

Filed: 2014-05-14 EB-2013-0321 Ex. D2-2-1 Attachment 7-5 Page 1 of 12

# ASSESSMENT OF COMMERCIAL STRATEGIES Developed for the Darlington Refurbishment Project's Balance of Plant Work Package

# **PREPARED FOR ONTARIO POWER GENERATION**

FEBRUARY 2014



# TABLE OF CONTENTS

I.	EXECUTIVE SUMMARY 1
II.	SUMMARY OF CONCLUSIONS
III.	STANDARD OF REVIEW 2
IV.	INFORMATION SOURCES
V.	GENERAL LIMITATIONS OF CONCENTRIC'S OPINION
VI.	BALANCE OF PLANT WORK PACKAGE COMMERCIAL STRATEGY 4
VII.	CONCENTRIC'S OBSERVATIONS AND RECOMMENDATIONS
VIII.	CONCLUSION10



Filed: 2014-05-14 EB-2013-0321 Ex. D2-2-1 Attachment 7-5 Page 3 of 12

## I. EXECUTIVE SUMMARY

On September 9, 2011, Tory's LLP retained Concentric Energy Advisors, Inc. ("Concentric") to review the commercial strategies developed and implemented for the refurbishment of four CANDU heavy water reactors at Ontario Power Generation, Inc's ("Ontario Power Generation's" or the "Company's") Darlington Nuclear Generating Station ("Darlington" or the "Plant").<sup>1</sup> The Darlington Refurbishment Project (the "Project") will include removal and replacement of the reactor calandria tubes and pressure tubes from each reactor, replacement of all feeders, refurbishment of the existing fuel handling equipment, refurbishment of the existing turbine generators, refurbishment of the existing steam generators, and a set of supporting refurbishment projects aligned with existing station systems (herein referred to collectively as "Balance of Plant" projects<sup>2</sup>). The plant modifications are planned to be made during 36-month outages for each of the four Darlington units between October 2016 and 2025.<sup>3</sup> The first refurbishment outage will be conducted on Unit 2 between Fall 2016 and Fall 2019. The remaining outages will occur between Fall 2019 and Fall 2025 with approximately 17 to 19 months of overlap between each successive outage.

Prior to commencing the execution phase work, Ontario Power Generation has committed to undertaking significant planning activities, which include working to develop and implement appropriate commercial strategies for the Project, to better prepare for a project of this magnitude. Concentric was engaged to review the Company's commercial strategies and how these strategies are being implemented. This report summarizes Concentric's review and opinion of the current Balance of Plant work package commercial strategy.

The Project is following a standard megaproject progression that includes the following phases: (1) project initiation; (2) definition; (3) execution; (4) commissioning; and (5) project closeout. In the project initiation phase, a project is evaluated for its initial feasibility based on relatively high-level information that is readily available. Should a project prove feasible during the project initiation phase, it will proceed into the definition phase. During the definition phase, the project team undertakes detailed reviews of the project's anticipated scope, cost, and schedule to begin to define the activities that must be completed during the project, when those activities must be completed, and how much those activities are expected to cost. Concurrently, the project team begins to define the commercial strategies expected to be employed. Later during the definition phase, the project team is responsible for: (1) identifying, procuring and fabricating all long lead materials, components and tooling; (2) executing all of the necessary agreements to proceed with the major work packages; (3) completing the detailed scope and project schedule; and (4) developing a "release quality" cost and schedule estimate from which the project's performance can be measured. The release quality estimate and the integrated schedule available at the conclusion of the definition phase are more defined than prior iterations of the cost estimate and integrated schedule, yet both still contain some uncertainty that is a component of any undertaking of this nature, particularly projects that compare to the Refurbishment Project in magnitude. Following the definition phase, a project enters the execution phase during which the actual plant modifications will take place. This stage is followed by the commissioning and project closeout phases.

<sup>&</sup>lt;sup>1</sup> As used in this context, commercial strategies refer to the processes by which Ontario Power Generation will procure goods and services for the Darlington Refurbishment Project.

<sup>&</sup>lt;sup>2</sup> The Balance of Plant work package includes Islanding, Shutdown/Layup and Services work scopes.

<sup>&</sup>lt;sup>3</sup> As a practical matter, initial planning for the Project began in 2006 with the initiation of feasibility studies and plant technical assessments. Thus, from the Project's initiation to closeout, the Project will span nearly 20 years.



Filed: 2014-05-14 EB-2013-0321 Ex. D2-2-1 Attachment 7-5 Page 4 of 12

During these phases, the project team brings the project online and completes all of the recordkeeping associated with the project.

The initiation phase of the Project began in late 2007 with the preparation of a business case that evaluated, at a high level, the overall feasibility of completing the Project. In November 2009, the Project sought and received authorization from the Ontario Power Generation Board of Directors to proceed with the planning portion of the definition phase. In February 2010, the Ministry of Energy concurred with the Board of Directors' decision. To execute the work, Ontario Power Generation will retain multiple contractors for discrete portions of the Project work known as work packages. Consistent with this approach, Ontario Power Generation has proposed dividing the work into multiple major work package, of which the Balance of Plant work package is one. In its plans for the Balance of Plant work package, the Company is primarily relying on existing contracts with two qualified vendors for separate bundles of work within the Balance of Plant scope. Components of this scope will be allocated to the vendors under a defined methodology, and in most cases the work will be completed using an Engineering Procurement and Construction ("EPC") arrangement. Throughout the remainder of the initiation phase of the Project, the Company will complete planning, solicitation, and negotiation of supplemental contracts for specialty components of the Balance of Plant work package. The Company will also execute any necessary project agreements, and develop a release quality cost estimate for the work, among many other activities.

#### II. SUMMARY OF CONCLUSIONS

As discussed below, Concentric has concluded that, based on activities that have taken place between late 2009 and January 20, 2014, the commercial strategy Ontario Power Generation is employing for the Balance of Plant work package is appropriate and reasonable and meets the regulatory standard of prudence. Concentric's opinion is not without certain caveats and limitations, which are discussed in the sections that follow.

The bases for our opinions on the prudence and reasonableness of the Company's Balance of Plant commercial strategy are described throughout the sections that follow.

#### III. STANDARD OF REVIEW

To conduct our review of the commercial strategy selected by Ontario Power Generation for the Balance of Plant work package, Concentric sought to answer three primary questions:

- 1. Is the commercial strategy Ontario Power Generation is pursuing for the Balance of Plant work package reasonable?
- 2. Is the Company executing that commercial strategy in a reasonable manner?
- 3. Do the selected commercial strategy and the execution of that strategy meet the regulatory standard of prudence?

To answer these questions, Concentric adopted a definition for the regulatory standard of prudence based on Concentric's work before state, provincial and federal energy regulators in both Canada and the United States. The definition utilized by Concentric is consistent with decisions rendered by the Ontario Superior Court of



Justice,<sup>4</sup> the Court of Appeal for Ontario,<sup>5</sup> the Ontario Energy Board,<sup>6</sup> and the U.S. Supreme Court,<sup>7</sup> among other jurisdictions. Specifically, Concentric defined the prudence standard as examining the range of actions that a reasonable manager would take given the facts or circumstances that were known or knowable at the time of the decision or action. That definition rejects the use of hindsight as a basis for determining the prudence of a decision or action. In addition, that definition relies on an evaluation of decisions or actions. Project costs are neither prudent nor imprudent; instead, costs are prudently or imprudently incurred as a consequence of the decisions and actions of management.

In this letter, Concentric provides its assessment of the Company's development and execution of its commercial strategy for the Balance of Plant work package in the context of the above-described standard of prudence review. In particular, Concentric is providing its opinion on the prudence and reasonableness of Ontario Power Generation's decision-making and plans regarding the division of Balance of Plant work primarily among the Company's two Extended Services Master Services Agreement ("ESMSA") vendors. As is discussed below in Section VI, selection of the ESMSA vendors took place using a competitive process that was conducted in 2011.

### IV. INFORMATION SOURCES

Our review and the development of our opinions relied on three primary information sources. First, Concentric submitted multiple rounds of data requests for information related to the Balance of Plant work package. Second, Concentric performed independent research on topics including lessons learned and the experiences of other CANDU operators performing similar projects, the Canadian nuclear safety regime, and industry trends and practices for other large nuclear refurbishment projects. Third, Concentric conducted a series of in-person and telephone interviews with members of the Balance of Plant refurbishment project team.

### V. GENERAL LIMITATIONS OF CONCENTRIC'S OPINION

The following are general limitations regarding the scope of our review:

- First, our review is limited to Ontario Power Generation's actions and documents prepared for the Balance of Plant work package before January 20, 2014.8
- Next, Concentric did not independently verify the appropriateness, sufficiency, or correctness of the project schedules, cost estimates, scope, or, from an engineering perspective, the division of responsibilities currently assigned or envisioned for the Balance of Plant scope of work.

<sup>&</sup>lt;sup>4</sup> 2005 CanLII 4941 (Ont. Div. Ct.).

<sup>&</sup>lt;sup>5</sup> Court of Appeal for Ontario Decision, Docket: C55602, C55641 and C55633, June 4, 2013.

<sup>&</sup>lt;sup>6</sup> Decision with Reasons, RP-2001-0032, December 13, 2002. This Decision deals with Enbridge Gas Distribution Inc.'s (formerly Enbridge Consumers Gas or ECG) application for a Board Order approving rates for the 2002 Test Year.

<sup>&</sup>lt;sup>7</sup> Separate, concurring opinion of Justice Louis Brandeis, Missouri ex. Rel. Southwestern Bell Telephone Co. v. Public Service Commission, 262 U.S. 276 (1923).

<sup>&</sup>lt;sup>8</sup> The beginning of the period Concentric reviewed is roughly concurrent with Ontario Power Generation's completion of the Economic Feasibility Assessment of Darlington Refurbishment dated November 13, 2009. However, portions of the operational experience material reviewed by Concentric were prepared prior to this time.



However, Concentric was informed of the processes used to develop these metrics, and we did review cost assessment documentation.

- We understand that the majority of the Balance of Plant scope of work has been split into a number of bundles that are being allocated primarily among the Company's two ESMSA vendors. This will allow Ontario Power Generation to balance the workload of those vendors for a large and logistically complex scope of work. The split in responsibilities will be based on vendor experience and skill set, location within the Plant, the systems being refurbished, and type of work in order to best meet the work package's objectives. While the majority of work will be allocated to the two ESMSA vendors, some specialty work elements of the work package may require separate contracting. Concentric has evaluated this approach to the division of responsibilities between the two ESMSA vendors, but has not evaluated the appropriateness of each vendor's responsibilities from an engineering perspective.
- Concentric assumes that Ontario Power Generation will retain adequately qualified personnel to complete the Project generally and the Balance of Plant work package specifically. Those resources are critical to the success of the project, and may be sourced internally, hired directly, or engaged through contracts with third parties, including the ESMSA vendors or other qualified contractors.
- Concentric did not perform a compliance audit to determine whether Ontario Power Generation and the Project were in compliance with Ontario Power Generation's internal policies, procedures, instructions and guidelines, or applicable provincial and federal regulations. Similarly, Concentric did not conduct a legal review of Ontario Power Generation's agreements or proposed agreements with any contractors. Notwithstanding that limitation, Concentric did review relevant Ontario Power Generation internal policies and procedures, and relevant provincial and federal laws and regulations when developing our opinion.
- Finally, Concentric's review is not an assessment of the Project's likelihood of success. Successful execution of the Project will require the efforts of many entities and individuals over many years, and the development and implementation of the Project's commercial strategies is only one contributor to project success.

# VI. BALANCE OF PLANT WORK PACKAGE COMMERCIAL STRATEGY

### A. OVERVIEW

Ontario Power Generation's Balance of Plant project team was established in mid-2011 and includes representation from throughout the Company, including Refurbishment Engineering, Execution, Supply Chain, Project Controls, and Nuclear Commercial Development. In addition, the Refurbishment Cross Functional Sourcing Team, the Refurbishment Program Executive Team, the ESMSA Contract Support function, and the Refurbishment and Darlington Operations and Maintenance Engineering groups provided input to the development of the Balance of Plant commercial strategy. As is documented in the Contracting Strategy for the Balance of Plant work package, the Project team was focused throughout this process on achieving the Company's core business objectives including safety, accountability, transparency, fairness, and



value for money.<sup>9</sup> In addition, the Balance of Plant team has focused on pursuing an EPC contracting approach,<sup>10</sup> which will minimize the risk inherent in integrating numerous vendors and prevent OPG from having to manage simultaneous tasks at various sites. As the Balance of Plant contracting strategy notes, engaging vendors under an EPC model will facilitate vendor engagement with the engineering challenges as scope continues to develop. This has been identified as a critical lesson learned from similar projects in the industry.

The Balance of Plant team began by reviewing the Darlington Component Condition Assessment ("CCA") reports in order to identify plant equipment and services that will require refurbishment or replacement, but that do not easily fit within the scope of the other work packages designated for the Darlington Refurbishment Project. This initial evaluation focused on:

- The type of work required for continued operation;
- The scheduling implications, requirements and dependencies;
- Long-lead procurement planning;
- Recommendations from the CCA reports; and
- Identification of systems that require collaboration with an Original Equipment Manufacturer ("OEM").

The Balance of Plant scope was evaluated in detail in the Fall of 2013 by a senior executive committee tasked with identifying scope elements that are best suited for lifecycle maintenance work rather than for completion within the Project.<sup>11</sup> The latest revision of the Balance of Plant commercial strategy integrates feedback received during this review process, and reflects changes in approach that result from the removal of approximately one third of the Balance of Plant scope requests from the Refurbishment program.

The Balance of Plant team investigated Canadian nuclear refurbishment operating experience to determine whether any high-level strategic planning principles have led to strong or weak execution performance in similar projects that have been completed at other nuclear generating stations. The team examined the refurbishments at Bruce and Pickering, in particular. Key lessons learned during those refurbishment projects include:

- 1. Valve replacement, which is a significant component of the Darlington Balance of Plant scope of work, must be carefully planned to ensure that the hardware installed by one vendor is not sequenced in such a way that it interferes with or must be removed by a different vendor performing other work at the site.
- 2. Significant value can be gained from involving the Balance of Plant vendor(s) in early planning stages. This involvement improves coordination of effort, it achieves a more comprehensive understanding of key site challenges, and it enables the vendor to secure adequate staff resources

<sup>&</sup>lt;sup>9</sup> Contracting Strategy for Balance of Plant. Ontario Power Generation document number NK38-REP-09701-10102, R001.

<sup>&</sup>lt;sup>10</sup> While Ontario Power Generation is planning to rely primarily on an EPC model, it has flexibility under the terms of the existing ESMSA contracts to select "E," "P," "C," or any combination thereof at its discretion based on the profile of work under consideration.

<sup>&</sup>lt;sup>11</sup> Darlington Nuclear Refurbishment – Scope Review – Closure Report. Ontario Power Generation document number NK38-REP-09701-0467871, R000.



as a result of participation in and contribution to the development of refurbishment project logistics.

3. Efficiency gains can be realized by packaging work in a manner that makes optimal use of contractors with multiple areas of expertise. This not only reduces the number of contractor interfaces that must be managed from a Project and Schedule management perspective, but may reduce costs by packaging volumes of work together.

The project team determined early in its planning that the skill sets required to complete the Balance of Plant work are closely aligned with the ESMSA service providers. These vendors have been involved in traditional operations and maintenance projects at Darlington on an ongoing basis, and Ontario Power Generation plans to continue using these vendors for maintenance projects after refurbishment is complete.

The Company selected the ESMSA vendors through a competitive solicitation process designed to identify and engage firms capable of completing a broad array of maintenance and construction assignments such as the Balance of Plant work orders. This selection process initially involved 20 contractors as potential ESMSA vendors, including a number of firms with the full set of capabilities and Darlington Plant experience necessary for the range of tasks the ESMSA vendors will be required to complete.<sup>12</sup> The two firms that were eventually selected as ESMSA vendors (E.S. Fox and Black & McDonald), offered terms and conditions that set them apart from the other competing firms and provided significant value to the Company. In its ESMSA solicitation process Ontario Power Generation negotiated pricing and contract terms, significantly simplifying the process of engaging these vendors for defined packages of work. This process works particularly well for work packages that require limited design engineering or other highly technical requirements, but that require the ability to attract and organize a large team of skilled-trade professionals.

The Balance of Plant work package contains a variety of refurbishment activities that support essential Plant systems and services. Consistent with the lessons learned from prior refurbishment projects, the Balance of Plant bundles are designed to coordinate with station systems in order to minimize project management complexity and to restrict the number of potential interfaces that may arise during refurbishment execution.

A significant challenge facing the Balance of Plant project team is management of the work package's scope. As of the date of this report, the Company is proceeding with a Balance of Plant refurbishment scope that includes approximately 140 Darlington Scope Requests, at an estimated cost of approximately **1**<sup>13</sup> Ontario Power Generation's efforts to contain scope have already produced significant results, including a nearly 80% reduction in the number of valves requiring replacement during refurbishment. Nevertheless, the challenge of limiting "scope creep" will remain throughout the Project. As additions to Balance of Plant scope continue to materialize, the Company may determine the need to pursue contracts with specialized vendors for specific pieces of detailed work.<sup>14</sup>

<sup>&</sup>lt;sup>12</sup> This range of activities includes, but is not limited to, the Balance of Plant refurbishment scope.

<sup>&</sup>lt;sup>13</sup> Of this estimated approximately approximately is estimated for defined elements of scope, and the remaining **sector** is designated as contingency.

Required enhancements to the Digital Control and Monitoring Computer Systems is an example of work that does not fit easily into the structure of plant systems supported by the Balance of Plant work package. The Company plans to contract this highly technical work separately, while keeping the work within the Balance of Plant work package for project management and vendor oversight purposes.



### B. INITIAL APPROACH TO BUNDLING BALANCE OF PLANT TASKS

Ontario Power Generation considered several approaches to organizing the components of the Balance of Plant work package. The first bundling approach was to divide the work into five key categories (Safety and Control Systems; Common Systems; Reactor Systems; Conventional Systems; and Special Programs) with separate contracting solicitations for each. This alternative would involve many points of accountability, would introduce the likelihood of conflicts and interference among vendors during execution, and would require considerable effort from Ontario Power Generation to manage and coordinate more vendors than may be necessary to complete the work.

The Company also considered bundling the work into a single package. This approach may offer efficiencies in terms of execution cost and scheduling, but it introduces significant risk. While it would eliminate the interfaces among multiple Balance of Plant vendors, it would fail to capture the advantage of being able to compartmentalize portions of work, would prevent the ability to balance workload between both capable vendors identified in the ESMSA solicitation process, and would eliminate the ability to respond quickly if one vendor experiences poor performance during execution. Ontario Power Generation instead chose to recast the work breakdown structure in a way that aligns with Darlington station systems, making optimal use of both ESMSA vendors. This will allow the Project to rely on the vendors that are best suited for different kinds of work.<sup>15</sup> This approach is designed to prevent over-extension of either vendor, while limiting the interface and project management risks the Company must bear.

### C. CONTRACTING MODEL SELECTION

The Balance of Plant project team initially identified five alternatives for contracting the bundled scope of work:

- 1. Self-perform;
- 2. An open and competitive EPC process;
- 3. Sole-source (using the EPC model);
- 4. Separate Engineering, Procurement and Construction solicitations; and
- 5. Competitive EPC solicitation among the ESMSA vendors.

The Company selected the 5<sup>th</sup> option. Ontario Power Generation completed a Kepner-Tregoe ("KT") analysis on a single component of the Balance of Plant work in order to assess the comparative merits and risks of each of these approaches for contracting the bundled scope. The analysis indicated that seeking an





EPC contract through a secondary-compete process restricted to approved ESMSA vendors would yield the best outcome and lowest risk to the Project.<sup>16</sup>

Based on the range of scope elements within the Balance of Plant work package, the Company determined that engaging both vendors for distinct packages of work allocated by system and location would provide Ontario Power Generation with a stronger ability to limit execution risk. The Company recognizes that engaging both ESMSA vendors raises interface management risk. However, as is discussed above, the method by which work is to be allocated among the vendors<sup>17</sup> is designed to limit this risk to the degree possible while preserving the ability to reassign packages of work if either vendor experiences challenges during the execution phase of the refurbishment Project.

#### VII. CONCENTRIC'S OBSERVATIONS AND RECOMMENDATIONS

As stated above in the Summary of Conclusions, Concentric determined that the planning processes and activities completed by the Company through January 20, 2014 were appropriate and reasonable, and met the regulatory standard of prudence. Concentric agrees that pursuing EPC arrangements for the Balance of Plant scope of work, using a logical separation of sub-packages between the two ESMSA vendors, will allow Ontario Power Generation to obtain value for money by preventing the over-extension of either vendor, reducing interfaces to a manageable number, and engaging qualified contractors capable of accommodating new elements of scope that may emerge as the Project progresses.

However, we note that significant risks to the Balance of Plant work package remain and must be closely monitored to ensure that they do not affect Project or work package milestones, performance, cost, or safety expectations. Our observations regarding Project risks that the Company should monitor and opportunities for commercial strategy improvement include the issues described below.

1. As of January 20, 2014, the majority of sub-bundles of Balance of Plant work have been allocated to the two ESMSA vendors or identified as specialty projects requiring separate contracting mechanisms. However, the assignment of new scope elements that emerges as the Project unfolds is likely to be a significant activity, and is likely to affect the competitive balance between and among the Company and its ESMSA vendors. To manage these contractors in these circumstances, the Company has recognized that it may need to develop a detailed, Balance of Plant-specific supplement to its ESMSA Contractor Management Plan ("CMP") to ensure the highest quality of execution of its Balance of Plant contracting strategy. We believe that the need for such a specific CMP supplement is likely enough to warrant development at the outset of this project. The magnitude of the project's budget contingency indicates that there is a reasonable likelihood of significant scope additions, and that several additional contracting

<sup>&</sup>lt;sup>16</sup> Solicitation of EPC proposals from only the ESMSA vendors is considered a "secondary" compete because the ESMSA vendors already completed a rigorous and competitive selection process to achieve ESMSA designation. As is discussed in Section VI, the ESMSA process was conducted in 2011-2012, and resulted in the selection of two ESMSA vendors: E.S. Fox and Black and McDonald.

<sup>&</sup>lt;sup>17</sup> As scope is defined for each Balance of Plant bundle of work, the Company determines whether to seek cost estimates from one or both ESMSA vendors based on a set of established work allocation criteria. The ESMSA vendors will then provide estimates based on the previously negotiated terms and conditions of their respective contracts. These estimates are then compared to assessments that are prepared for the Company by Faithful & Gould in order to ensure costs are reasonable.



decisions are likely to be needed as the project progresses. A project-specific CMP will also ensure that risks associated with engaging two EPC vendors for the bulk of the work package scope are well-documented and periodically reviewed.<sup>18</sup>

2. The ESMSA selection process was completed in order to identify industry vendors interested in and capable of completing a large and varied scope of work, including the elements that are envisioned for the Balance of Plant work package. Concentric agrees with the Company that the schedule constraints facing the project team are significant, and would render an open solicitation for an additional ESMSA vendor for the purpose of the Balance of Plant work infeasible. The time required to solicit proposals from qualified firms in the industry and to negotiate terms and conditions with another contractor would make it nearly impossible to achieve a reliable work package cost estimate on schedule.

However, despite the elimination of approximately one third of the scope elements of the Balance of Plant work package, the magnitude of the scope may still place a strain on the non-refurbishment maintenance and capital expenditure activities the Plant currently relies on the ESMSA contractors to complete. For this reason, Concentric recommends that Ontario Power Generation prepare plans to engage a third contractor to fill a role similar to that of the ESMSA vendors if significant contingent scope arises during the execution of the Project. A third contractor would not likely be engaged for Balance of Plant work, but would relieve strain on the current ESMSA vendors by contributing to the regular plant maintenance and non-refurbishment project activities. This would free the existing ESMSA contractors to focus more resources on the Refurbishment Project without introducing an additional interface to the Balance of Plant work package. If necessary, this could be explored without impact on the Project's schedule.

- 3. Ontario Power Generation's Balance of Plant commercial strategy indicates that third-party assessments of vendor cost estimates will be used to ensure value for money but these cannot be completed until scope definition and design engineering are sufficiently advanced. By the time these assessments are complete, there may not be time to pursue alternative strategies without significant impact on Project schedule. Concentric recommends that, to the degree possible, Ontario Power Generation prepare for third-party assessments in advance in order to facilitate rapid turnaround of cost analyses. This will preserve the Project's ability to change course if it is determined that certain work package elements do not provide sufficient value for money.
- 4. The Company's Balance of Plant Commercial Strategy references established terms and conditions as a key benefit of engaging the ESMSA vendors to complete the Balance of Plant scope. However, the strategy also concedes that Ontario Power Generation will need to revisit portions of the existing ESMSA agreements for each bundle of the Balance of Plant scope in order to ensure that each agreement meets the objectives of the specific bundle of work to which it applies. This is currently managed through supplemental worksheets with details on specific requirements, which are provided to the ESMSA vendors when the Company seeks pricing for bundles of work it intends to assign. Concentric recommends that Ontario Power Generation clearly document the risks associated with requiring custom elements for each agreement under

<sup>&</sup>lt;sup>18</sup> Extended Services Master Service Agreement: Contract Management Plan. Ontario Power Generation document number N-PLAN-00150-10001, R000.



the ESMSA contracts (*i.e.*, obtaining agreement from the ESMSA vendors on provisions contained in the supplemental worksheets).

5. The Balance of Plant contracting approach has evolved from the time of the KT assessment of contracting approach options. We recommend that Ontario Power Generation revise the KT Analysis that has been completed to ensure it reflects the current contracting strategy, and ensure that similar assessments are completed for each sub-bundle of Balance of Plant work in order to identify the optimal scoping approach under the ESMSA (*i.e.*, EPC or some alternative combination of engineering, procurement, and construction activities).

#### VIII. CONCLUSION

Concentric was retained to review Ontario Power Generation's development and implementation of its commercial strategies for the Project. At a cost of \$6 to \$10 billion in 2009 dollars, excluding inflation and interest, and a duration of more than 18 years from the start of planning to the conclusion of commissioning and project closeout activities, the Project is clearly a major undertaking for Ontario Power Generation, and it is subject to financial, economic, regulatory, political, and execution risks. While effective commercial strategies are necessary to assist the Company in mitigating these risks, no commercial strategy can fully eliminate them.

To conduct our review of the Project's commercial strategies, Concentric undertook a detailed process to determine whether the strategies selected by the Balance of Plant Project team are reasonable, whether the strategies were executed in a reasonable manner and whether Ontario Power Generation's actions related to the selection and execution of those strategies meet the regulatory prudence standard. Our opinion of these strategies relied on information provided by the Company in response to our data requests, in-person interviews, our independent research and Concentric's experience advising other megaproject sponsors. Our review confirms the reasonableness and prudence of Ontario Power Generation's selected procurement strategies.