/2/16	16,17,21	1.75%
23	Construct Upstream Cofferdam to El. 25m (winter headpond)	59 d	9/3/16	10/31/16	22	0.90%
24	**North Dam**	**674 d**	**9/3/16**	**7/8/18**		**5.88%**
25	North Dam Foundation Preparation	70 d	9/3/16	11/11/16	22	0.66%
26	Construct North Dam RCC & CVC Face (post winter calendar) to El. 39m	220 d	3/15/17	10/20/17	23,25	4.72%
27	Place CVC Flip Bucket	95 d	8/12/17	11/14/17	26FS-70 d	4.72%
28	Place CVC Crest (post winter calendar)	85 d	4/15/18	7/8/18	27	5.68%
29	Impound Reservoir to El. 39m (allowed to start earlier)	42 d	1/11/19	2/21/19	10,28	34.50%



4 Risk frame: Astaldi loss/credit-worthiness

DRAFT

Description

- Given the execution struggles and financial vulnerability of Astaldi, there is a chance that Astaldi may be unable or unwilling to complete MFG
- In the worst case, Astaldi will have to be replaced, and thus several costs will be incurred, including:
  - Mobilization of a new contractor
  - Security and demobilization of Astaldi
  - Schedule loss
  - Legal, audit, and consultants fees
- Although some costs will likely be recouped from the recovery of securities and possibly from a breach of contract lawsuit
- In the best case, LCMC will instill incur legal, audit, and consulting fees associated with preparing for the worst case

Potential mitigation

- The currently proposed strategy of a negotiated agreement with Astaldi aims to give Astaldi enough liquidity and credit-worthiness to finish MFG

Calculation methodology

- Worst case of replacing Astaldi will include the costs shown below:

Description	Value (C$M)
Mobilization	300
Security and demob.	200
Schedule loss	100
Legal/audit/consult.	100
Recovery of securities	(200)
Recovery for breach of contract	(200)

- Best case will still incur the legal, audit, and consulting fees

4 Typical cost elements incurred to demobilize Astaldi and mobilize a new contractor

DRAFT

	Details of specific costs incurred
Demobilization of Astaldi	▪ Additional security staff to secure site and camp and control transport for orderly close out, including minimizing potential theft and sabotage of site and work (estimated at 200 people on-site for a project of this size and location) ▪ Rework or clean-up resulting from Astaldi abandonment or lack of care in final days of contract ▪ Any payments to Astaldi for services required during the transition ▪ Additional staff or contractor to: — Inventory material and material payment status — Status subcontracts, including subcontractor payments — Close out contractor payroll, accounts payable, and other related book-keeping — Provide arrangements for travel and personnel relocation — Survey and measure work complete and in-progress — Assess status of all construction equipment (condition / ownership) — Assess status of small tools and consumables
Mobilization of new contractor	▪ Incremental costs for new contract including any personnel concessions, overhead recovery, and profit ▪ Recruiting and securing key existing staff and workforce ▪ Bridging payroll for retaining existing staff and workforce during change ▪ Bridging payroll for new contractor during change ▪ Adjustment/changes for license, permits, and PLA ▪ Vetting and approval of new contractor team and construction plan ▪ Social introduction and integration into community and site ▪ Media campaign announcing and validating change ▪ Visitation and travel for new contractor ▪ Any services for site and work evaluation with respect to new contractors plan to execute the work ▪ Installation of new systems, processes, and reporting ▪ Evaluation of existing suppliers and subcontractors ▪ Sourcing, evaluation, and order placement for new suppliers and subcontractors ▪ Inventory and agreement on work remaining ▪ Interface and alignment with mechanical and electrical contractors

Disclaimer

DRAFT

The analysis in this report was developed by Westney Consulting Group (Westney) in concert with the project team using project documents and interviews.

Westney has had varying levels of involvement on this project since 2008, providing us with good general knowledge of the project.

For probabilistic analysis, the Westney Risk Resolution® process and proprietary distributions were used.

Any expressed opinions or recommendations expressed by Westney herein are the product of the experience of the Westney consultant(s) and are provided as input and information for decisions; any reliance upon or decisions made from the information is the sole judgment/ decision of the user of the information.

Pages 269 – 317 have been fully redacted.

Negotiating Strategy

March 6 2016

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

nalcor energy
LOWER CHURCHILL PROJECT

Purpose

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

- Subsequent to identification of the issue(s), followed by detailed analysis resulting in a decision to negotiate, the next step is development of a negotiating strategy.
- The purpose of this document is to outline at a summary level Nalcor's negotiating strategy in addressing commercial and construction issues regarding Astaldi's request for adjustment to the commercial terms of the contract between Nalcor and Astaldi for construction of the Muskrat Falls powerhouse and spillway

Summary

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

- Nalcor acknowledges Government's serious financial position. Our focus remains pursuing least cost options to create maximum value, minimize risk, and generate sustainable long term revenues
- Nalcor has a proven track record in negotiating large scale commercial agreements in conjunction with Gov NL eg. Whiterose, Hibernia South, Hebron, Innu "New Dawn Agreement, LCProject/Emera/NS/Federal Loan Guarantee etc.
- Nalcor believes Astaldi remains the best and least cost option for powerhouse construction, based on 2015 performance and readiness for the 2016 construction season

Summary

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

- Nalcor is committed to sharing our analysis and data with EY. To date we have produced extensive, existing supporting documentation and provided hundreds of person-hours of briefing/meeting time
- Nalcor employs a principled based negotiating style – mutual understanding of interests, collaboration, win-win outcomes
- This negotiation with Astaldi will be principled based, but must result in Astaldi sustaining maximum losses.
- Negotiations must also consider the following;
  - analysis of Astaldi's position and their ability to finance construction performance
  - Strength of claim and contract
  - Value to Nalcor of time/schedule and minimization of progress issues
  - Alternatives to a negotiated arrangement

Key Elements of Negotiation Strategy

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

1. Selecting a negotiating style
2. Selecting a negotiating format
3. Preparations and planning
    a. Goals/Principles
    b. Key Interests
    c. Relative views
    d. Key Drivers/Levers and Other Drivers/Levers
    e. Options Analysis
    f. Identifying Objective Criteria, BATNA, ZOPA
4. Executing the actual negotiation
5. Implementation

Selecting a Negotiating Style and Format

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

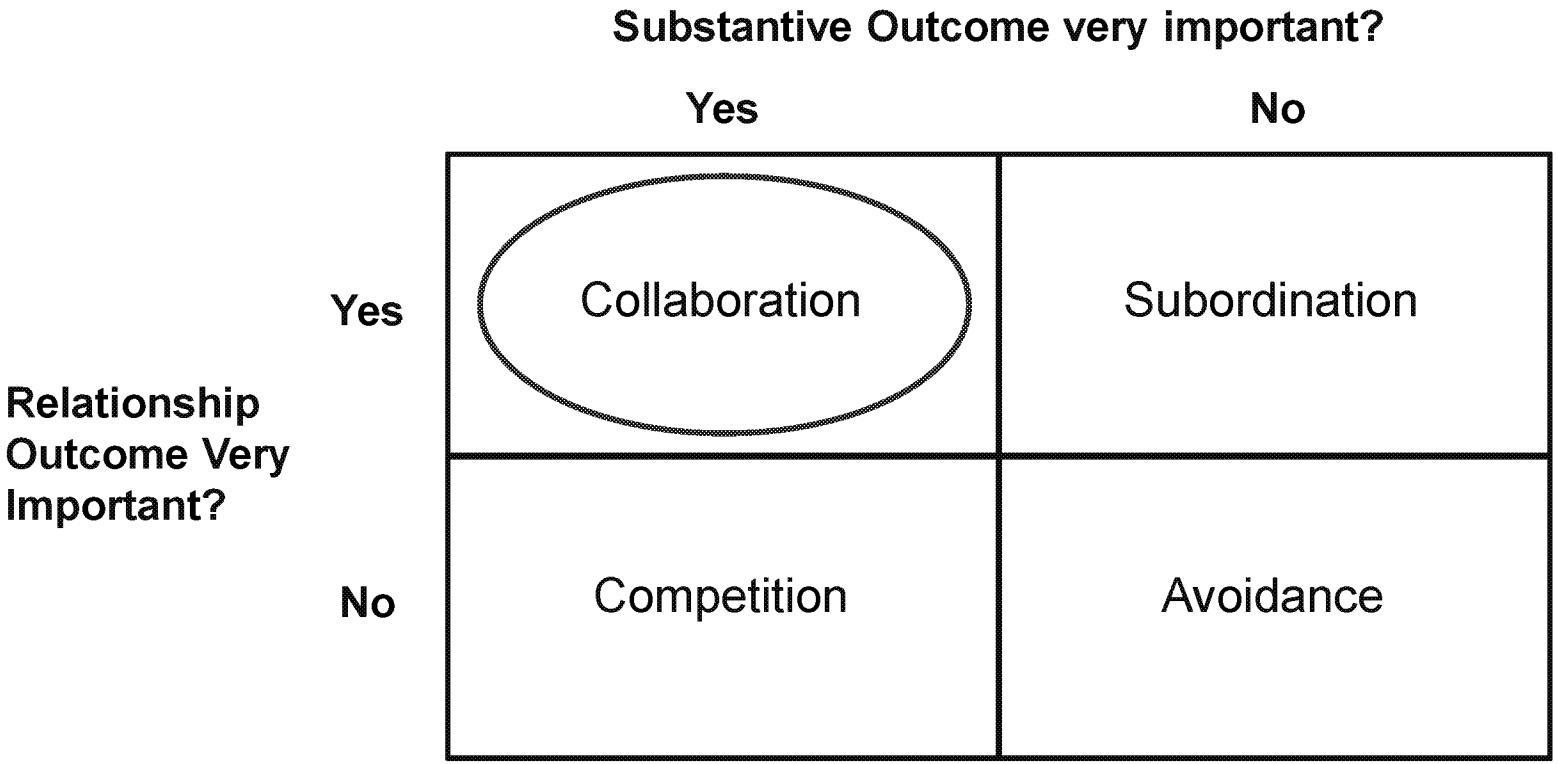
Selecting a Negotiating Style

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

- Choice of strategy is reflected as a function of the answers to two questions;
  1. How much concern do I have in achieving my desired outcomes at stake in the negotiation?
     - **High level of concern for Nalcor as the implications are very significant**
  2. How much concern do I have for the current and future quality of the relationship with the other party?
     - **Seeking a strong relationship with Astaldi over the next 2-3 years as this will significantly enhance quality, safety, cost and schedule outcomes**

Selecting a Negotiating Style

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft



Avoidance: Don't negotiate
Competition: I gain, ignore relationship
Collaboration: I gain, you gain, enhance relationship
Subordination: I let you win, enhance relationship

Selecting a Negotiating Format

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

- The two main negotiation formats
  - Positional bargaining
    - Win-lose proposition
    - Negotiations characterized by conflict and "drag-on"
    - Creates lack of trust and entrenchment
  - Principled bargaining
    - Win-win proposition, within defined "interests"
    - Negotiations characterized by collaboration
    - Creates trust, Leaves both parties no worse off than when they started

Negotiating Format

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

- Negotiations of this nature will take place in a series of meetings as needed over several weeks or months in locations mutually agreed
- Many of the earlier sessions will be exploratory in nature so will require open discussion
- If solutions start to develop, presentations containing offers will become more the norm

Preparation and Planning

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

a. Goals/Principles
b. Key Interests
c. Relative views
d. Key Drivers/Levers and Other Drivers/Levers
e. Options Analysis
f. Identifying Objective Criteria, BATNA, ZOPA

Goals and Principles

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

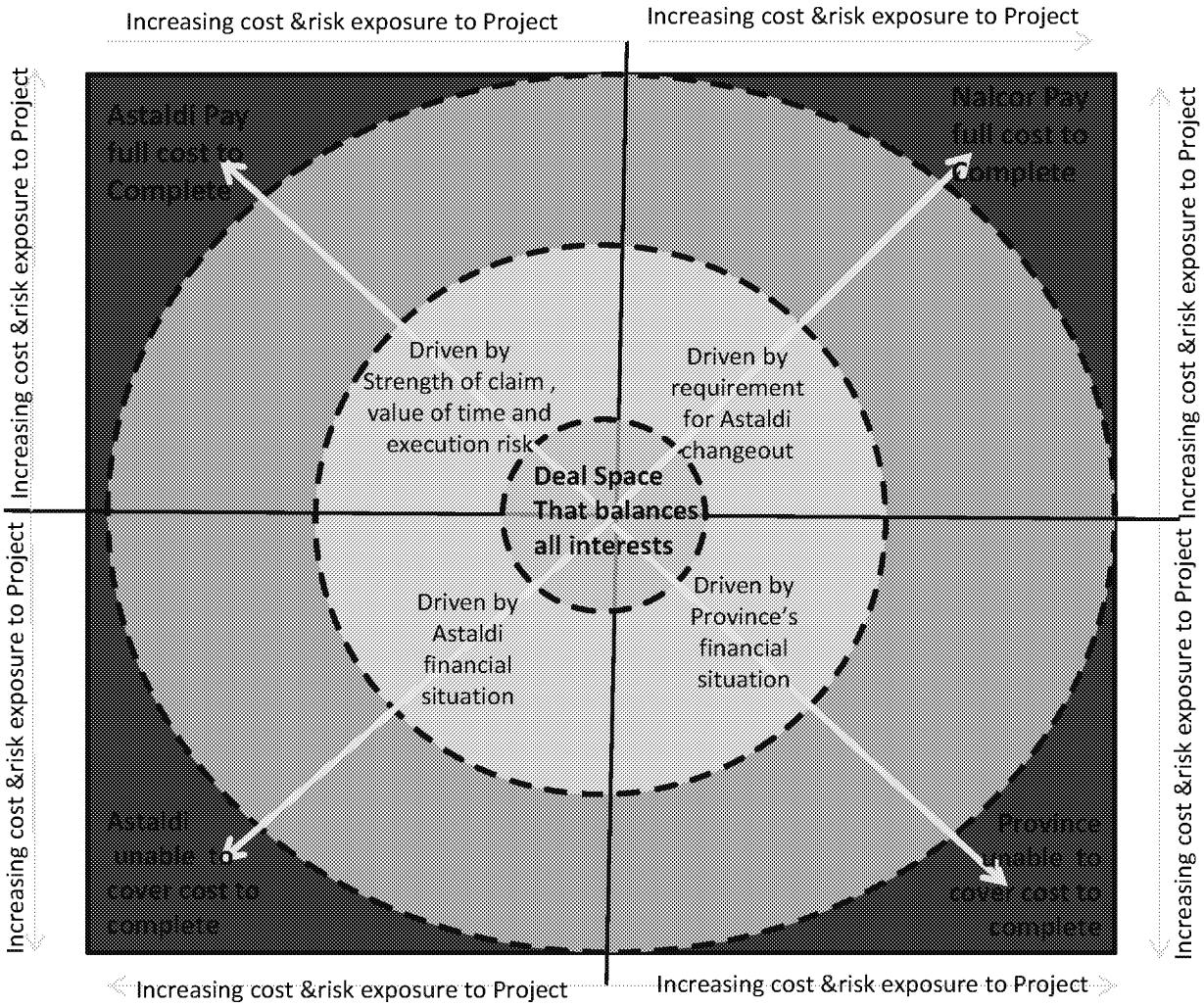
Goals and Principles

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

- Understand goals and principles
- Keep Lines of Communication Open
  - Ask about and understand the other sides interests and alternatives
  - Prepare questions prior to entering negotiations
  - Develop process to frame interests when in the room together
- Assess where you are in the relationship and where you wish to be following the negotiation
- Clarify the level of authority held by each party at the table
  - Know your counterparts and their relative roles
  - What approvals are required outside of the negotiating room?
  - What steps are required to finalize an agreement?

Balancing the interest drivers to reach an arrangement

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft



Commercial – Principles (Nalcor Goals)

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

Astaldi must take on a large loss (To the extent they can survive)

- Have Astaldi take responsibility for their errors
- Have Astaldi share in the additional costs to complete from this point onward
- Astaldi to take exposure that equals at least their security (Not PG) (Provided they can financially survive)
- Astaldi to take exposure at least as large as our value of time lost (Provided they can financially survive)

Any deal is predacated on performance in the field

- Performance must stay within planned expectations and industry norms (No slowing down or stopping)
- Their must be a heavy focus on improved efficiency
- Additional funds should be paid consistent with performance (e.g., after concrete installation)

We must maintain our strong contractual position whilst limiting future risk exposure

- Basic contract terms should remain in place
- As deemed necessary, new protections should be put in place, i.e. Insolvency protections, ownership change
- Securities will remain unchanged or increased
- Have Astaldi take future performance risk exposure
- Will seek a full waiver of claims
- Additional funds may have physical assets or revenue streams tied to them
- Future payments will be protected for local use

Payment Principles

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

- Structured to ensure payment tied to measureable production
  - Unit Rates tied to Concrete Production
  - Key Milestone Payments
  - Stretch Targets
  - Performance Security Maintained

Key Interests

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

Interests

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

- Focus on Interests
  - A good agreement fulfills interests (i.e. reasons behind a position), not positions.
  - A position may change but interests generally remain unchanged
  - Understand the Relative Views of the situation to aid in Interest development
  - Understand the potential Drivers and Levers available to the parties to aid in interest development
  - Consider and document both parties "interests"
  - Identify the common interests

Nalcor Current View of Key Interests

Nalcor	Astaldi
Finish the job	Finish the job
Reputation intact	Reputation in tact
Minimize cost impact and rates	Minimize cost impact
Maintain financial integrity of shareholder	Maintain financial integrity of company
Cash flow out	Cash flow in
Alignment with shareholder	Alignment with shareholders
Maximize 2016 with positive momentum	Achieve deal with nalcor before LMAX
Not have to use securities	Not have to use securities

Nalcor Current View of Key Interests

Nalcor	Astaldi
Productivity improvement	Productivity improvement
Avoid repeat ask	Opportunity for repeat ask
Total 300km3 after 2016	Total 300km3 after 2016
Contract clean slate for claims	Contract clean slate for claims
Maintain/increase securities	Reduce securities
Risk of overrun Astaldi's	Risk of overrun Nalcors
Keep Astaldi afloat to end of project, minimum end of 2016	Keep Astaldi afloat

Interests

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

- Deal with Conflicting Interests and Options
  - Although non-positional in nature conflicting inetrests and options will occur
  - Prior knowledge and open discussion will reveal those conflicts and game plans will be developed to arrive at positive outcomes

Sample of Conflicting Interests

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

Astaldi	Nalcor Counter	Desired Result	Materials Required
Astaldi's interest to minimize loss by stating they cannot pay for the $ gap	Explore Astaldi financial position in more depth, involve banks	100% certainty on Astaldi's financial status, stronger means we pay less	Latest internal financials, bankers views, Astalldi's view of cash source option
Astaldi's interest to manage cash flow by slowing the work	Show Astaldi that slow down will cost them considerably more money and lost reputation, help them find cash sources to assist	Agreement that it is in both parties interest to finish as early as possible	Joint time cost analysis and funding sources

Sample of Conflicting Interests

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

Astaldi	Nalcor Counter	Desired Result	Materials Required
To pass responsibility to Nalcor for productivity thus lower $ exposure	Nalcor had no prior knowledge it did not pass on, Astaldi took contract risk under our law	Astaldi accept and understand their interests are not served with this approach, Nalcor case is strong	Legal opinion and discussion
To not accept responsibility for execution errors thus lower $ exposure	Outline execution errors high level, show value of problems	Astaldi accept and understand their interests are not served with this approach, Nalcor case is strong	High level errors listing and valuation, Astaldi views of same

Relative Views

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

Relative Views

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

Nalcor

- Contractually have a very strong position
- Understand the financial situation of Astaldi and associated risks
- Understand the cost to complete the project
- Understand the options and realize the option with the least cost/schedule risk is to attempt a negotiated settlement
- Understand the financial position of GNL
- Realize that any settlement needs to be agreed by GNL , IE/Canada
- Commercial Principles are clear
- Astaldi has been told their view is untennable to us

Astaldi

- Cultural and civil law differences cloud Astaldi's understanding of the strong contract provisions
- Financial situation understood, however MF impact to their financial position is becoming more apparent
- Site team/ Canada appear to have suppressed the magnitude of their errors to Board in Rome
- Rome expected Nalcor to cover the cost gap (minus a small amount for Astaldi caused cost increases, which is grossly underestimated) plus Astaldi to give up their profit
- Astaldi has requested we re-engage due to corporate financial concerns
- Astaldi's settlement range likely to be dependent upon their liquidity challenges

Key Drivers/Levers and Other Drivers/Levers

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

Key Drivers/Levers

Privileged and Confidential- In contemplation of litigation- cabinet draft

- Contract – continue to build our position
  - Dispute Resolution Process – Legal team
  - Nalcor has a strong position under the contract, use that to lower any negotiated settlement as much as possible
- Financial Drivers
  - Cash (Availability)- Overall Liquidity
  - Debt analysis
  - Market Loss – Growth
  - Stock Price drivers – Astaldi auditors
  - Investment Funds
  - Astaldi's overall liquidity, stronger they are the less Nalcor pays
  - We must consider what cash challenges may do to progress
- Work progress/Alternatives
  - Astaldi could use unions and others to slow progress and productivity –
  - Must not let summer 2017 become a lever
  - Time – investment evaluation – what is time worth
  - The cost and risk of an alternate execution company must be considered
  - We must ensure that we put a value on progress of the project

Other Drivers/Levers

Privileged and Confidential- In contemplation of litigation – Cabinet Draft

- Performance Security – minimum pain threshold
  - Bond Company – Astaldi meeting with them- how can we use?
- Loan Guarantee – IE- use them as a supporter, keep them notified
- Reputation- tied to stock price, use Astaldi family reputation
- Politics
  - Ambassador, etc.
- Talking to other contractors – strategic use required
- Community Stakeholders –
  - Labour force – Astaldi may play them off against us- need attack plan
  - Community Stakeholders- Astaldi may create distractions here

Options Analysis

Privileged and Confidential in Contemplation of Litigation-Cabinet Draft

Options

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

- Generate Options
  - Brainstorm options for an agreement
  - Generate options first, evaluate second
  - Consider how to create additional value for each party

Options - Key Planning Questions LCP Asks Regarding Deal Options

- How much "should" each party contribute in an ideal world?
  - Hours to date of poor performance removed
  - Poor expenditures in the past removed, i.e. Their claim for additional costs
  - Remaining productivity challenges reviewed and used for sharing discussion
- How much can or will each party contribute?
  - Cash flow restrictions and opportunities clarified
  - Prioritize opportunities that lower/bridge the gap without cash outlay, i.e. FEX, productivity improvements
  - Where possible aid Astaldi cash flow with opportunity to get the money back later
  - Funding concepts applied against the gap
- How are the funds applied to the contract?
  - Majority of funds used as incentive tied to schedule/productivity performance
    - Link to our value of time (1 ,2 and 4 Units)
    - Productivity improvement incentives – planners, Labour team
    - Bonuses upon early completion, include Supervision
  - Some funds paid upon completion

Options - Conceptual Solutions to the Commercial Challenge – Astaldi POV

KEY – BG = Bridges the economic gap for Astaldi, SOC = Source of Cash

- Improve productivity – LOWERS the gap
- Exchange Rate – BG
- Income tax impacts – BG, Possible SOC
- Surety – SOC
- Share sale – SOC
- Asset sale – SOC
- New Loan – SOC
- Restructure Financing - SOC

Options- Conceptual Solutions to the Commercial Challenge - MF co. POV

Privileged and Confidential- In contemplation of litigation- Cabinet Draft

KEY – BG = Bridges the economic gap for Astaldi, SOC = Source of Cash

- Help Astaldi improve productivity – LOWERS the gap
  - Supplement Astaldi team – MF pays
- Flow income tax back to project (Internal)- BG, SOC
- Advance Clawback defferal and or relief – BG, SOC
- Investment in assets – SOC, Partial BG
- Assignment of other contracts – Partial SOC and BG
- Loan to Astaldi- with security and performance ties – SOC
- Pay for early completion – Bonuses tied to milestones – BG
- Change orders within contingency – BG, SOC
- LD's relief – BG
- Tie payment to revenue stream post production – BG,SOC

Potential Outcomes, Results and Consequences -1

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

Outcome	Results	Range of Consequences	Cost/Schedule impact
No deal reached	Reassess all options , enforce Contract. If no deal reached by L max than financial situation prevails	Astaldi could fail through either liquidity issues, stock collapse, hostile takeover resulting in default, requiring replacement contractor	Cost impact high/high Schedule impact high/high
		Astaldi do not fail but suffer financial difficulties and decide to slow down the work, remove personnel, equipment and manage cash flow to deal with corporate	Cost impact high Schedule impact high
Deal reached	Contract amendment to address the agreement	Astaldi financial situation for remainder of Contract is better, production is as agreed and milestones achieved	Cost impact lowest Schedule impact lowest
		Astaldi financial situation for 2016 is positive , production is as agreed but default occurs in 2017. Contractor changeout in 2017	Cost impact is offset by securities, cost impact medium Schedule impact high

Potential Outcomes, Results and Consequences -2

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

Outcome	Results	Range of Consequences	Cost/Schedule impact
Deal reached	Contract amendment to address the agreement	Astaldi financial situation for remainder of Contract is positive, production is not as agreed and milestones are not achieved- no default	Cost impact low Schedule impact high/high
		Astaldi financial situation for remainder of Contract is positive, production is not as agreed and milestones are not achieved- with default	Cost impact is high/high Schedule impact is high/high

Identify Objective Criteria, BATNA and ZOPA

Privileged and Confidential in Contemplation of Litigation-Cabinet Draft

Objective Criteria

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

- Use Objective Criteria to Evaluate Options
  - Creates a sense of fairness
  - Forces common evaluation and understanding of options
- Identify the Alternatives for Each Party (See Appendix A)
  - Document potential outcomes and cost/schedule implications
  - Identify "Best Alternative to a Negotiated Agreement" (BATNA)
    - The standard against which any proposed agreement should be measured
  - Identify "Most Likely Alternative to a Negotiated Agreement" (MLATNA)
  - Identify "Worst Alternative to a Negotiated Agreement" (WATNA)
- Identify the "Zone of Possible Agreement" (ZOPA) (See Appendix B)

Executing the Negotiation

Privileged and Confidential in Contemplation of Litigation-Cabinet Draft

Executing the Actual Negotiation

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

- This is the work performed together at the negotiating table
- Clarify who is at the table, where meeting will be held, when meeting will occur, how often, outline relevant deadlines
- Set the ground rules for negotiations, how each party expects the other to behave
- Clarify the approval process each party has to fulfill
- Develop lists of “interests” together, and identify “common interests”
- Generate/brainstorm options together, seek to widen the options base
- Set objective criteria together
- Be prepared to take the time to validate objective criteria as the negotiation unfolds

Executing the Actual Negotiation

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

- Following this work, at appropriate times as discussion unfolds, each party provides offers, explained in terms of meeting common interests
- Set goals and parameters clearly
- Work collaboratively
  - Provide reasons why particular options or portions of options will or will not work, based on interests, not unexplained positions
  - Ask open ended questions to encourage dialogue
  - Actively listen and seek to understand first
  - Provide clear, honest, open perspective and responses
- Ensure any negotiated solution improves upon BATNA and falls within approved riverbanks

Philosophical Approach at the Table

- Always be consistent in our messages, never waiver
- Work to our rules and timelines as much as possible
- Stress our pain along with empathizing to theirs – slowly have Astaldi accept their losses
- Stick to our values
- Be creative in our solutions
- Do not overreact- stay calm even when aggressively being challenged
- Do not underestimate them – ever
- Try and find common needs
- Do not be afraid of failure – have a contingency plan
- Never stop gathering data about Astaldi
- Understand the roles of all parties, i.e. Astaldi representatives, banks, bonds, media, third party advisors, etc.
- Make the issue as small as possible – i.e. be efficient

Participants

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

Nalcor	Astaldi (Nalcor View)
Sponsor – Ed Martin (CEO)	Sponsor – Fillippo Stenellis (CEO) (Paulo Astaldi)
Project Lead – Lance Clarke	Project Lead – Francesco Rotundi
Finance – Jim Meaney	Finance – Tommasso Garzelli
Legal – McInnes Cooper (Aidan Meade) Nalcor support – Peter Hickman	Legal – Glaholt (Duncan Glaholt) Astaldi – Luca Puletti
Additional Nalcor Influencers – Paul Harrington, Gilbert Bennett	Additional Astaldi Influencers Mario Lanciani- VP North America
Additional Nalcor Advisors (current) – Westney, Cleveland and Associates, Long International	Known Astaldi Advisors- FTI, Thornton Fein Davis

NEGOTIATION

Planning/Preparation

Frame the Situation: Understand Alternatives (BATNA)

Decide on Internal Principles/Goals

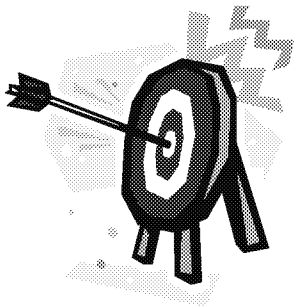
Execute Negotiation

Go Talk
Remove Emotion
Interest Based
Generate Creative Options
Allow Flexibility to changing circumstances

Test Outcomes against Principles and BATNA
Check Stakeholder Alignment

Approval

Recommend Deal If Appropriate



Validate & Agree on Deal

Execute Deal

nalcor energy

Implementation

Privileged and Confidential in Contemplation of Litigation- Cabinet Draft

Implementation

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

- Describe how the agreement will be implemented
- Clarify who is responsible for implementation
- Specify the form of agreement
  - Addendum to original agreement? Separate?
  - Original terms and protections remain intact
  - Additional terms necessary to protect interests?
- Document the communications plan.

Appendix A

ALTERNATIVES SUMMARY

Alternatives Summary

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

As summarized in the Westney Presentation and
Nalcor Summary Presentation

CONFIDENTIAL AND COMMERCIALLY SENSITIVE

Appendix B

ZONE OF POSSIBLE AGREEMENT

Zone of Possible Agreement (ZOPA)

Privileged and Confidential in Contemplation of Litigation - Cabinet Draft

As summarized in the Westney Presentation and
Nalcor Summary Presentation

CONFIDENTIAL AND COMMERCIALLY SENSITIVE

TRANSMITTAL

To:	EY Data Room
From:	LCMC
Date:	11-Mar-2016
Subject:	Independent Engineer Support of Nalcor Approach
Reference:	DRAW CONFIRMATION CERTIFICATE BY INDEPENDENT ENGINEER MF/LTA PROJECT FINANCING
Location:	EY Review 2016 Exchange/EY_CH-0007

Please find attached the Independent Engineer's Draw Confirmation Certificate for MF/LTA dated Feb 24, 2016. Specifically note the comment on page 3 with respect to the IE's opinion on Nalcor (Devco) preferred option with respect to the MF civil contractor situation. Note that as part of the funds release that happened on Feb 29, 2016, the IE's client, the Government of Canada as Guarantor, was required to accept this certificate, acknowledging their same view on this approach as well.

DRAW CONFIRMATION CERTIFICATE BY INDEPENDENT ENGINEER

MF/LTA PROJECT FINANCING

This Draw Confirmation Certificate is provided by MWH Canada, Inc. (the "**Independent Engineer**") to The Toronto-Dominion Bank, as collateral agent (the "**Collateral Agent**") in connection with the amended and restated MF/LTA Project Finance Agreement among, inter alia, Muskrat Falls Corporation and Labrador Transmission Corporation (collectively the "**Borrower**"), Muskrat Falls/Labrador Transmission Assets Funding Trust (the "**Lender**") and the Collateral Agent (as amended, supplemented or restated from time to time, the "**Finance Agreement**") and Her Majesty the Queen in Right of Canada, as represented by the Minister of Natural Resources ("**Canada**"). Capitalized terms used in this Draw Confirmation Certificate and not otherwise defined herein shall have the meanings assigned to them in the amended and restated Master Definitions Agreement dated July 16, 2015 among, inter alia, the Borrower, the Lender and the Collateral Agent, as amended, supplemented or restated from time to time.

The Independent Engineer has (i) discussed matters believed pertinent to this Draw Confirmation Certificate with Devco, the Borrower and any relevant Material Project Participants, (ii) made such other inquiries as we have determined appropriate and (iii) reviewed:

(a) the Construction Report dated February 20, 2016 (the "**Construction Report**"); and

(b) the Borrower's funding request dated February 19, 2016 (the "**Funding Request**").

On the basis of the foregoing limited review procedures and on the understanding and assumption that the factual information contained in the Construction Report and Funding Request is true, correct and complete in all material respects, the Independent Engineer makes the following statements in favour of the Collateral Agent and to the best of its knowledge, information and belief, as of the date hereof that:

1. Construction of the Project is progressing in a satisfactory manner and in accordance with the terms of the applicable Material Project Documents with the following exceptions:

MWH reviewed the most recent Contractor's Construction Report Summary available for the following contracts: CH0007, CH0030, CH0032, CT0319, PH0014 and CH0009. Data extracted from the reports are given in the following tables and text:

CONTRACT NO./TITLE	DESCRIPTION	PROGRESS (PERIOD) BASE/ACTUAL PERCENTAGES	PROGRESS (CUMULATIVE) BASE/ACTUAL PERCENTAGES	DELTA FOR PERIOD PERCENTAGE (ACTUAL – BASE)	DELTA FOR CUMULATIVE PERCENTAGE (ACTUAL – BASE)	CONTRACT AMOUNT/ CHANGE ORDERS APPROVED & "ONGOING" STATUS $$APPROVED$$ NEW CONTRACT AMOUNT
CH0007 Construction of Intake and Powerhouse: Spillway and Transition Dams Period: February 2016	MANAGEMENT	See Note[2]	See Note[2]			LABOR: CAD$543,130,225.00 + NON-LABOR: CAD$481,162,325.00 CAD$1,024,292,550.00
	ENGINEERING					
	PROCUREMENT					
	MANUFACTURING/ TESTING					
	TRANSPORT					
	INSTALLATION					
	OVERALL CONCRETE PLACEMENT		78.10/34.30		-43.80	
CH0030 Supply and Install Turbines and Generators Period: 26 Dec 2015 to 25 Jan 2016	MANAGEMENT					CAD$124,517,329.25 CAD$7,872,769.54 CAD$132,390,098.79[3] US$36,635,422.14 US$0. 00 US$36,635,422.14[3] €4,204,787.04 €0.00 €4,204,787.04[3]
	ENGINEERING		100.00 / 97.40		-2.60	
	PROCUREMENT		100.00 / 93.50		-6.50	
	MANUFACTURING/ TESTING		84.00 / 64.49		-19.51	
	TRANSPORT		28.00 / 25.21		-2.79	
	INSTALLATION					
	OVERALL PROJECT		64.96 / 47.87		-17.09	
CH0032 Powerhouse Hydro-Mechanical Period: 26 Nov 2015 to 25 Dec 2015	MANAGEMENT					CAD$ 122,932,996 CAD$ 20,598,407 CAD$ 143,531,403 €60,880,279 €0.0 €60,880,279 See Note [1].
	ENGINEERING		100.00 / 93.07		-6.93	
	PROCUREMENT		100.00 / 94.96		-5.04	
	MANUFACTURING/ TESTING		79.91 / 68.51		-11.40	
	TRANSPORT		56.71 / 6.38		See text	
	INSTALLATION		41.39 / 1.40		See text	
	OVERALL PROJECT		60.43 / 37.03		-23.40	

Notes: [1] See text for a summary of change order progress and amounts.
[2] No data was furnished by Contractor; see text.
[3] HST (13%) is not included in these values.

Contract CH0006 (Bulk Excavation) is discussed in the Construction Report, The Contractor has submitted a Request for Equitable Adjustment (REA) dated 27-August-2013. This REA was later denied by Devco. On 31 January 2015 the Contractor submitted a revised REA. Devco advised, "*On 26 October 2015, Devco provided an assessment of the revised REA and made a settlement offer. At this time the two parties are negotiating a settlement*". The Request for Equitable Adjustment will not impact the MF Project Schedule as the work has been completed, on schedule."

The monthly progress report furnished for Contract CH0007 (Construction of Intake and Powerhouse, Spillway and Transition Dams) is for the period of November'15. More recent (12 Dec'15) progress metrics were already reported in the December issued DCC and remain presented here as the concrete placement activities were stopped during the winter months.

Devco advised that during this reporting period the Contractor continued with the removal of the ICS shelter structure in parallel with formwork and rebar placement in the Powerhouse/Intake areas. The Contractor also commenced the installation of decking and miscellaneous steel for the CTU. Devco indicated that the Target Milestone for first power on December 10, 2017, is on hold and most likely will move towards the summer of 2018. Devco is in discussion with both Astaldi and the T&G Contractor Andritz (CH0030) for the development of an overall mitigation strategy. The accelerated new baseline schedule is expected to be available by the end of Q1, 2016.

During the month representatives of the Government of Canada and the IE met with Devco for an update on options and considerations relating to ongoing commercial discussions with the CH-0007 Contractor to resolve a number of pending issues related to organization, production rate and schedule. Based on the information presented and the related discussions, when considering all options and to the extent of all available information, the IE is of the opinion that, Devco's preferred option of seeking a reasonable commercial solution with the Contractor that would enable their completion of the work is a prudent approach.

Contract CH0030 (Supply and Install Turbines and Generators) appears to be currently (-) 17.09 percent behind schedule, representing a minor slippage of 1.63 percent from the previous month. The Engineering and Procurement activities are close to completion and the Manufacturing is (-) 19.51 percent behind plan. Apparently, none of these variances has any significant impact on the subsequent phases of the work. The Contractor still notes that the pre-mobilization activity is delayed and the original (and current) Base-Line Schedule is under review. It is expected that the schedule will be revised once milestones confirmation is received from Devco. Continued monitoring of the progress of all items listed is important since this is a significant contract to complete in accordance with the Integrated Project Schedule.

Additionally, the Contractor's Construction Report for Contract CH0030 notes twenty five items that remained open to Jan 25, 2016, on the Change Request Register amounting to $12,115,069.53 + T&M (Time & Material), one has an estimated order of magnitude cost impact of more than $1,200,000.00, three are yet to be determined (TBD), one is T&M (Time & Material) and another one is based on weekly charges. There is no Potential Changes (Change Requests) Register in this monthly report.

Contract CH0032 (Powerhouse Hydro-Mechanical) is behind schedule by (–23.40) percent, with procurement (-5.04) percent and manufacturing (-11.40) percent being the baseline schedule. The Contractor reports that these variances are due to the "Just on Time" delivery concept that is maintained in order to mitigate storage risk and cost associated with the uncertain installation dates as per Devco's instructions (LCP CO # 06 – revised Exhibit 9). The

engineering variance of (-6.93) percent behind plan is apparently driven by some outstanding design clarifications of the electrical scope. The Contractor is actively working to mitigate the impact of this delay. The Contractor also advises that the approved baseline schedule is no longer valid especially for the transportation and installation activities; hence, the progress metrics are unreliable. The schedule needs to be revised following confirmation of new milestone dates by Devco.

There are twenty five Change Requests listed in the register in the Contractor's Monthly Progress Report for December 2015 with five claims "To Be Determined", one with only daily cost impact and the remaining nineteen amounting to $8,657,996.00.

Contract CT0319-001 (315 kV HVac Transmission Line – MF to CF) Contractor's Construction Report, for the month of November 2015, indicates (from the tracking metrics provided by the Contractor) the following progress for the work:

Item	Cumulative Planned Total[1] / Actual (Percentage)	Delta for Cumulative Percentage
Access	100.00 / 97.79	-2.21
Foundation Installation	74.5 / 97.94	23.44
Structure Assembly	76.9 / 91.03	14.13
Anchor Installation	75.7 / 96.76	21.06
Structure Erection	73.4 / 81.43	8.03
Conductor Stringing	54.1 / 62.46	8.36
OHSW Stringing	54.1 / 61.75	7.65
OPGW Stringing	27.7 / 24.05	-3.65

Note: 1. Planned total is 1263 structures

According to the Contractor's Monthly Report, the foundations for 1234 structures were completed as of November 25, 2015. Currently, this activity is 22.3 percent ahead of schedule. Contractor advised that 1147 structures were assembled by the end of the reporting period. This is 12.3 percent ahead of schedule. The structure erection is now ahead of schedule by 6.3 percent with 1026 structures erected. The stringing is 0.3 percent ahead of plan. The Contractor reports that the crews have encountered a significant snowfall throughout the reporting period and work fronts have been changed to mitigate snow and assist with clearing/grating of access. The forecasted completion date for HVac Transmission line construction has been adjusted, but line construction activities continue to be forecasted to complete in advance of the AC switchyards.

Forty eight Change Requests are listed in the register; thirty six Change Requests total $19,843,074.58 and twelve Change Requests amounts are "To Be Determined." The total contract price (including all CHO issued to date) is $258,157,712.85. The forecast final contract price is now $270,208,099.61.

Contract PH0014-001 (Supply of Power GSU Transformers, MF) latest Contractor's Progress Report is for the month of December 2015. The current overall progress appears to be behind the base line schedule by 2.0 percent. The main activities for this period are still related to engineering and procurement of raw materials. The progress metrics provided by the Contractor indicate slight 3.5 percent slippage of progress in comparison to the previous reporting period.

There are five Change Requests listed open in the register in this Contractor's Progress Report. No price impact is provided for these items. The total contract price (including three CHOs issued to date) is $15,012,670.

The monthly progress report for Contract CH0009 (Construction of North and South Dams) is for the month of December 2015. The report indicates the following progress for the work:

DESCRIPTION	PROGRESS (PERIOD) BASE/ACTUAL PERCENTAGES	PROGRESS (CUMULATIVE) BASE/ACTUAL PERCENTAGES	DELTA FOR PERIOD PERCENTAGE (ACTUAL – BASE)	DELTA FOR CUMULATIVE PERCENTAGE (ACTUAL – BASE)
Overall Project	1.06 / 1.26	4.41 / 5.61	0.2	1.2

The engineering of the temporary bridge is at 76 percent completion and the procurement is at 25%. The supply of batch plan and crushing equipment is ongoing and the south temporary bridge abutment is complete. The intake channel cofferdam is 75 percent complete and the starter groin is at 100 percent completion. Thy Office Complex Setup is complete too. The Contractor is preparing for winter shutdown. Activities are scheduled to resume in the spring of 2016.

MWH also notes that according to the latest Devco's Monthly Construction Report, the planned Commissioning Date (01 June 2018) as well as Date Certain (28 February 2019) remain under review as a result of MF schedule review. The IE will further closely monitor the potential schedule changes.

2. We believe that all payments to the Material Project Participants to be paid with the proceeds of the Muskrat/LTA Construction Loan requested to be made pursuant to the Funding Request, are allowed under the payment terms of the applicable Material Project Documents and the Finance Agreement as to the funds release requirements of Section 7.3/7.4/7.5/7.6/7.7, as applicable, with the following exceptions:

NO EXCEPTIONS NOTED

3. Assuming the Borrower and Devco exercise proper engineering and construction management throughout the remainder of the Project, we have no reason to believe that the Commissioning Date will not occur prior to the Date Certain, or that the total Project Costs will exceed $4,563,523,000, with the following exceptions:

MWH notes that for Contract CH0030 the approved Change Orders to Jan 26, 2016 amount to $7,872,769.54.

For Contract CH0032, the approved Change Orders for the period of December 2015 amount to $20,598,407.

For Contract CT0319-001, the approved Change Orders for the period of November 2015 amount to $12,050,386.76.

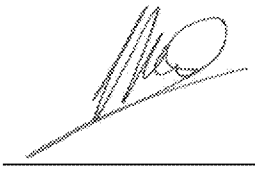
For Contract PH0014, the approved Change Orders to date (31 Dec'15) amount to (-) $37,800.00.

There are no Change Orders reported to date (19 Dec'15) for Contract CH0009.

This Draw Confirmation Certificate is solely for the information and assistance of the Collateral Agent and Canada in connection with the Funding Request and shall not be used, circulated or relied upon for any other purpose or by any other party.

Dated: February 24, 2016

MWH CANADA, INC.



By: _____

Title: IE Team Leader