Ontario Power Generation

Project and Modifications

Project Management Audit Report

Torys LLP
Privileged and confidential

KPMG LLP
November 26, 2020
This report contains 39 pages
Appendices comprise 14 pages

© 2020 KPMG LLP, a Canadian limited liability partnership and a member firm of the KPMG network of independent member firms affiliated with KPMG International Cooperative ("KPMG International"), a Swiss entity. All rights reserved.

Table of Contents

1. Executive Summary 2

2. Methodology 7

3. Detailed Audit Results 16

4. Restrictions, Independence and Objectivity 38

Appendix A: Subject matter expert qualification 40

Appendix B: Detailed Audit Results 43

Appendix C: Project-specific documents assessed 44

Appendix D: Interview session minimum requirements 46

Appendix E: Requested project-specific documents 50

Appendix F: Abbreviations list 53

1. Executive Summary

Introduction

1.1. Torys LLP ("Torys"), legal counsel to Ontario Power Generation ("OPG"), on behalf of OPG, has engaged KPMG LLP ("KPMG") to conduct an independent audit of OPG's nuclear Projects & Modifications organization ("P&M"), as directed by the Ontario Energy Board (the "OEB" or the "Regulator") (the "Audit").

1.2. Specifically, the OEB has directed OPG to:

> *"…file an independent audit of its nuclear P&M organization including adherence to best practices, measures and reporting regarding cost and schedule performance, and implementation of lessons learned."*[1]

1.3. KPMG has prepared this report on P&M's project controls as they relate to measures and reporting regarding cost and schedule performance, the implementation of lessons learned, and associated processes and procedures in comparison to our view of general and best practices.

1.4. Although the OEB requires OPG to file an independent Audit of its nuclear P&M organization, we understand that the OEB directive does not specifically set out the Audit requirements, such as the Audit methodology; the sampling of projects, if any; and what the OEB considers to be best practices. As a result, for the purpose of this Audit, we have developed our own Audit methodology designed to specifically address the OEB's directive, based on our experience as subject matter experts.[2]

1.5. We understand that this Audit Report ("Report") may be filed with the OEB in connection with OPG's next cost-based application.

Objectives and Scope

1.6. The overall objective of this Audit is to assess the adequacy of P&M's project controls, including associated processes and procedures implemented in January 2018, as they relate to measures and reporting regarding cost and schedule performance, the implementation of lessons learned, and associated processes and procedures in comparison to our view of general and best practices. We have identified the following three Audit objectives to address the OEB's directive:

[1] This directive was included in OEB's Decision and Order (EB-2016-0152) on OPG's Application for Payment Amounts for the period January 1, 2017 to December 21, 2021.
[2] See Appendix A for the CVs of the team members.

Objective 1 - Procedures: To assess the alignment of P&M's project management procedures to industry recommended practices;[3]

Objective 2 - Implementation: To assess the implementation of P&M's project management procedures on a representative sample of projects; and

Objective 3 - Effectiveness: To assess the effectiveness of P&M's project management function with respect to its projects, including any mitigating controls in place, if any, on a representative sample of projects.

1.7. Collectively we refer to these three objectives as the "Audit Objectives" in this Report.

1.8. The scope of the Audit does not include the following:

a) Engineering assessments of the projects (i.e. Was the selected design the best option?);

b) Recommendations and root cause analysis for the observations and findings identified (e.g. why the project was delayed and/or over budget); and

c) Waste management projects.

Overview of the Audit Methodology

1.9. The following is a brief summary of the Audit methodology that we developed and used to conduct this Audit:

a) Defined the Audit framework, which includes 11 project management areas[4] (the "Audit Framework");

b) Developed the rating criteria to address the Audit Objectives;

c) Selected a representative sample of projects (10 projects sampled – representing over 25% of P&M's portfolio of project value);

d) Obtained and reviewed P&M's project management procedures applicable to the Audit Framework, in order to assess their alignment with industry recommended practices (i.e. Objective 1 – Procedures);

[3] As discussed in further detail in Section 2 of this Report, it is our view that "best practices" (or leading/recommended practices) are determined in reference to industry recommended practices.
[4] Refer to Table 2 for the 11 project management areas

e) Obtained and reviewed project-specific documents to assess the implementation of P&M's procedures in relation to the areas identified in the Audit Framework (i.e. Objective 2 – Implementation);

f) Obtained and reviewed project-specific documents to assess P&M's project management effectiveness in relation to the areas identified in the Audit Framework (i.e. Objective 3 – Effectiveness); and

g) Conducted interview sessions with the project management teams for the projects sampled to further understand the processes implemented and the projects' status and to identify any mitigating controls of P&M's project management (i.e. Objective 3 – Effectiveness).

1.10. See Section 2 of this Report for further details pertaining to our Audit methodology.

Summary Audit Results

1.11. Based on our Audit methodology and subject to the restrictions and qualifications noted herein, our Audit results are set out in Appendix B and summarized in Table 1.

Table 1
Summary of Audit Results

Results				
No.	**Areas within the Audit Framework**	**Objective 1 – Procedures**	**Objective 2 – Implementation**	**Objective 3 – Effectiveness**
1	Governance	Fully aligned	Fully Implemented	Effective
2	Scope management	Fully aligned	Fully Implemented	Effective
3	Cost and estimating management	Fully aligned	Fully Implemented	Effective
4	Schedule management	Aligned	Partially Implemented	Effective
5	Change management	Aligned	Fully Implemented	Effective
6	Contract management	Fully aligned	Fully Implemented	Effective
7	Procurement management	Fully aligned	Fully Implemented	Effective
8	Quality management	Fully aligned	Fully Implemented	Effective
9	Risk management	Fully aligned	Fully Implemented	Effective
10	Reporting	Fully aligned	Implemented	Effective
11	Lessons learned	Aligned	Fully Implemented	Effective

1.12. The rating criteria is defined in Table 3, 4 and 5 in Section 2 of this Report.

1.13. We note the following relevant points from Table 1:

a) Objective 1 – Procedures

The objective is to assess the alignment of P&M's project management procedures to industry recommended practices.

- In 8 of the 11 areas, P&M procedures are **fully aligned** with industry recommended practices, in all material respects;
- In 3 of the 11 areas, P&M procedures are **aligned** with industry recommended practices, but there are some observations for management's consideration; and
- Considered overall, we found P&M's procedures to be within industry recommended practice.

b) Objective 2 – Implementation

The objective is to assess the implementation of P&M's project management procedures (as identified in Objective 1) using a representative sample of projects.

- In 9 of the 11 areas, P&M has **fully implemented** its procedures based on the projects we have sampled, in all material respects;
- In 1 of the 11 areas, P&M has **implemented** its procedures based on the projects we have sampled, but there are some observations for management's consideration;
- In 1 of the 11 areas, P&M has **partially implemented** its procedures based on the projects we have sampled, and we have identified some opportunities for improvement;
- Considered overall, we found P&M's procedures implementation to be within industry recommended practice.

c) Objective 3 – Effectiveness

The objective is to assess the effectiveness of P&M's project management function with respect to its projects, including the identification of any mitigating controls on a representative sample of projects.

- In all 11 areas, based on the projects sampled, P&M **effectively** managed the projects in all material respects.
- Considered overall, we found P&M's project function effectiveness to be within industry recommended practice.

2. Methodology

2.1. This section discusses the Audit methodology, as follows:

a) Establishing the Audit Framework;

b) Developing the rating criteria to address the Audit Objectives;

c) Selecting a representative sample of projects;

d) Obtaining and reviewing P&M's project management procedures applicable to the Audit Framework;

e) Obtaining and reviewing project-specific documents to assess the implementation of P&M's procedures; and

f) Obtaining and reviewing project-specific documents and conducting interview sessions with P&M's project management teams to assess the effectiveness of P&M's project management function.

a) <u>The Audit Framework</u>

2.2. It is our view that "best practices", as referred in OEB's directive, are determined in reference to industry recommended practices. For purposes of this Audit, we have considered the following as the overarching industry recommended practices to make this assessment and have selected the relevant elements from the following:

a) The Project Management Body of Knowledge, the Sixth Edition ("PMBOK") from the Project Management Institute ("PMI"), dated 2017 (current edition); and

b) Recommended practices from the Association for the Advancement of Cost Engineering ("AACE"), multiple dates.

2.3. Where the PMI and AACE are silent on a specific element, or provide little detail on a specific element, or where we believe additional depth was required for this Audit, we supplemented the PMI and AACE with elements from additional resources including:

a) KPMG's Capital Project Risk Framework; and

b) Subject matter expertise of the members of the Audit team.

2.4. For purpose of this Audit, the foregoing (in 2.2 and 2.3) is the basis for the standard "*industry recommended practices"* as used in this Report.

2.5. In addition to our comments noted above, we have also considered the interdependencies of the project management areas by examining certain specific areas that were identified in OEB's directive, in order to have a complete view of P&M's project management function.

2.6. As a result of our consideration of the items noted above, we have identified 11 areas that form the Audit Framework, as summarized in Table 2.

Table 2
The 11 Areas within the Audit Framework

No.	Area	Brief description of the Objective of the Area
1	Governance	Lifecycle of the projects and the stage-gate process.
2	Scope management	Scope management plan and its definition, controlling and validation processes.
3	Cost and estimating management	Cost management plan and its estimating and controlling processes.
4	Schedule management	Schedule management plan and its development (including activity definition, relationship and duration) and controlling processes.
5	Change management	Change management plan and its identification, review, approval and implementation processes.
6	Contract management	Contract management plan and its award, administration and closure processes.
7	Procurement management	Assess how the procurement is conducted and controlled.
8	Quality management	Quality management plan and its management and controlling.
9	Risk management	Risk management plan and its identification, assessment and monitoring processes, and how the response is planned and implemented.
10	Reporting	Reporting structure including the information and intended audience of the reports.
11	Lessons learned	Lessons learned plan and its collection, storage, and implementation processes.

2.7. In our view, these 11 areas are fundamental to assessing the Audit Objectives that address the OEB's directive.

b) Rating criteria to address the Audit Objectives

Objective 1 – Procedures:

2.8. In order to address Audit Objective 1 - Procedures, we have developed a four-point rating scale to assess the alignment of P&M's project management procedures against industry recommended practices, as illustrated in Table 3 below.

Table 3
Objective 1 – Procedures - Rating Criteria

Procedures rating	Rating description
Fully aligned	P&M's procedures fully align with the industry recommended practice.
Aligned	P&M's procedures align with industry recommended practice. There are some observations for management's consideration.
Partially aligned	P&M's procedures partially align with the industry recommended practice. The processes are not included and/or misaligned in the procedure (findings), which could lead to a low to moderate-level risk impact on the project results and how the information is reported.
Not aligned	P&M's procedures are not aligned with industry recommended practice (findings). This could lead to a high-level risk impact on the project results and how the information is reported.

2.9. For the criteria described in Table 3, "observations" are opportunities for improvement. "Findings" are opportunities for improvement or areas of non-compliance which may carry material risk to the project.

Objective 2 – Implementation:

2.10. In order to address Audit Objective 2 - Implementation, we developed a four-point rating scale to assess the alignment of P&M's implementation of its project management procedures (i.e. identified in Objective 1 – Procedures above), as illustrated in Table 4 below.

Table 4
Objective 2 – Implementation - Rating Criteria

Implementation rating	Rating description
Fully implemented	P&M has fully implemented its procedures.
Implemented	P&M has implemented its procedures. There are some observations for management's consideration.
Partially implemented	P&M has implemented parts of its procedures or only on certain projects. The parts that are not implemented (findings) could lead to a low to moderate-level risk on the project results and how the information is reported.
Not implemented	P&M did not implement its procedures. Not implementing the procedures (findings) could lead to a high-level risk impact on the project results and how the information is reported.

2.11. For the criteria described in Table 4, "observations" are opportunities for improvement. "Findings" are opportunities for improvement or areas of non-compliance which may carry material risk to the project.

Objective 3 – Effectiveness:

2.12. In order to address the Audit Objective 3 - Effectiveness, we have developed a three-point rating scale to assess P&M's project management function effectiveness on its project, as illustrated in Table 5 below.

Table 5
Objective 3 – Effectiveness - Rating Criteria

Effectiveness rating	Rating description
Effective	The project management area is effectively managed. Documentation and results demonstrate that the area is effectively managed.
Effective with opportunities for improvement	The project management area is effectively managed. Some opportunities for improvement were identified (findings) which could lead to a low to moderate-level risk on the project results and how the information is reported.
Not effective	The project management area is not effectively managed. Documentation and results show that the area is not adequately managed (findings), and this could lead to a high-level risk impact on the project results and how the information is reported.

2.13. For the criteria described in Table 5, "findings" are opportunities for improvements or areas of non-compliances which may carry material risk to the project.

c) Selection of representative sample of projects

2.14. As mentioned above, the overall objective of the Audit is to assess the adequacy of P&M's project controls, including associated processes and procedures.

2.15. In order to conduct this assessment, we have used a non-statistical sampling method to select a sample of P&M's projects to test Audit Objectives 2 and 3, and to provide us with sufficient examples regarding P&M's project controls.

2.16. We selected the projects based on a list provided by P&M representing its whole portfolio of projects as of April 2019.[5]

2.17. We selected the sampled projects based on the P&M's list using the following criteria:

a) The samples selected should collectively account for a minimum of 25% of the total portfolio dollar value of the P&M projects. The actual samples selected collectively accounted for approximately 27% of the total portfolio dollar value of the P&M projects, as summarized in Table 6 below.

b) The samples selected should collectively account for a minimum 25% of the spending forecast for 2019, since this Audit is to include active projects. The actual samples selected collectively represented 33% of the spending forecast for 2019, as summarized in Table 6 below.

c) The samples selected should proportionally align with the number of projects P&M manages at the Darlington and Pickering stations (P&M only manages projects at these two stations).

d) Ideally, the samples should collectively cover projects in all phases of a project's lifecycle, in order to provide insight into performance by stage. Put differently, at least one project in each project phase, if possible.

e) All of the samples selected should have exposure to the new governance procedures implemented by P&M in January of 2018.

2.18. As a result of our review of P&M's projects and consideration of the items noted above, we selected 10 projects as noted in Table 6 below:

[5] The criteria used to select the projects selection is discussed below.

Table 6
Sample Projects Selected

Index	Project #	Project title	Station
1	83296	DN Main Output Transformer & Unit Service Transformer Replacement	Darlington
2	80126	DN Emergency Power Generator 1 and 2 Replacement	Darlington
3	83298	DN Secondary System Obsolete Control	Darlington
4	31710	DN Shutdown Cooling Heat Exchanger	Darlington
5	73566	DN RS PHT Pump Motor Replacement	Darlington
6	31412	DN Class II UPS Replacement	Darlington
7	80022	DN OH180 Aging Management Hardware Installation	Darlington
8	49158	PB Fukushima Phase 1 Beyond Design Basis Event Emergency Mitigation Equipment	Pickering
9	31535	DN Water Treatment Plant	Darlington
10	83072	PN P58 Buried Blowdown Piping Replacement	Pickering

2.19. These 10 projects collectively represent approximately 27% and 33% of the total portfolio dollar value of the OPG projects and 2019 spending forecast, respectively.

2.20. Based on KPMG's expertise and previous experience with similar types of audits, we deem the selected sample as robust and representative of P&M's whole portfolio.

d) <u>Obtained and reviewed P&M's project management procedures applicable to the Audit Framework</u>

2.21. As mentioned above, one of the Audit Objectives is to assess the alignment of P&M's project management procedures against industry recommended practices (i.e. Objective 1 – Procedures).

2.22. In conducting our assessment, we obtained the procedures P&M uses to manage each of their projects for each of the 11 areas within the Audit Framework, as summarized in Table 7 below.

Table 7
P&M Project Management Procedures

No.	Audit Framework Areas	Procedures assessed
1	Governance	• Project Management: OPG-STD-0148_R001 • Project Phase-Gate Management: OPG-MAN-00120-0019_R000
2	Scope management	• Nuclear Project Scope Management: N-MAN-00120-10001-SCOPE-R003
3	Cost and estimating management	• Nuclear Project Cost Management: N-MAN-00120-10001-COST_R000 • Nuclear Project Cost Estimating: N-MAN-00120-10001-EST-R003 • Nuclear Project Cost Estimating Guide: N-GUID-00120-10130 R000
4	Schedule management	• Nuclear Project Schedule Management: N-MAN-00120-10001-SCH_R000 • Nuclear Project Scheduling Guide: N-GUID-00120-10131-R000 • Nuclear Project P6 Scheduler's User Manual: N-MAN-00120-10001-SCH-08-R002
5	Change management	• Nuclear Project Change Management: N-MAN-00120-10001-CHNG_R000
6	Contract management	• Contract Management: OPG-STD-0153_R000
7	Procurement management	• Procurement Activities: OPG-PROC-0058_R014
8	Quality management	• N286 Nuclear Construction Quality Assurance Program Manual: N-MAN-01983-10000-R001
9	Risk management	• Nuclear Project Risk Management: N-MAN-00120-10001-RISK-R004
10	Reporting	• Nuclear Project Reporting: N-MAN-00120-10001_REPT_R000
11	Lessons learned	• Sections from project management, scope and risk procedures.

2.23. We compared each of the P&M procedures with industry recommended practices and we rated P&M's procedures based on the rating criteria that we set out above in Table 3. This phase of the Audit took place between July and August 2019, prior to conducting the implementation and effectiveness assessments.

e) <u>Obtained and reviewed project-specific documents to assess the implementation of P&M procedures</u>

2.24. As mentioned above, one of the Audit Objectives is to assess the implementation of P&M's project management procedures (i.e. those procedures identified in Objective 1 – Procedures noted above) with respect to its projects.

2.25. In assessing the 10 projects, we reviewed more than 660 documents[6] provided to us by P&M.

[6] See Appendix C for the total number of assessed project specific documents.

2.26. For each of the 10 projects, we reviewed the project-specific documents to assess if P&M implemented its procedures in its projects. Next, we rated P&M's implementation of its procedures based on the rating criteria that we set out in above Table 4.

f) Obtained and reviewed project-specific documents and conduct interview sessions with P&M's project management teams

2.27. As previously discussed, one of the Audit Objectives is to assess the effectiveness of P&M's project management function on its projects, including to identify any mitigating controls that would allow P&M to effectively manage the project by meeting the intended objectives of the areas within the Audit Framework.

2.28. In assessing this question, we:

a) Reviewed the various project documents;

b) Conducted interview sessions with the project management teams for the projects sampled to further understand the process implemented in the projects and to identify any mitigating controls. As part of the interview sessions, we requested that each project management team walk through the various documents produced as set out in Appendix D for the purpose of understanding how P&M managed those projects; and

c) Rated P&M's effectiveness based on the rating criteria that we have set out above in Table 5.

2.29. These interview sessions took place between August 14, 2019 and November 14, 2019, as indicated in Table 8 below.

Table 8
Audit Interview Sessions Schedule

Date	Project #	Project title	Station
14-Aug-19	49158	PB Fukushima Phase 1 Beyond Design Basis Event Emergency Mitigation Equipment	Pickering
15-Aug-19	31412	DN Class II UPS Replacement	Darlington
10-Sep-19	31535	DN Water Treatment Plant	Darlington
11-Sep-19	83296	DN Main Output Transformer & Unit Service Transformer Replacement	Darlington
12-Sep-19	80022	DN OH180 Aging Management Hardware Installation	Darlington
8-Oct-19	73566	DN RS PHT Pump Motor Replacement	Darlington
9-Oct-19	83072	PN P58 Buried Blowdown Piping Replacement	Pickering
10-Oct-19	31710	DN Shutdown Cooling Heat Exchanger	Darlington
13-Nov-19	80126	DN Emergency Power Generator 1 and 2 Replacement	Darlington
14-Nov-19	83298	DN Secondary System Obsolete Control	Darlington

3. Detailed Audit Results

3.1. Based on our Audit methodology and subject to the restrictions and qualifications set out herein, Table 9 summarizes the key results from our Audit of the 10 sampled projects listed in Table 6. The details of our findings are set out in Appendix B and discussed in this section of our Report.

Table 9
Summary Audit Results

Results				
No.	**Areas within the Audit Framework**	**Objective 1 – Procedures**	**Objective 2 – Implementation**	**Objective 3 – Effectiveness**
1	Governance	Fully aligned	Fully Implemented	Effective
2	Scope management	Fully aligned	Fully Implemented	Effective
3	Cost and estimating management	Fully aligned	Fully Implemented	Effective
4	Schedule management	Aligned	Partially Implemented	Effective
5	Change management	Aligned	Fully Implemented	Effective
6	Contract management	Fully aligned	Fully Implemented	Effective
7	Procurement management	Fully aligned	Fully Implemented	Effective
8	Quality management	Fully aligned	Fully Implemented	Effective
9	Risk management	Fully aligned	Fully Implemented	Effective
10	Reporting	Fully aligned	Implemented	Effective
11	Lessons learned	Aligned	Fully Implemented	Effective

Objective 1 – Procedures

3.2. It is our view that each of the 11 areas within the Audit Framework includes various elements that are required for P&M's procedures to be fully aligned with industry recommended practices in all material respects. We have included a detailed description of these elements in Appendix B.

3.3. Considered overall, based on our methodology and the documents reviewed, we found P&M's procedures to be within industry recommended practice.

3.4. As noted in Table 9, Schedule Management, Change Management, and Lessons Learned are rated as "aligned", with some opportunities to enhance P&M's procedures relative to industry recommended practices, as discussed in further detail below.

Objective 2 – Implementation

3.5. Considered overall, we found P&M's procedures implementation to be within industry recommended practice.

3.6. Reporting was rated as "implemented," as we have identified some observations in relation to P&M's implementation of its procedures.

3.7. Based on our assessment, Schedule Management was rated as being "partially implemented," as some aspects of P&M's procedures were not implemented in certain projects.

Objective 3 – Effectiveness

3.8. Considered overall, and based on the documents reviewed and workshops, we found P&M's project function effectiveness to be within industry recommended practice.

3.9. Although Schedule Management was rated as "partially implemented" in Objective 2 – Implementation, we found that Schedule Management was effective in this assessment, as we identified that mitigating controls were in place that enabled P&M to manage its schedules effectively, which are discussed in further detail below.

3.10. The following section of our Report will discuss some of our findings as it relates to the 11 areas within the Audit Framework and the Audit Objectives. Details are presented in Appendix B.

A. Governance

3.11. Table 10 summarizes our Audit results for each of the Audit Objectives as it relates to the Governance area within the Audit Framework.

Table 10
Governance – Overall Audit Results

Objective	Results
Procedures	Fully aligned
Implementation	Fully implemented
Effectiveness	Effective

Objective 1 – Procedures

3.12. Considered overall, and based on the procedures analyzed and documents reviewed, we found P&M's governance procedures to be **fully aligned** with industry recommended practices, in all material respects.

3.13. Specifically, we observed that P&M's procedures incorporated the following processes that are in line with industry recommended practices, including:

a) Stage-gate process, which contains the expected level of details; and

b) The procedures correctly define the stage of the project when the baselines related to scope, schedule and cost should be locked down (Gate 3).

Objective 2 – Implementation

3.14. Considered overall, we found P&M's governance procedures to be **fully implemented** on all of the projects we have sampled, in all material respects.

3.15. Specifically, we observed that P&M implemented the procedures that we noted above and those procedures set out in Appendix B. In particular, we noted that for all approvals required after January 2018 (that is, the gate process implementation date), the gate process was followed by P&M.

Objective 3 – Effectiveness

3.16. Considered overall, we found that P&M **effectively** managed the governance procedures, in all material respects.

3.17. Specifically, we noted the following:

a) The project managers and their teams demonstrated a thorough understanding and ownership of their project baselines; status of the projects; and phase gate approval actions that are necessary to enable them to deliver the projects per the technical, costs and schedule requirements; and

b) The gate process and the business case summaries (BCS) required for each of the gates describe and provide an adequate record of the need for and objective of the project, the basis of the proposed next project phase and the approval of the progression of gates.

B. Scope Management

3.18. Table 11 summarizes our Audit results for each of the Audit Objectives as it relates to the Scope Management area within the Audit Framework.

Table 11
Scope Management – Overall Audit Results

Objective	Results
Procedures	Fully aligned
Implementation	Fully implemented
Effectiveness	Effective

Objective 1 – Procedures

3.19. Considered overall, we found that P&M's scope management procedure to be **fully aligned** with industry recommended practices, in all material respects.

3.20. Specifically, we observed that P&M's scope management procedures incorporated the processes that are in line with industry recommended practices, including:

a) A plan on how to manage the scope throughout the lifecycle of the projects;

b) The process of collecting requirements including the methods to be used;

c) The scope definition activity is described including the tools, processes, desired results, acceptance criteria and outputs from it (e.g. statement of work documents);

d) The Work Breakdown Structure (WBS) development, including the integration with cost and schedule management;

e) The scope validation with multiples methods to verify and accept the work done; and

f) The monitoring and controlling of the scope.

Objective 2 – Implementation

3.21. Considered overall, we found P&M's scope management procedures to be **fully implemented**, in all material respects.

3.22. Specifically, we observed that P&M implemented the procedures that we noted above and those set out in Appendix B. Elements of these implemented procedures included:

a) P&M applies the scope management procedure in all assessed projects;

b) The project manager is accountable and involved in the early stages of the project including the project charter and scope of work development;

c) The project manager defines the project objectives in the project Scope of Work (SOW) and at least three possible alternatives are considered in the BCS to ensure the best solution is selected to meet the projects' objectives;

d) P&M takes into account the lessons learned and operation experience reports (OPEX) from previous projects when defining the scope of work;

e) All parameters, requirements, objectives, and success criteria are outlined in the SOW, project charter, or the BCS; and

f) All assessed projects follow a standardized WBS structure and the work packages are broken down to the appropriate level.

Objective 3 – Effectiveness

3.23. Considered overall, we found P&M's scope management to be **effective**, in all material respects.

3.24. Specifically, the observed attributes that demonstrate effectiveness within the sampled projects include the following:

a) The scope was defined;

b) All the expected stakeholders were included in the scope definition process, including members from the engineering team; and

c) For the project with the scope defined after January 2018 (implementation of this procedure), no substantial scope change was identified on the assessed projects.

C. Cost and Estimating Management

3.25. Table 12 summarizes our Audit results for each of the Audit Objectives as it relates to the cost and estimating management area within the Audit Framework.

Table 12
Cost and Estimating Management – Overall Audit Results

Objective	Results
Procedures	Fully aligned
Implementation	Fully implemented
Effectiveness	Effective

Objective 1 – Procedures

3.26. Considered overall, we found that P&M's cost and estimating management procedures were **fully aligned** with industry recommended practices, in all material respects.

3.27. Specifically, we observed that P&M's cost and estimating management procedures incorporated elements that are in line with industry recommended practices, including:

a) A cost management plan, including how to estimate, budget, manage, monitor and control the cost;

b) Estimating processes, including the requirement for a basis of estimate;

c) The budgeting process and how to establish the cost baseline; and

d) Cost monitoring and controlling, including the performance measures (earned value management).

Objective 2 – Implementation

3.28. Considered overall, we found P&M's cost and estimating management procedures to be **fully implemented**, in all material respects.

3.29. Specifically, we observed that P&M implemented the procedures that we noted above and those set out in Appendix B. In particular, the elements incorporated within P&M's implementation include:

a) P&M follows its procedure and manages the cost adequately for all assessed projects;

b) The project manager and projects control team use a detailed basis of estimate, which includes the estimate from the vendor, the quality review checklist of the vendor's estimates, and the estimates for the activities performed by P&M;

c) The basis of estimate includes labour rates, shift pattern, total hours, productivity factor, overhead costs, closeout and demobilization, non-long lead and long lead materials' cost, and project management cost;

d) The basis of estimate document also includes the assumptions, exclusions, risks and opportunities, the design basis and the planning basis;

e) Contingency is calculated based on the risks and cost uncertainty and uses Monte Carlo simulation;

f) P&M controls the cost through EcoSys, a cost management system which contains the budget, actual cost, earned value and forecast; and

g) The earned value is calculated based on information extracted from the schedules.

Objective 3 – Effectiveness

3.30. Considered overall, we found P&M's cost and estimating management to be **effective,** in all material respects.

3.31. Specifically, we observed elements of effectiveness in the sampled projects, including:

a) P&M's management team demonstrated good understanding of the estimating process;

b) The basis of estimate included the expected information at the sufficient level of details;

c) Project costs have been effectively monitored and controlled; and

d) The control systems in place adequately support the management team to manage the cost.

D. Schedule Management

3.32. Table 13 summarizes our Audit results for each of the Audit Objectives as it relates to the Schedule Management area within the Audit Framework.

Table 13
Schedule Management – Overall Audit Results

Objective	Results
Procedures	Aligned
Implementation	Partially implemented
Effectiveness	Effective

Objective 1 – Procedures

3.33. Considered overall, we found that P&M's schedule management procedures are **aligned** with industry recommended practices. We have identified an observation for management's consideration.

3.34. Specifically, we observed P&M's schedule procedure incorporated elements that are in line with industry recommended practices, including:

a) A schedule management plan, which includes the following: scheduling methodology and the tools to be used for the project (Primavera P6); schedule release and iteration management; units of measure; level of accuracy; rules of performance measurement; reporting formats and control thresholds;

b) Activity definition process for the various levels of schedule by using the WBS as a framework and the rolling wave planning technique. It also presents the milestone definition criteria;

c) Activity sequencing document, which includes the identification and documentation of the relationship between the defined project activities. The procedure presents tools like the precedence diagramming method, accounting for dependencies and leads and lags as examples to be used;

d) Estimating activity duration process is outlined and establishes the responsible parties (P&M or contractor); and

e) Schedule development is described and includes the network analysis, critical path method, resource optimization and schedule compression techniques.

3.35. Although all of the expected requirements are present in the schedule management procedure, due to the complexity of its projects, P&M uses more tools and processes than what is described in its procedure. This observation is detailed below:

Observation – Schedule Management Procedure

3.36. The scheduling management procedure does not include all the tools and processes being used by P&M. The procedure provides industry common used classical P6 directions and has some flexibility in the classic P6 approach, but the structure presents a more rigid approach than what is currently applied. The procedure does not reflect the flexibility appropriate for the multi-unit, multiple operational condition constraints encountered in the majority of P&M projects and it does not include the additional tools and processes used by P&M that make the schedule management effective (e.g. integration meetings with the station).

Objective 2 – Implementation

3.37. Considered overall, we found P&M's schedule management procedure to be **partially implemented**. We observed that P&M has not implemented parts of its schedule management procedures on certain projects sampled, as discussed in further detail below.

3.38. The majority of the processes within the procedure were implemented, including the following elements:

a) The schedules have the required level of detail for each phase of the project;

b) The WBS in the schedule aligns with the one used in the scope development and cost control;

c) The schedules were resource loaded; and

d) The contractors send the level 3 schedule baseline and the monthly updates to P&M.

3.39. The majority of projects have complex situations dealing with multiple units and with multiple operational condition constraints, which requires deviation from the classical P6 model (using Primavera software and the Critical Path Method), which is the base for the schedule management procedure. The schedule management process has evolved; P&M uses its own schedules, the vendor schedules, and the station schedules that support daily, weekly, and monthly project status and actions meetings. Using these tools in conjunction, the work gets integrated and managed to meet project needs and milestones.

3.40. The following part not implemented could lead to a low to moderate-level risk to the project results and how the information is reported.

Finding – Schedule Management Implementation

3.41. Even though the procedure requires the contractor to submit a basis of schedule[7] document, P&M did not have this document for the majority of the projects.

Observations – Schedule Management Implementation

3.42. There is no schedule narrative for the schedule updates. The schedule narrative highlights the changes from the previous updates, slippages and any information that requires attention.

3.43. P&M does not keep a schedule log for its projects (list of schedule updates for the project).

Objective 3 – Effectiveness

3.44. Considered overall, we found P&M's schedule management to be **effective**, in all material respects.

3.45. Although we found the schedule management procedures to be partially implemented as noted above, based on our review of certain documents and workshops with P&M's management teams, we noted that P&M has implemented mitigating controls, such as extra meetings and reports, to address the processes and controls not implemented.

3.46. Specifically, the observed elements of schedule management implementation include the following:

a) P&M developed mitigating tools (e.g. projects and station interface meetings) to manage its projects' schedules due to the complexity of its projects;

b) The tools being used to integrate with the station schedule provide good communications of issues and status;

c) The schedules are used as a looking forward tool and supports the management team on the decision-making processes; and

d) The one finding and two observations regarding Objective 2 – Implementation have been mitigated by these tools and the project management team's knowledge.

[7] The basis of schedule is a document that records the basis for the development of the project schedule and assists the project team and stakeholders in identifying any key elements, issues and special considerations (assumptions, exclusions, risks/ opportunities, etc.).

E. Change Management

3.47. Table 14 summarizes our Audit results for each of the Audit Objectives as it relates to the Change Management area within the Audit Framework.

Table 14
Change Management – Overall Audit Results

Objective	Results
Procedures	Aligned
Implementation	Fully Implemented
Effectiveness	Effective

Objective 1 – Procedures

3.48. Considered overall, we found that P&M's change management procedures to be **aligned** with industry recommended practices. We identified some observations for management's consideration.

3.49. Specifically, P&M's change management procedures incorporated elements that are in line with industry recommended practices, including:

a) The process to identify the change and include the impact on scope, cost and schedule;

b) Review and approval of a change request: the procedure includes the levels of authority for change approval including a fast-track approval process for emergencies; and

c) Change implementation includes the responsible individuals and the required actions.

3.50. Although the change management procedure aligns with industry recommended practices, we did identify one internal discrepancy when compared to the stage-gate procedure. The observation is detailed below.

Observation – Change Management Procedure

3.51. Section 1.5 of the Change Management Procedure has wording that implies the cost and schedule baselines are defined at Gate 1 and locked down at Gate 2, rather than locked down at Gate 3, as conveyed in the life cycle management procedure (evaluated in the governance section). While the projects reviewed under the current governance follows the right procedure and lock down their baselines at Gate 3, this procedure conflicts with the right information. The

inconsistency between procedures may create confusion when locking down the baselines for the projects.

Objective 2 – Implementation

3.52. Considered overall, we found P&M's change management procedure to be **fully implemented**, in all material respects. Although one section of the change management procedure indicates that the baselines should be set at Gate 1 and locked down at Gate 2, the projects assessed followed the Stage-Gate procedure and correctly used Gate 3 as the gate to lock down the baselines.

3.53. We observed that P&M implemented the procedures that we noted above and those set out in Appendix B. In particular, we noted elements of procedure implementation, including:

a) The change control log was implemented and up to date;

b) The changes were approved in accordance with the schedule of authority;

c) The changes are linked to the contingency, when applied; and

d) The projects assessed locked down their baselines at the correct Gate (Gate 3).

Objective 3 – Effectiveness

3.54. Considered overall, we found P&M's change management to be **effective**, in all material respects.

3.55. Specifically, we observed elements of effectiveness in the sampled projects, including:

a) Good documentation and appropriate approvals of changes are in place;

b) P&M management team demonstrates commitment to reducing the impacts of unexpected changes due to scope growth or unforeseen issues; and

c) The use of 'pilot project' to determine real durations and costs before proceeding into full funding commitment.

F. Contract Management

3.56. Table 15 summarizes our Audit results for each of the Audit Objectives as it relates to the Contract Management area within the Audit Framework.

Table 15
Contract Management – Overall Audit Results

Objective	Results
Procedures	Fully aligned
Implementation	Fully implemented
Effectiveness	Effective

Objective 1 – Procedures

3.57. Considered overall, we found that P&M's contract management procedures are **fully aligned** with industry recommended practices, in all material respects.

3.58. We understand that P&M uses preferred vendors to expedite the process for onboarding contractors to new projects, and contracts with a number of companies qualified to work in the nuclear environment.

3.59. The observed elements that are incorporated into P&M's contract management procedures include:

a) Contract planning determines the work that needs to be contracted out and interacts with the scope definition process before issuing the request for proposal;

b) Contract award: key activities to be performed prior to contract being awarded are listed in the procedure;

c) Contract administration lists the processes involved to ensure the contractors comply with the agreed terms; and

d) Closeout of a contract: verifying the deliverables against the requirements and any outstanding issue.

Objective 2 – Implementation

3.60. Considered overall, we found P&M's contract management procedure to be **fully implemented**, in all material respects.

3.61. Specifically, we observed that elements of implementation procedures were incorporated, including:

a) Contract owner is accountable for the contract planning;

b) Purchase agent is accountable for the bid process (RFP, bid evaluation and award);

c) Contract owner and purchase owner share accountability for the success of the contract execution; and

d) Contract owner is responsible for closing the contract.

Objective 3 – Effectiveness

3.62. Considered overall, we found P&M's contract management to be **effective**, in all material respects.

3.63. Specifically, we observed that the contracting governance requirements are being met by the project manager and the supply team and contract management representatives in the planning, awarding, oversight, and execution of the engineering and EPC contracts to support the projects, amongst other things.

G. Procurement Management

3.64. Table 16 summarizes our Audit results for each of the Audit Objectives as it relates to the Procurement Management area within the Audit Framework.

Table 16
Procurement Management – Overall Audit Results

Objective	Results
Procedures	Fully aligned
Implementation	Fully implemented
Effectiveness	Effective

Objective 1 – Procedures

3.65. Considered overall, we found that P&M's procurement management procedure to be **fully aligned** with industry recommended practices, in all material respects.

3.66. Specifically, we observed elements of procurement management procedure were incorporated, including:

a) The procurement plan establishes the procurement strategy, bid documents and procurement statement of work;

b) Conduct procurement - specific techniques to complete this process include bidder conferences, proposal evaluations and negotiations; and

c) Control procurement - managing and controlling vendor relations, contract performance, contract amendments and contract closeout, including potential inspections of vendor facilities and claims administration.

Objective 2 – Implementation

3.67. Considered overall, we found P&M's procurement management procedure to be **fully implemented**, in all material respects.

3.68. Specifically, we observed that elements of P&M's procurement management procedures implementation were incorporated, including:

a) The rules for the evaluation of suppliers, including evaluation methodology, criteria and weightings are established by Supply Chain and the requisitioner, and are fully disclosed to suppliers;

b) The negotiation and finalization of contract terms are performed by the purchasing agent with assistance from the requisitioner as appropriate;

c) The performance of the supplier is assessed by the contract administrator and Supply Chain and consideration given to performance when selecting suppliers on future work; and

d) Supply Chain manages data on the performance of suppliers through supplier scorecards.

Objective 3 – Effectiveness

3.69. Considered overall, we found P&M's procurement management to be **effective**, in all material respects.

3.70. Specifically, we noted that the purchasing governance requirements are being met by the project manager and the engineering and supply team representatives in planning OPG's procurement of long lead materials, amongst other activities.

H. Quality Assurance Management

3.71. Table 17 summarizes our Audit results for each of the Audit Objectives as it relates to the Quality Assurance Management area within the Audit Framework.

Table 17
Quality Assurance Management – Overall Audit Results

Objective	Results
Procedures	Fully aligned
Implementation	Fully implemented
Effectiveness	Effective

Objective 1 – Procedures

3.72. Considered overall, we found that P&M's quality assurance management procedures to be **fully aligned** with industry recommended practices, in all material respects.

3.73. Specifically, we observed elements of quality assurance management procedures were incorporated, including:

a) Quality management plan defines project quality standards, quality objectives, quality roles and responsibilities, deliverables and processes subject to quality review; quality control and quality tools to be utilized for the project. The quality metrics were also defined; and

b) Manage and control quality: the procedure refers to a number of other specific procedures which define the design and technical requirements for the specific activities (e.g. electrical, mechanical, civil work).

Objective 2 – Implementation

3.74. Considered overall, we found P&M's quality assurance management procedure to be **fully implemented**, in all material respects.

3.75. Specifically, we observed elements of implementation, including:

a) Quality plan is implemented;

b) Quality control activities are planned, sequenced and documented in Inspections and Test Plan;

c) The work is released via Field Installation Package Release process;

d) Field Engineering performs Construction Quality Oversight; and

e) Non-conformances were identified and Non-Conformance reports were initiated and tracked through the log.

Objective 3 – Effectiveness

3.76. Considered overall, we found P&M's quality assurance management to be **effective**, in all material respects.

3.77. Specifically, we observed elements of effectiveness, including:

a) The quality assurance program provides an adequate approach to ensuring quality is achieved;

b) Effectiveness was evidenced through well-documented quality inspections and reports;

c) The program requirements are consistently applied;

d) Where the documentation evidence is not yet available due to the early phase of the project, the quality plan and requirements for the project are invoked; and

e) The quality assurance program is consistently applied to P&M and its vendors.

I. Risk Management

3.78. Table 18 summarizes our Audit results for each of the Audit Objectives as it relates to the Risk Management area within the Audit Framework.

Table 18
Risk Management – Overall Audit Results

Objective	Results
Procedures	Fully aligned
Implementation	Fully implemented
Effectiveness	Effective

Objective 1 – Procedures

3.79. Considered overall, we found that P&M's risk management procedures are **fully aligned** with industry recommended practices, in all material respects. The risk management procedure integrates with the cost management procedure to develop the contingency.

3.80. Specifically, we observed elements of risk management processes incorporated, including:

a) Plan risk management: determines the risks strategy and how they should be managed. The procedure includes the Risk Management Oversight (RMO) tool used by P&M to manage the risks;

b) Risk identification: includes the tools (e.g. Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis, data analytics, input from experts, lessons learned) used to identify risks and the processes involved. The output is a risk register with the risks, owner and associated responses;

c) Qualitative and quantitative risk analysis: describes the analysis that should be made to determine the probability and the impact of a risk;

d) Plan risk responses: selecting the strategy for threats and opportunities as well as define the overall strategy to respond to the projects' overall risks;

e) Implement risk responses: action plan from the risk responses; and

f) Monitor risk: continuously monitor the project risks and update the risk register as new risks emerge, existing risks materialize or are no longer relevant.

Objective 2 – Implementation

3.81. Considered overall, we found P&M's risk management procedures to be **fully implemented**, in all material respects.

3.82. Specifically, the observed elements incorporated within the risk management procedures include:

a) A Risk Management Plan or a section dedicated to risk management in the Project Management Plan;

b) The RMO tool is used as a decision-making tool;

c) The project managers are involved in risk identification in the beginning and throughout the life cycle of the projects;

d) The risk register provides adequate level of detail, including risk description, responsible individual, probability of occurring, impact, status, revision, monitoring dates, and action plan;

e) Qualitative and quantitative assessment is performed as part of the risk management process;

f) Contingency is calculated based on the risk register and project uncertainty, depending on the stage of the project; and

g) Monte Carlo simulations are applied in the contingency calculation (cost and risk management).

Objective 3 – Effectiveness

3.83. Considered overall, we found P&M's risk management to be **effective**, in all material respects.

3.84. Specifically, we observed elements of effectiveness, including:

a) The risk management tools and the results from the analysis are used by P&M in their decision-making process for the projects;

b) Risk identification uses lessons learned from previous projects, as well as OPEX reports; and

c) The qualitative and quantitative analysis results in a comprehensive risk register, which includes description(s) of the risk, the responsible manager, an action plan, and a timeline to monitor the risk.

J. Reporting

3.85. Table 19 summarizes our Audit results for each of the Audit Objectives as it relates to the Reporting area within the Audit Framework.

Table 19
Reporting – Overall Audit Results

Objective	Results
Procedures	Fully aligned
Implementation	Implemented
Effectiveness	Effective

Objective 1 – Procedures

3.86. Considered overall, we found that P&M's reporting procedure is **fully aligned** with industry recommended practices, in all material respects.

3.87. Specifically, we observed that the reporting procedures incorporates elements including:

a) Cost and schedule;

b) Performance measurement; and

c) Standards and templates.

Objective 2 – Implementation

3.88. Considered overall, we found P&M's reporting procedure to be **implemented**, but there is one observation for management's consideration.

3.89. We observed elements of reporting procedures were implemented, including:

a) The reports provided by P&M follow its procedures and present the expected information and expected details for the projects;

b) This includes monthly dashboards, integration with the station reports, and a monthly project forecast update;

c) The monthly report (dashboard) uses Earned Value Management System (EVMS) as the primary indicator, i.e. Cost Performance Index (CPI), and Schedule Performance Index (SPI); and

d) Monthly report includes the top risks, top issues/concerns, milestone performance, mitigation action and project forecast (cost and schedule).

3.90. During the presentations, the project managers and project teams were able to adequately answer questions from KPMG on variations in cost and schedule; however, some status reports (e.g. Dashboard Report) did not capture all explanations about why some discrepancies related to schedule and cost occurred.

Observation – Reporting Implementation

3.91. P&M does not provide a consistent explanation pertaining to the variances in the report. The assessed project reports did not explain why some variances existed in cost and schedule.

Explanations regarding the variance should be included in the report. A report should stand on its own.

Objective 3 – Effectiveness

3.92. Considered overall, we found P&M's reporting management to be **effective**, in all material respects.

3.93. Specifically, we observed that P&M uses multiple reports for every project depending on the level of detail required and the intended audience, amongst other things.

K. Lessons Learned

3.94. Table 20 summarizes our Audit results for each of the Audit Objectives as it relates to the Lessons Learned area within the Audit Framework.

Table 20
Lessons Learned – Overall Audit Results

Objective	Results
Procedures	Aligned
Implementation	Fully Implemented
Effectiveness	Effective

Objective 1 – Procedures

3.95. Considered overall, we found that P&M's lessons learned processes documented in the different procedures to be **aligned** with industry recommended practices. There are some observations for management's consideration.

3.96. Specifically, we observed that:

a) The lessons learned requirements align with industry recommended practices;

b) The project management procedure describes the process of collecting lessons learned; and

c) The scope and risk management procedures outline the process of identifying and applying lessons learned from past projects to the new project.

Observation – Lessons Learned Procedure

3.97. P&M's lessons learned processes are documented among different procedures. A stand-alone P&M procedure (or road map document) including all the processes of P&M Lessons Learned would improve the clarity around the recording and use of lessons learned.

Objective 2 – Implementation

3.98. Considered overall, we found P&M's lessons learned processes in different procedures to be **fully implemented**, in all material respects.

3.99. Even though P&M does not have a stand-alone specific procedure for lessons learned, the lessons learned processes included in the various procedures (e.g. scope management, risk management) were fully implemented.

3.100. Specifically, we observed that:

a) P&M records and implements its lessons learned consistently throughout its projects;

b) P&M uses an automated system to store the data and make it accessible to all project managers;

c) P&M uses lessons learned from their internal projects, other projects in OPG, and projects from other organizations (Bruce Power); and

d) P&M also use OPEX reports.

Objective 3 – Effectiveness

3.101. Considered overall, we found P&M's lessons learned management to be **effective**, in all material respects.

3.102. Specifically, we observed that the lessons learned documents assessed were comprehensive and included all relevant information from the projects, amongst other things.

4. Restrictions, Independence and Objectivity

Restrictions

4.1. In preparing this Report, we have reviewed and relied upon the documents in Appendix E.

4.2. Our review focuses on procedures and project-specific documents that were provided to KPMG, and workshops held with P&M's project management teams. Evidence of the implementation of key control activities generally focused on what we understand to be the most recent performance of the control activity and after the implementation of the new procedures).

4.3. We have not performed any verification of the documents and information listed in Appendix E

4.4. Our review was limited to, and our recommendations are based on, the procedures conducted. The scope of our engagement was, by design, limited to the OEB's directive, and therefore the observations and recommendations should be considered in the context of the procedures performed. In this capacity, we are not acting as external auditors for financial purposes nor value for money auditors and, accordingly, our work does not constitute an audit, examination, value for money, attestation, or specified procedures engagement in the nature of that conducted by external auditors on financial statements or other information and does not result in the expression of an opinion on any financial information of a nature conducted by external auditors on financial statements.

4.5. Other than in the event that our Report is filed with the OEB in connection with OPG's next cost-based application, our Report is privileged and confidential and is not intended for general circulation or publication nor is it to be reproduced or used for any purpose other than as outlined herein without our prior written permission in each specific instance. For the avoidance of doubt, other than in respect of the aforementioned OEB proceeding, our Report may not be disclosed, copied, quoted or referred to in whole or in part, whether for purposes of other litigation, disciplinary proceedings or otherwise, without our prior written consent in each specific instance, other than as noted above. We do not assume any responsibility for any losses occasioned to Torys or any other parties as a result of the circulation, publication, reproduction or use of this Report contrary to the provisions of this paragraph. Furthermore, we will not assume any responsibility or liability for any costs, damages, losses, liabilities, expenses incurred by anyone else as a result of circulation, publication, reproduction, use of or reliance upon our Report.

4.6. We believe that our analyses must be considered as a whole and that selecting portions of our analyses and of the factors considered by us, without considering all factors and analyses together, could create a misleading conclusion.

4.7. Comments in our Report are not intended, nor should they be interpreted to be legal advice or opinion, as we are not qualified to provide such advice or give such an opinion.

Independence and Objectivity

4.8. The members of the KPMG engagement team are independent of OPG and are acting objectively. The KPMG engagement team has no present or contemplated interest in OPG, nor is any member of the engagement team an insider or associate of OPG or their affiliates.

4.9. Moreover, our fees for this engagement are not contingent upon our findings or any other event.

Yours very truly,

Ms. Janet Rieksts-Alderman
Partner
KPMG LLP

Appendix A: Subject matter expert qualification

Janet Rieksts-Alderman	
Title	Partner, Leading Major Projects Advisory Practice, Risk Consulting, and Co-Leader Board Leadership Center KPMG Canada
Highlights of experience	– Ms. Rieksts-Alderman possesses more than 20 years of experience in asset-intensive organizations and 15 years in reviewing and auditing Capital Projects, including having served as a subject matter expert in construction claims and disputes. – She has been instrumental in developing project audit methodologies used by significant organizations, including global consulting firms. She routinely provides training on both major and mega project audit methodology. – She has also advised numerous public and publicly accountable organizations with significant capital project portfolios on Project Management Office setup, effectiveness, and overall governance. – Ms. Rieksts-Alderman co-leads the Board Leadership Centre for KPMG Canada, routinely advising on Capital Project Governance. Additionally, she has served as a Board and Advisory Board member for organizations with major and mega (billion plus dollar) Capital Projects.
Designations	– Certified Public Accountant (CPA) – Certified Management Accountant (CMA) – Certified in Control Self-Assessment (CCSA) – Master of Business Administration (MBA)
Professional accreditations/ associations	– Chartered Professional Accountants Canada (CPA) – Certified Management Accountants of Canada (CMA Canada) – The Institute of Internal Audits (IIA) – North America – Project Management Institute (PMI) – Canada Member
Description of experience and expertise	Janet Rieksts-Alderman is a Partner leading Major Project Advisory in KPMG's Risk Consulting practice. She specializes in project performance, risk, and governance. Janet has more than 20 years of experience working in the area of capital project risk and asset-intensive organizations. She has led major and mega project reviews in large, international public and publicly accountable organizations. She advises at all levels of the organization including the audit committee and board. She has also served as a subject matter expert in construction claims and disputes and project performance. Industries include utilities (including nuclear), energy, real estate and infrastructure, ports, shipbuilding, transportation, mining, financial services, insurance, manufacturing and government (including hospitals, schools and

Janet Rieksts-Alderman	
	P3's). Client locations include Canada, United States, South and Central America, Asia, Australia, and the United Kingdom. Former board member of Waterfront Toronto, Acting Chair, Chair of Audit Committee (overseeing $1.2B Port Lands Project), Chair of Governance Committee, Chair, CEO Selection Committee; TAS Design Build, Advisory Board Member. – Developed governance structures for $30B+ downstream oil and gas project. – Developed governance structures and KPIs for a Canadian portfolio of P3 projects on behalf of an insurer and re-insurer. – Construction claim support for oil and gas major – $200M project in the United States. – Review of capital project processes for International Construction Company. Review included the following areas of business: Nuclear, Mining, Infrastructure and Concessions. – Capital Project Processes and Procedure Audit of billion plus dollar Copper Mine. – Claims and Disputes Expert Report – 100 million-dollar aromatics project for Global Oil and Gas company. – Project Management Office Audit – Canadian Municipality with a portfolio size of over $900 million
Number of years of experience	20+

Norman Boyter	
Title	Nuclear Subject Matter Expert
Designations	Master of Science (MSc.)
Academic training	– Master of Science, Nuclear Engineering – North Carolina State University – Bachelor of Science, General Engineering – United States Military Academy, West Point
Description of experience and expertise	Mr. Boyter is a subject matter expert in the nuclear industry with more than 40 years of experience in operations, maintenance, licensing, engineering, construction, and project management on commercial and government nuclear plants and facilities in the US, Korea, China, and Philippines. His experience ranges from hands-on home office and field positions for nuclear plant operations; maintenance and outage management; and new plant engineering and construction, up to the executive-level positions, including proposal development, contract negotiations, claims settlement

Norman Boyter	
	and dispute resolution on plants and projects such as: US Naval Reactors S1W; US Nuclear Plant Unit 2, Arkansas No. One; Korea KORI II; Philippines Nuclear Power Plant Unit 1; US TVA Sequoyah Nuclear Plant; US DOE Defense Waste Processing Facility; US DOE N Reactor; and US AP1000 Vogtle Units 3 and 4. Boyter also served as a US Nuclear Regulatory Commission "Reactor Operations and Start-up Inspector" for the start-up of a new US nuclear power plant.
Number of years of experience	40+

William Carnes	
Title	Nuclear Subject Matter Expert
Designations	– Master of Business Administration (MBA) – Engineering Officer of the Watch (EOOW)
Professional accreditations/ associations	Project Management Institute (PMI) – former member
Academic training	– Master of Business Administration – Auburn University – Bachelor of Science, Civil Engineering – University of Michigan – Bachelor of Science, Electrical Engineering – University of Michigan – Bachelor of Science, Mechanical Engineering – General Motors Institute
Description of experience and expertise	Mr. Carnes is a subject matter expert in the nuclear industry. He possesses more than 40 years of experience with a specific focus on power plant project management, design, construction, manufacturing, licensing, operations, and decommissioning. He is also experienced in production metal casting and waste incineration, both commercial and nuclear. Mr. Carnes has more than nine (9) years of international experience related to nuclear power plant project management, construction, decommissioning, and component manufacturing. His international experience spans countries including the US, Bulgaria, Spain, Ukraine, Taiwan, Philippines and South Korea. Major nuclear projects / plants worked on include: Naval Reactors Facilities (USA); Waterford III NPP(USA); Allens Creek NPP (USA); Kori-2 NPP (South Korea); Philippines NPP (Philippines); Vogtle NPP units 1-2 (USA); Chernobyl NPP (Ukraine); Kozloduy NPP; and AP1000 NPPs (China – Haiyang and Sanmen, V.C. Summer and Vogtle).
Number of years of experience	40+

Appendix B: Detailed Audit Results

Appendix B: Detailed Audit Results

Ontario Power Generation Project and Modifications Project Management Audit

✓ Control or process in place
- Control or process partially in place
✗ Control or procedure not in place
⊘ Control or process not applicable to the project

Detailed Audit Results

No.	Project Management Area	Procedure Criteria (i.e. Industry-Recommended Practices)	Project No. 31412			Project No. 49168			Project No. 31535			Project No. 80022			Project No. 83296			Project No. 31710			Project No. 73566			Project No. 83072			Project No. 80126			Project No. 83298		
1	GOVERNANCE		Procedure	Implementation	Effectiveness	Procedure	Implementation	Effectiveness	Procedure	Implementation	Effectiveness	Procedure	Implementation	Effectiveness	Procedure	Implementation	Effectiveness	Procedure	Implementation	Effectiveness	Procedure	Implementation	Effectiveness	Procedure	Implementation	Effectiveness	Procedure	Implementation	Effectiveness	Procedure	Implementation	Effectiveness
1.1	Project Management	The high-level guidelines for the Project Management Plan development and implementation is described including all the management areas, the schedule of authority, and all the phases of the projects.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1.2	Phase-Gate Management	All gates include the specific information required to proceed with the project; the stakeholders and approvers are identified.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1.3	Governance - Overall		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	SCOPE MANAGEMENT																															
2.1	Plan Scope	The process for planning scope includes requirements for input from project charter, project management plan, and organizational process assets, including lessons learned and historical information, to determine how the scope will be managed throughout the project.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2.2	Collect Requirements	All stakeholder needs and requirements are collected to determine a requirements list and traceability matrix. This can be completed via conducting brainstorms, interviews, surveys or holding focus groups.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2.3	Define Scope	Scope definition involves confirmation of the project/product description, requirements and desired results using tools like alternatives analysis, requirements and systems analysis and value engineering to develop a detailed scope statement. The detailed scope statement needs to include the scope description, acceptance criteria, deliverable list and project exclusions.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓
2.4	Create WBS	The WBS is created by decomposing the project deliverables and project work, contained in the scope statement, into smaller and more manageable components. The WBS is then utilized to create project work packages. The WBS along with the WBS dictionary and approved scope statement forms the scope baseline.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2.5	Validate Scope	Scope validation involves the formalized acceptance of completed deliverables and their adherence to the acceptance criteria. Adherence to the acceptance criteria can be validated by conducting reviews and inspections.	✓	✓	✓	✓	✓	✓	✓	⊘	✓	✓	✓	✓	✓	⊘	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2.6	Control Scope	Scope control involves monitoring and managing the project scope and any changes to the scope baseline, ensuring all requested changes and recommended actions are processed through the integrated change control process. Scope control can be achieved by performing analysis like trends and variance analysis to determine the scale of deviation from the scope baseline.	✓	✓	✓	✓	✓	✓	✓	⊘	✓	✓	✓	✓	✓	⊘	✓	✓	✓	✓	✓	⊘	✓	✓	⊘	✓	✓	⊘	✓	✓	✓	✓
2.7	Scope Management - Overall	Project Scope Management includes the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully. Managing the project scope is primarily concerned with defining and controlling what is and is not included in the project.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	COST & ESTIMATING MANAGEMENT																															
3.1	Plan Cost Management	This process' primary output is a cost management plan that defines how project costs will be estimated, budgeted, managed, monitored and controlled. The plan is expected to include tools and techniques that will be utilized by the project including items such as control thresholds, guidelines for performance measurement, reporting formats and levels of precision and accuracy.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3.2	Estimate Costs	This quantitative process develops an approximate cost for the resources needed to complete the project. It is an iterative process with the cost estimates refined as more project details are made available. Estimating techniques such as analogous estimating, parametric estimating, bottom-up estimating and three-point estimating may be utilized. The process outputs include an overall cost estimate along with the basis behind the cost estimates.	✓	⊘	⊘	✓	⊘	⊘	✓	⊘	⊘	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3.3	Determine Budget	The budget is determined by rolling up the estimated costs of individual activities or work packages to establish an authorized cost baseline. Expert judgement along with techniques like cost aggregation and historical information review may be utilized to determine the budget. Project funding requirements and their associated timings is a result of this process.	✓	⊘	⊘	✓	⊘	⊘	✓	⊘	⊘	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3.4	Control Costs	Cost control entails monitoring of project costs and management of changes made to the cost baseline. Controlling cost requires use of performance controls like earned value analysis, variance analysis, trend analysis or reserve analysis. The analysis performed will help determine the cost forecast which could result in changes to the cost baseline.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3.5	Cost Management - Overall	Project Cost Management includes the processes involved in planning, estimating, budgeting, financing, funding, managing, and controlling costs so that the project can be completed within the approved budget.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	SCHEDULE MANAGEMENT																															
4.1	Plan Schedule Management	This process leads to the development of the schedule management plan. This plan should include details such as, scheduling methodology and tools to be used for the project; schedule release and iteration management; units of measure; level of accuracy; rules of performance measurement; reporting formats and control thresholds.	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓
4.2	Define Activities	Activity definition is the process of identifying the steps that need to be performed to produce the project deliverables. Techniques such as decomposition and rolling wave planning can be employed to develop the activity and milestone list and activity attributes.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4.3	Sequence Activities	Activity sequencing is the identification and documentation of linkages between defined project activities. Sequencing activities may utilize tools like the precedence diagramming method, accounting for dependencies and leads and lags. The sequenced schedule network contributes to the activity and milestone list and can be graphically represented in a project schedule network diagram.	✓	⊘	✓	✓	⊘	✓	✓	⊘	✓	✓	⊘	✓	✓	⊘	✓	✓	✓	✓	✓	⊘	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4.4	Estimate Activity durations	This quantitative process estimates the amount of time required to complete an activity with estimated resources. This may be achieved using expert judgement and techniques like: • Analogous Estimating: uses historical data from similar activities or projects • Parametric Estimating: combination of historical and statistical methods • Three Point Estimating: uses a blend of most likely scenario, best case and worst case scenarios • Bottom-Up Estimating: aggregation of estimates of the lower level components of the WBS The end result of the process is to have activity duration estimates and the basis for each of the estimates.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4.5	Develop Schedule	Schedule development is the process of developing a schedule model for project monitoring and execution, which may require the use of tools and techniques like: • Schedule Network Analysis • Critical Path Method: used to estimate the minimum project duration and determine schedule flexibility within the schedule model • Resource Optimization: uses tools like resource leveling and smoothing • Schedule Compression: uses tools like crashing and fast tracking The end result of this process would be a project schedule that would be considered a baseline.	✓	-	✓	✓	⊘	✓	✓	⊘	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	⊘	✓	✓	-	✓	✓	-	✓	✓	✓	✓	✓
4.6	Control Schedule	Schedule control entails the monitoring of the project baseline schedule and management of changes made to it. The schedule can be controlled using techniques like: • Data Analysis: using tools like Earned Value Analysis, trend and variance analysis and an Iteration Burndown Chart • Critical Path Method • Resource Optimization • Schedule Compression The analysis performed will help determine the schedule forecast which could result in changes to the baseline.	✓	✓	✓	✓	✓	✓	✓	⊘	✓	✓	⊘	✓	✓	⊘	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	⊘	✓
4.7	Schedule Management - Overall	Project Schedule Management includes the processes required to manage the timely completion of the project.	✓	-	✓	✓	-	✓	✓	✓	✓	✓	-	✓	✓	-	✓	✓	✓	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	✓	✓
5	CHANGE MANAGEMENT																															
5.1	Identify the Change	Once a change is identified it should be formalized and should include impact on scope, cost, and schedule performance baselines as well as to identify any documents that will be affected by this change.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
5.2	Review Change Requests	The Change Control Board (CCB) should be established as a formally chartered group responsible for reviewing, evaluating, approving, delaying, or rejecting changes to the project, and for recording and communicating such decisions. Data Analysis (alternatives and cost-benefit analysis) and decision making (voting, autocratic decision making and multicriteria decision analysis) should be used to accept or reject changes. Decisions and the associated basis needs to be documented in the change log.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
5.3	Implement the Approved Change	The approved change request may be a corrective action, a preventive action, or a defect repair. Approved change requests are scheduled and implemented by the project team and can impact any area of the project or project management plan.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
5.4	Change Management - Overall	Change management includes the process of reviewing all change requests; resolving changes and managing changes to deliverables, project documents, and the project management plan; and communicating the decisions.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6	CONTRACT MANAGEMENT																															
6.1	Contract Planning	This process involves determining the work that needs to be contracted out. The scope of work as well as specifications should be developed in this process, which will be used when issuing request for quotations (RFQ) or request for proposals (RFP).	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6.2	Contract Award	In this process the proposal responses are evaluated and the successful proponent to complete the work is selected. The primary output of this process is a completed contract document that is awarded and agreed to with the selected proponent.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6.3	Contract Administration	This process relates to the execution of the signed contract, ensuring the contractors compliance to the agreed upon terms in the signed contract. Changes to the contract may occur and should be managed too.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6.4	Contract Closeout	The deliverables specified in the signed contract needs to be verified in this process prior to closing out the contract in this process.	✓	⊘	⊘	✓	✓	✓	✓	⊘	⊘	✓	⊘	⊘	✓	⊘	⊘	✓	⊘	⊘	✓	⊘	⊘	✓	✓	✓	✓	⊘	⊘	✓	✓	✓
6.5	Contract Management - Overall		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
7	PROCUREMENT MANAGEMENT																															
7.1	Plan Procurement Management	The process to plan for procurement is completed by getting inputs from the project charter, project management plan and organizational process assets. The plan should among others contain a timetable of procurement activities, procurement metrics to manage contracts and the type of bidding that will be used. The procurement strategy, bid documents and procurement statement of work needs to be completed too.	✓	⊘	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
7.2	Conduct Procurements	This is the process of receiving and evaluating seller responses, leading to the selection of a seller and contract award. Specific techniques to complete this process include bidder conferences, proposal evaluations and negotiations. The end results of the process are the established agreements including formal contracts with selected vendors.	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
7.3	Control Procurements	Procurement control involves managing and monitoring vendor relationships, contract performance, contract amendments and closeout of contracts. This may be achieved by audits, inspections and claim administration as needed and would result in closed procurements and change requests.	✓	✓	✓	✓	✓	✓	✓	⊘	✓	✓	⊘	✓	✓	⊘	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
7.4	Procurement Management - Overall	Project Procurement Management includes the processes necessary to purchase or acquire products, services, or results needed from outside the project team. Project Procurement Management includes the management and control processes required to develop and administer agreements such as contracts, purchase orders, memoranda of agreements (MOAs), or internal service level agreements (SLAs).	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
8	QUALITY CONTROL & SAFETY																															
8.1	Plan Quality Management	The quality management plan is required to define project quality standards, quality objectives, quality roles and responsibilities, deliverables and processes subject to quality review; quality control and quality tools to be utilized for the project. It is imperative to determine quality metrics too.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
8.2	Manage Quality	Managing quality involves translating the quality management plan into specific quality activities. This requires the use of data analysis tools (Ex. process and root cause analysis); data representation techniques (affinity, fishbone, matrix and scatter diagrams); audits and quality improvement methods. These analyses result in quality reporting, test and evaluation documentation for evaluating conformance to quality objectives.	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	✓	✓	✓	✓	⊘	⊘	✓	⊘	⊘	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	⊘	⊘
8.3	Control Quality	This process requires the use of checklists/check sheets, sampling and questionnaires or surveys to control quality and to verify that project deliverables meet the requirements prior to final acceptance. Inspections, meetings and reporting of results may also be used to complete this process.	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	✓	✓	✓	✓	⊘	⊘	✓	⊘	⊘	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
8.4	Quality Management - Overall	Project Quality Management includes the processes for incorporating the organization's quality policy regarding planning, managing, and controlling project and product quality requirements in order to meet stakeholders' objectives. Project Quality Management also supports continuous process improvement activities as undertaken on behalf of the performing organization.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
9	RISK MANAGEMENT																															
9.1	Plan Risk Management	This process includes the development of a risk management plan which needs to contain the following items: • risk strategy and methodology; approach to managing project risks • timing of project risk exercises • risk categories • stakeholder risk appetite • definition of risk probability and impact • reporting formats • tracking documents and requirements	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
9.2	Identify Risks	This process identifies individual project risks and sources of overall project risks. Tools for identifying risks includes input from experts, stakeholder brainstorming and data analysis like root cause analysis, SWOT analysis, assumption and constraint analysis. The main output is a project risk register including a list of identified risks, their owners and associated risk responses.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
9.3	Perform Qualitative and Quantitative Risk Analysis	Identified risks are to be evaluated from a qualitative and quantitative point of view. A qualitative analysis should assess the probability of occurrence and the impact of the identified risks using techniques like risk categorization and data analysis and representation. The quantitative analysis should determine the numerical impact of project risks. This can be completed using tools like simulations, influence diagrams and sensitivity and decision tree analysis.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
9.4	Plan Risk Response	This is the process of developing options; selecting strategies for threats, opportunities and overall project risk; as well as agreeing on actions to address overall project risk.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
9.5	Implement Risk Responses	Using expertise from experienced individuals, in this process, agreed upon risk responses need to be implemented. This could result in changes to cost and/or schedule baselines. Furthermore, the issue log, risk register and lessons learned register needs to be updated.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
9.6	Monitor Risk	In this process this project is continuously monitored for new, changing and outdated project risks. Data analysis and audits should be conducted to monitor risk and the effectiveness of the risk management process.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
9.7	Risk Management - Overall	Project Risk Management includes the processes of conducting risk management planning, identification, analysis, response planning, response implementation, and monitoring risk on a project.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
10	REPORTING																															
10.1	Report Data	The information collected and compiled throughout the project lifecycle should be presented in the form of reports. These reports should include items such as key performance indicators, cost and schedule details and significant risks. These reports could raise issues and action and enable decision making.	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
10.2	Communication	The protocols of communication should include the channels, levels and audience each report should have.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
10.3	Reporting - Overall		✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
11	LESSONS LEARNED																															
11.1	Collecting Lessons Learned	Tools and processes used to identify and collect the lessons learned from the projects.	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓
11.2	Lessons Learned storage	Data base used to store the lessons. It should be of easy access and with searching tools to facilitate the lessons learned search.	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓
11.3	Use of Lessons Learned	Use of lessons learned from past projects.	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓
11.4	Lessons Learned - Overall		-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓

Appendix C: Project-specific documents assessed

Type of Document Assessed	Number of Documents Assessed
Presentation	6
PM Procedure	10
Project Basic Info	10
Org Chart	22
Stakeholder list	18
Project Life Cycle	
Gate Approval Status	10
Approved Documents	61
Scope	
SOW Statement	41
WBS Dictionary	2
Charter	13
Execution Plan	21
Cost Info	
CBS	1
Approved Cost Estimate	13
Basis of Estimate	20
Change Log	54
Contingency	
Original and Available Today	7
Basis of Contingency	13
Schedule	
Basis of Schedule	28
Original Approved Schedule	23
Current Approved Schedule	16
Schedule Updates	16
Look Ahead Schedule	9
Change Log	1
POs and Contracts	
Contract Strategy	12
RFP	24
Major Contracts	14
POs	9
Risk	
Original Risk Register	8

Type of Document Assessed	Number of Documents Assessed
Risk Register	10
Status Report	
Monthly	10
Integration with Station	53
Dashboards	19
Design Plan	23
Construction Work Package	19
Lesson Learned	40
Safety Report	10
TOTAL	**666**

Appendix D: Interview session minimum requirements

Project Overview:

A. Project Basic Information
   a. Project No., Project Title, Station, Phase, Vendor
   b. Project Manager, Project Director, Project Controls Manager
   c. Project Driver (regulatory requirement, equipment replacement, etc.)
   d. Project Charter
   e. Project Organization Chart and Roles & Responsibilities
   f. Total Funds Released: Budget, LTD Actuals, and Percent Spent
   g. Budget At Completion, Estimate at Completion
   h. Final AFS Milestone: Description, Baseline Date, and Current Forecast Date
B. Cost Baseline (summary at major cost account level)
   a. Original Budget and date approved
   b. Current Baseline and data date
C. Project Contingency
   a. Total Approved for Project
   b. Total Allocated/Approved for utilization
D. Project Schedule: Present and explain Current Stats versus Approve Baseline Schedules
E. Estimated Total Project Percent Complete to date
F. Project Life Cycle: Review/explain the following information on the last or currently approved Gate Base Case Summary (BCS):
   a. Gate Number or Category, Date BCS Approved
   b. Funding Released: Base With Contingency and Contingency
   c. Total Project Cost
      i. Previous Value: Base and Contingency
      ii. Current Value: Base and Contingency
   d. Variance Analysis Between Previous and Current BCS: for each summary cost account provide:
      i. Amount Spent to Date
      ii. Last BCS Approved Amount
      iii. New BCS Approved Amount
      iv. Variance
      v. Explain

Project Deliverable Status:

Present the current project status of the key deliverables for the below list of project functional areas based on the comparison of the number of required work products to the number of completed work products as of the status date:

A. Engineering: Quantity of Documents Issued for Procurement, Construction, and Testing
    a. Total Required/Planned by categories 1, 2, and 3
    b. Total Issued/Approved for use by 3 categories to date
B. Procurement: Purchase Orders
    a. Total Required/Planned
    b. Total Awarded to date
    c. Total Shipped/Received to date
C. Construction: Work Packages
    a. Total Required/Planned
    b. Total Released to Date
    c. Total Completed to date
D. Testing: ITPs
    a. Total Required/Planned
    b. Total Issued to date
    c. Total Received to date
E. Safety – reportable injuries
    a. Target for year
    b. Actual to date
F. Closeout reports
    a. Lessons learned reports
    b. Available for Service reports
    c. Project Closeout reports

Project Performance Analysis

A. Provide/Explain the following Earned Value Metrics:
    a. Planned Value (PV) = BCWS
    b. Earned Value (EV) = BCWP
    c. Actual Cost (AC) = ACWP
    d. Schedule Performance Index (SPI)
    e. Cost Performance Index (CPI)
    f. Cost Variance (CV)
    g. Budget Variance (BV)
    h. Schedule Variance (SV)
    i. Forecast Variance

B. Baseline Change Control
    a. Cost Baseline
        i. Original and Currently Approved
        ii. List of Changes, Cause of Change, Amounts, and Dates
        iii. Estimates and Basis of Estimates
    b. Schedule Baseline
        i. Original and Currently Approved
        ii. List of Changes, Cause of Change, Amounts, and Dates
    c. Contingency
        i. Original and Currently Available
        ii. List of Changes, Cause of Change, Amounts, and Dates
    d. Business Case Summary (BCS)
        i. Current – Latest Copy
        ii. Previous versions as available

C. Risk Register and Tally/Numbers for
    a. Total Risks
    b. Number that has had mitigation actions taken
    c. Number that has had mitigation actions complete
    d. Risk to contingency correlation/analysis results

D. Engineering and Quality Performance Metrics
   a. Engineering
      i. Total number of revisions to Design Engineer Change documents
      ii. Total number of Field Initiated Change (FIC) requests
      iii. Average age or time from receipt to the approval of FICs.
   b. Quality
      i. Total number of Non-Conformance Reports (NR)
      ii. Average age or time from initiating an NR until approved to work.

E. Regulatory
   a. Regulatory commitments for the project
   b. List of Open Regulatory Issues and date will impact schedule if not closed
   c. Estimated date to close open issues

Major Issues or Constraints to Meeting Project Costs and Schedule Baselines

A. List

Appendix E: Requested project-specific documents

1. Project Management Procedures (Scope, Cost, Schedule, etc.)
2. Project Basic Information (one filled table for each project)

Project No.	
Project Manager	
Project Phase	
Project Title	
Project Director	
Station	
Vendor	
Original Budget CAD (k)	
Budget at Completion CAD (k)	
LTD Actuals CAD (k)	
Estimate at Completion CAD (k)	
Total Funding Released CAD (k)	
Final AFS	
Milestone Description	
Baseline Date	
Forecast Date	

   a. Project Organization Chart and Roles and Responsibilities
   b. Stakeholders' List

3. Project Life Cycle and Gate Process
   a. Fill-in below table on Gate Approval Status or provide information in another table.
   b. Include complete copies of the listed Approval Documents (include BCSs)

Phase Gate	Planned Gate Approval Date	Actual Gate Approval Date	Approval Document	Baseline TPC (xK) $ with Contingency	Baseline Final AFS Date	Total Contingency X K $
0						
1						
2						
3						
4						
5						

4. Project Scope
    a. Scope of Work Statement (SOW)
    b. Work Breakdown Structure (WBS) and its dictionary
    c. Project Charter
    d. Project Execution Plan
5. Project Cost Management
    a. Cost Breakdown Structure (CBS)
    b. Original approved Cost Baseline Estimate
    c. Basis of Estimate (BOE)
    d. Current approved Baseline Cost Estimate
    e. Change Documents for changes from Original to Current Baseline Cost Estimate
    f. Contingency
        i. Original Amount and Available Today
        ii. Basis of Contingency (Risk analysis correlation results)
        iii. Change Documents
6. Project Schedule Management
    a. Basis of Schedule
    b. Original approved Schedule Baselines from OPG and Contractors (all levels in pdf and xer)
    c. Current approved Schedule Baselines from OPG and Contractors (all levels in pdf and xer)
    d. Current approved Schedule Updates and their Schedule Narrative from OPG and Contractors (all levels in pdf and xer)
    e. Look Ahead Schedules
    f. Schedule changelog
7. Project Procurement and Contracting
    a. Contract Strategy
    b. RFP
    c. Major Contracts (E, P, and C)
    d. List of Equipment Purchase orders
8. Project Risk Management

   a. Original approved Risk Register
   b. Current Risk Register with the mitigation status
9. Project Status Reports
   a. Monthly Reports (including narrative)
   b. Station and Project Integration/Coordination Reports (including narrative)
   c. Reports and Dashboards used to communicate the Project status to different levels of OPG (including Key Performance Indicators, Project Forecast, Estimate to Complete, etc.)
10. Design Plan
11. Construction Work Package Status (list)
12. Lessons Learned Documents
13. Safety Reports (last two months)

Appendix F: Abbreviations list

Abbreviation	Definition
AACE	The Association for the Advancement of Cost Engineering
BCS	Business Case Summaries
CPI	Cost Performance Index
EVMS	Earned Value Management System
FE	Field Engineering
FIPR	Field Installation Package Release
ITP	Inspections and Test Plan
KPMG	KPMG LLP
NR	Non-Conformance Reports
OPG	Ontario Power Generation
OEB	Ontario Energy Board
OPEX	Operational Experience
P&M	Projects and Modifications Group
PMBOK	The Project Management Book of Knowledge
PMI	Project Management Institute
PMP	Project Management Plan
RFP	Request for Proposal
RMO	Risk Management Oversight
RMP	Risk Management Plan
SOW	Scope of Work
SPI	Schedule Performance Index
SWOT	Strengths, Weaknesses, Opportunities and Threats
Torys	Torys LLP
WBS	Work Breakdown Structure