OPG CONFIDENTIAL

ONTARIO POWER GENERATION

Internal Audit

Project Controls Audit - Project & Modifications Group

March 9, 2016

Report Rating: **Requires Improvement**

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1.0 EXECUTIVE SUMMARY

1.1 Summary of Internal Audit Findings

Report Rating: **Requires Improvement**

No.	Finding	Risk Type	Risk Rating[1]		
			High	Moderate	Low
1	Project estimates are not at a sufficient level of accuracy prior to the execution phase.	Financial	x		
2	Cost and Schedule Control Baselines ("CSCB's") are not keeping pace with approved project changes.	Operational		x	
3	A Gating Process for AISC Portfolio Projects has not been formally implemented.	Operational		x	
4	Governance and Procedures specific to AISC projects require improvement.	Operational			x
Total			**1**	**2**	**1**

1.2 Background

The Projects and Modifications ("P&M") Group, part of the Nuclear Projects Organization, is responsible for the management and execution of Operations, Maintenance and Administration ("OM&A") and Capital Projects supporting the Darlington and Pickering Nuclear Generating Stations and Western Waste Facility. The P&M Group has a total project portfolio of $1.1B over the three year period from 2015 through to 2017. The projects that the Asset Investment Steering Committee ("AISC") manages total $833M, with the remaining portfolio related to projects supporting the Darlington Nuclear Refurbishment ("DNR") Project. DNR Projects are executed using the Nuclear Project's Project Management framework which has different requirements than is currently used on the AISC projects, which follows Finance governance. To address these differences, a "Project Excellence" initiative is now in place and includes the development of a common set of standards for all projects across Nuclear. This initiative had just started at the time of the audit.

The AISC is a committee that meets to review, prioritize and provide budgets for sustaining projects for OPG's Nuclear Generating Stations. The committee works in conjunction with business line sponsors to prioritize and recommend projects for approval in accordance with business objectives.

Given the high value of P&M's AISC project portfolio and the critical role these projects play in OPG's on-going nuclear operations, this audit was performed as part of Internal Audit's ("IA's") cyclical audit program.

[1] Please refer to Appendix D for risk rating definitions

1.3 Audit Objective & Scope

The objective of this audit was to assess the design and operational effectiveness of project management controls implemented by the P&M Group to support timely completion of the current portfolio of AISC projects in a manner that achieves project goals.

The scope of the audit included a review of processes and testing, on a sample basis, to determine whether:

A. Governance & Procedures

1. Policies and procedures for project control processes have been established and reflect current practices;
2. Roles and responsibilities for project control processes have been clearly defined.

B. Planning

1. Each project has a valid Business Case Summary ("BCS") which has been approved by the ASIC;
2. A Project Charter and Project Management Plan ("PMP") has been developed, approved, and communicated;
3. The project scope has been clearly defined, with the input of key stakeholders and approved;
4. An appropriate Work Breakdown Structure ("WBS") has been developed which identifies all work to be performed by the project and its deliverables;
5. A schedule has been created that considers resource requirements;
6. The schedule is structured in accordance with the project's WBS, built upon the logical division of work by cost accounts, work packages;
7. The schedule integrates and identifies interdependencies between activities, including critical path as appropriate;
8. Costs are planned, structured, controlled and reported based on the project's WBS, Cost Accounts, and Work Packages;
9. Risks are formally identified with mitigation plans and managed with periodic reviews and updates throughout the project; and
10. Contingency amounts are assigned, formally tracked and appropriately approved when released.

C. Execution

1. Schedule monitoring and control has been established on the project;
2. Schedules are updated on a timely basis and accurately reflect the current status of all deliverables, activities, interdependences and timelines across the project;
3. Performance Metrics have been adopted on the project and are reported to management (e.g. Schedule Performance Index, Cost Performance Index, etc.);
4. The project has a material procurement schedule or tracking sheet representing the receipt of materials, equipment and prefabricated items;
5. Scope, cost, schedule, and contingency changes are managed and approved through a change management process;
6. Forecasts are generated and reviewed for expected variances to plan;
7. Completion of work packages is validated including quality requirements;
8. Projects are executed in accordance with OPG's quality requirements; and
9. Projects are assessed for completeness of scope, cost, schedule and quality objectives, and approved by project sponsors prior to close-out.

D. Reporting

1. Costs are accurately coded to projects to allow for proper tracking;
2. Cost, quality and schedule performance is accurately measured and reported to management on a timely basis. Variances and mitigation efforts to recover on these variances are explained and reported in a complete fashion;
3. Post-implementation reviews are performed to validate that completed projects have met their objectives and to gather lessons learned for future projects; and
4. System access to reporting systems are controlled and monitored.

The scope of the audit included an evaluation of thirteen projects (see Appendix A) from P&M's AISC Portfolio up to the end of September, 2015. Projects were selected based on size, facility, and phase to ensure a cross-section of the population.

1.4 Conclusion

Positive Observations

- The P&M Group is in the process of implementing several changes to their project management framework to align with the revised Nuclear Projects governance, including adopting more up-front planning activities prior to execution; and

- The P&M group's project management team were found to be highly knowledgeable concerning project management principles and how to deploy them on their projects.

Key Findings and Recommendations

The audit has noted the following key findings:

- Project scope definition and estimate accuracy is sometimes insufficient for the start of a project's execution phase. This has caused significant variances to project estimates on several AISC projects. The P&M group should ensure, through implementation of its new gating process, that an AACE[2] Class 3 or better estimate for the project is developed, approved and established as a baseline prior to the start of execution phases. The amount of contingency should reflect risks, including the confidence in and the class of estimate;

- Cost and Schedule Control Baselines ("CSCB's") are not keeping pace with approved changes in Business Case Summaries ("BCS's") and Project Change Request Authorization Forms ("PCRAF's"). The P&M Group should evaluate resource requirements and work with its vendors to ensure proper CSCB's are deployed prior to starting work. In addition, a review of the project change management processes should be undertaken as considerable amount of time is required to get approval for changes;

- The plan to change to the Gated Process for AISC Portfolio Projects to facilitate oversight, phased approval and release of project funds has not been fully implemented. The Nuclear Projects group should work with the AISC Chair in the implementation of a gating process for AISC projects, clearly defining the requirements for each gate; and

[2] Association for the Advancement of Cost Engineering ("AACE").

- There are gaps in governance and procedures. For example a Terms of Reference ("TOR") document for AISC should be finalized and reporting for cost and schedule performance should be standardized.

The findings noted in the report have been reviewed with management who has committed to specific action plans to address them. Please refer to Section 2.0 for details of the above findings along with the potential causes, impacts, recommendations and management action plans.

Opportunities for improvement

The P&M group should look at:

- Expanding its use of Earned Value ("EV") techniques such that cost and schedule variances are explained formally by work package, and Cost Performance Index ("CPI") values take on a greater role in cost and forecast management. At present, use of EV techniques have not been fully implemented for AISC projects, although the plan is to implement EV techniques going forward on all new 2016 projects;

- Improving the Contingency Management process utilized in AISC projects such that specific contingency is established and tracked on a per-risk basis. Contingency Tracking Logs should be used to monitor the allocation of contingency on an on-going basis. The confidence level associated with the class of estimate at the various release phases should be considered in contingency development. Management should also review the assignment and ownership of contingency for monitoring and releases; and

- Improving housekeeping efforts on Risk Registers such that risks and risk action items are closed in a timely manner.

2.0 DETAILED AUDIT FINDINGS

1. Project estimates are not at a sufficient level of accuracy prior to the execution phase.	**High**

As per OPG's BCS requirements and the Association for the Advancement of Cost Engineering ("AACE") standards, cost estimates should be developed to at least a Class 3 estimate prior to execution (see Appendix B). For certain projects, a Class 2 estimate may be used as a "check estimate" once construction work packages are complete and just prior to the start of field execution to confirm accuracy of the Class 3 estimate submitted as part of the Execution Phase BCS. In order to come to a more precise estimate, detailed engineering must be substantially complete to determine material and labour requirements.

It was noted that of the six projects sampled in the execution phase, all six projects did not have an Estimate at Completion ("EAC") for the project established at either a Class 3 or Class 2 level and they were still performing detail engineering work while in their execution phase. In some cases, the true EAC value for the entire project is not identified until the project is in the advanced stages of execution when a significant portion of the execution costs have already been incurred. (Refer to Appendix A for sample projects reviewed in the execution phase).

Potential Causes & Impact

Potential Cause:

- The current AISC process, which utilizes Finance Governance, does not mandate the establishment of at least an AACE Class 3 estimate prior to the start of execution governance allows for execution to be released with different class of estimates;
- Business Case Summary documents and governance does not require clearly identifying the class of estimate and the range for the potential costs for the current release and the total project;
- Contingency assigned does not always fully address potential variances associated with the class of estimate;
- Lack of a formal gating process and clear definition of gate requirements; and
- Station requirements for "fast tracking" of projects to address emergent issues.

Impacts:

- Growth in project estimate-at-completion values through the execution phase of the project;
- Insufficient budget assignments when entire cost of project is not defined prior to execution, potentially resulting in deferrals or cancellations of other downstream projects; and
- The decision process to proceed with projects may be based on inaccurate cost/benefit analysis when releases are sought with incomplete cost information.

Recommendations	Management Action Plan	Owner & Target Completion Date
Management should ensure sufficient detailed engineering is completed in the definition phase to yield at least an AACE 3 estimate prior to start of execution and factor in potential variability associated with the class of estimate when establishing contingency in the various phases of the project. The BCS's and reporting of EAC for Definition Phase should provide the approving authorities with the understanding of the ranges of estimate for the release and the total project.	As part of the Nuclear Projects "Project Excellence" initiative, an estimating Centre of Excellence ("COE") is now in place within the Planning and Project Controls group; all 2016 AISC Project New Starts greater than $5 Million will require estimate review by the COE, consistent with the Gated process (See Finding 3). Gated process will also provide increased oversight in the release phase of projects and cost and estimate accuracy and contingency management.	Gary Rose VP Planning and Controls April 30, 2016

2. Cost and Schedule Control Baselines ("CSCB's") are not keeping pace with approved project changes.	**Moderate**

Cost and Schedule Control Baselines ("CSCB's") are the primary control for measuring cost and schedule performance on a project. When setup correctly (i.e. Built upon reliable project estimates and front-end planning), they provide an indication of which work packages on a project are ahead or behind on cost and schedule performance, the magnitude of these variances and their net impact on the overall project.

CSCB's on three out of 13 projects sampled were found not to be keeping pace with cost and schedule baseline changes being requested and approved in Business Case Summaries ("BCS's") and Project Change Request Authorization Forms ("PCRAF's"). The reliability of contractor data has contributed to this issue. This lack of accurate and timely data has contributed to Cost Performance Index ("CPI") measurements being skewed at work package levels.

In addition to the above, two of the projects were found to be without CSCB's entirely. The P&M group has indicated that they are in the process of implementing project planning and control protocols with their Engineer-Procure-Construct ("EPC") vendors to ensure vendor schedules are received at the start of projects and that CSCB's are created, beginning with new project starts for 2016.

Potential Causes & Impact

Potential Causes:

- Less than adequate front-end planning due to a substantially larger work program executed in short time frame;
- Contractors are not providing accurate cost and schedule information as required by the contract. Therefore, cost and schedule are being updated through PCRAFs and BCS' by OPG Cost and Schedule Analysts ("CSA's") who are challenged to keep up with increasing changes;
    - CSA resources are constrained due to competing priorities associated with processing numerous BCS and contingency releases;
- Some station priority projects are fast-tracked with reduced front-end planning that may result in increased changes later in the project; and
- Difficulty incorporating vendor schedules within CSCB's due to the significant volume of scope changes.

Impact:

A CSCB is the primary control mechanism used to manage and control cost and schedule performance on a project. The absence of a current and realistic CSCB may result in potential cost increases and schedule delays.

Recommendations	Management Action Plan	Owner & Target Completion Date
Management should: • Review workloads of CSAs and evaluate resource requirements; • Work with contractors to ensure proper CSCB's are deployed prior to starting work; and • Review the current BCSs and PCRAF approval processes to reduce time for approvals.	P&M is reviewing the Project Controls work processes executed by CSAs in planning and controlling projects and the amount of project work which will be executed by P&M through the Business Plan period. This information will help in determining the resource gap with CSAs. Once the gap has been determined, an appropriate resourcing strategy will be implemented. This review will include the review of BCSs and PCRAF approval processes to determine opportunities to reduce time of approval.	Jamie Lawrie Director, Project Controls September 30, 2016

3. A Gating Process for AISC Portfolio Projects has not been formally implemented.	**Moderate**

A gating process is meant to define a clear list of requirements, deliverables, and expectations a project should follow in order to be granted approval to proceed to its next phase within the typical five phases of a project's life cycle.[3] In addition to the above, a robust gating process also requires that a project be defined and associated work scope be estimated to specified levels of accuracy.

Although the AISC acts as a de facto Gate Review Board for AISC projects, the gating process outlined in the Nuclear Projects governance (N-STD-AS-0028) and Project Management Manual (N-MAN-00120-10001-GRB) has not been fully implemented for AISC projects. At present, the primary control used for gate approval between phases in the AISC project life cycle is the BCS process. While this is an important requirement, the BCS process does not constitute a complete list of all the deliverables required at each gate approval, nor formalize the challenge process that should take place regarding the approval of each deliverable. Management has indicated that they are in the process of formalizing a gating process for AISC projects in Q1 2016.

Potential Causes & Impacts

Potential Cause:
The new Nuclear Projects governance and procedures are high-level principle-based documents which do not specifically address AISC requirements.

Impact:
Potential for cost increases and schedule delays due to insufficient independent oversight and control of project activities and objectives.

Recommendations	Management Action Plan	Owner & Target Completion Date
Management should: • Complete its plans to develop and deploy a formal gating process for P&M use on AISC projects; • Ensure gate review documentation packages are created and maintained as a key part of the gate-approval process; and • Ensure that formal gate reviews and approvals are performed and that required stakeholders such as Finance are involved in the gate review and challenge process.	The Nuclear Projects Gated process will become the standard approach for P&M AISC projects beginning with 2016 Project New Starts. This change has been approved by the SVP/CNE and VP, P&M and an initiative is underway to align and implement the Gated process. Finance will be involved in the gate review process. Implementation requires the following actions: 1. Establish a common Gated process for all Nuclear Projects. 2. Through a Change Management Plan, prepare and issue desktop guides for Project Life Cycle to AISC Members and Project Managers. 3. Preparation and Issuance of AISC Terms of Reference to AISC Members and Project Managers.	Actions #1 and #2: Gary Rose VP Planning and Controls April 30, 2016 Action #3: Steve Woods SVP & CNE April 30, 2016

[3] The five standard phases in a project life-cycle are Identification, Initiation, Definition, Execution and Closeout.

4. Governance and Procedures specific to AISC projects require improvement.	**Low**

There are three key gaps identified in governance and procedures that should be addressed:

1. A formal Terms of Reference ("TOR") document does not exist to govern the role, accountabilities, and operation of the AISC;

2. Although Nuclear Projects Governance should apply to AISC funded projects, this principal is not adequately documented as AISC projects follow existing Finance governance. To reduce this confusion, some AISC specific processes should be defined including:
   - The scope and change management process involving PCRAF's should be substituted with the current process in Nuclear projects called CCF;
   - The gating process, including the requirements and deliverables for each gate; and
   - The process for establishing and integrating vendor schedules, establishing forecast inputs, work breakdown structure requirements, etc.

3. Requirements for month-end performance reports and record keeping are undefined. Each project manager runs their project using a different set of month-end reports and reports are not formally stored by project in a central directory for future reference.

Potential Causes & Impact

Potential Cause:
The new Nuclear Projects governance and procedures are high-level principle-based documents which do not specifically address AISC requirements.

Impacts:
- Potential for confusion amongst project team members on how to handle AISC specific requirements versus other DNR requirements; and
- Potential for cost increases and schedule delays due to ineffective planning and control of project activities and objectives.

Recommendations	**Management Action Plan**	**Owner & Target Completion Date**
Management should: 1. Formalize a Terms of Reference document for the AISC; 2. Formalize requirements specific to AISC Project Management; leveraging Nuclear Project's governance where possible; and 3. Standardize the reporting for AISC projects and store these in a centralized repository for future reference. i.e. Book of Record.	Recommendations 1 and 2: Action plan for Finding 3 will include issuance of AISC Terms of Reference and a desktop guide to assist projects under AISC authority in the use of Nuclear Projects Governance, specifically the gated process. Recommendations 3 and 4: Nuclear Projects is in the process of developing standardized reports using Ecosys. Phase 1 implementation will be in Nuclear Refurbishment and Phase 2 will be in P&M.	Recommendations 3 and 4: Gary Rose VP Planning and Controls December 31, 2016

APPENDIX A – LIST OF PROJECTS REVIEWED

Item	Project No.	Project Description	Project Area	Current Project Phase	Current EAC (CDN$M)
1	31412	DN Class II UPS Replacement	Darlington	Execution	55.099
2	31422	DN Pressurizer Heaters & Controllers Replacement Project	Darlington	Execution	14.511
3	31426	DN F/H Inverter Replacement	Darlington	Execution	14.386
4	31508	DN Fukushima Phase 1 Beyond Design Basis Event (BDBE) Emergency Mitigation Equipment (EME)	Darlington	Execution	58.391
5	31710	DN Shutdown Cooling Heat Exchanger Replacement	Darlington	Execution	56.085
6	80058	NWM Western Waste Management Facility Groundwater Monitoring Network	NWM	Execution	4.710
7	33623	DN Installation of partial discharge monitors	Darlington	Close-out	7.147
8	40682	PB MOT8 Foundation Settlement	Pickering	Close-out	3.844
9	60144	IC-18's/IC-HX's	NWM	Close-out	9.730
10	40990	PN Bay Module Loader PLC Replacement	Pickering	Definition	1.200
11	41027	PN Fukushima Phase 2 Beyond Design Basis Event (BDBE) Emergency Mitigation Equipment (EME)	Pickering	Definition	46.302
12	38419	DN Capping of D2O Collection Lines	Darlington	Definition	8.398
13	31516	DN Station Lighting Retrofit	Darlington	Deferred	11.379

Legend:
EAC= Estimate-At-Complete based upon latest Business Case Summary ("BCS").

APPENDIX B – AACE AND BCS CLASSIFICATIONS FOR ESTIMATES

Estimate Class

Estimate Class is a cost estimate classification system developed by the Association for the Advancement of Cost Engineering International (AACE) which defines the estimate "quality" based on the input information used and the project's stage of development. AACE uses five estimate classes with Class 5 being the least accurate, and Class 1 being the most accurate. Below is a table that is included in the instructions for Cost Estimates in the BCS template.

Estimate Class	**Class 5**	**Class 4**	**Class 3**	**Class 2**	**Class 1**
Project Phase	**Identification**	**Initiation**	**Definition**	**Execution**	**Execution**
Level of Project Definition (%)	0% to 2	1 to 15	10 to 40	30 to 75	65 to 100
Expected Accuracy Range (%)	-50 to +100	-30 to +50	-20 to +30	-15 to +20	-10 to +15

APPENDIX C – PROJECTS WITH BASELINE DISCREPANCIES

Item	Project No.	Project Description	Latest EAC (CDN$M)	Latest Target In-Service Date	CSCB Out-of-Date	CSCB Does Not Exist	Summary of Discrepancy
1	31412	DN Class II UPS Replacement	55.099M	2023-Q4	x		Vendor Schedule has not been integrated into Baseline Schedule.
2	31422	DN Pressurizer Heaters & Controllers Replacement Project	14.511M	2020-03-20	x		The current Performance Measurement Baseline (PMB) does not yet include baseline changes required by PCRAF No.'s 3 and 4 dated 15Apr2015 and 22Oct2015, respectively.
3	31508	DN Fukushima Phase 1 Beyond Design Basis Event (BDBE) Emergency Mitigation Equipment (EME)	58.391	2017-12-23	x		No Vendor Schedule. Vendor Schedule has not been integrated into Baseline Schedule.
4	40990	PN Bay Module Loader PLC Replacement	1.2M	TBD BCS under Revision		x	Integrated Cost & Schedule Control Baseline not yet established in P6 and Proliance.
5	80058	NWM Western Waste Management Facility Groundwater Monitoring Network	4.710M	2016-09-30		x	Integrated Cost & Schedule Control Baseline not yet established in P6 and Proliance.
				Totals:	**3**	**2**	

Legend:
BCS= Business Case Summary
CSCB= Cost and Schedule Control Baseline
EAC= Estimate-At-Complete
P6= OPG's Scheduling Software System.
Proliance= OPG's Cost Management Software
TBD= To be Determined

Notes:
Latest EAC and Target In-Service Date based upon latest Business Case Summary inputs.

APPENDIX D – RISK RATING DEFINITIONS FOR AUDIT FINDINGS

Ratings are derived through professional judgement by the audit team and discussion with management. The ratings for individual control findings are outlined below.

Rating	Definition
High Risk	The finding presents a risk that could potentially have severe/major impact on financial sustainability (≥$5M), operational excellence, project excellence, safety, environment and reliability, reputation, regulatory relationship, or compliance with laws and regulations.
Moderate Risk	The finding presents a risk that could potentially have a moderate impact on financial sustainability ($500K to <$5M), operational excellence, project excellence, safety, environment and reliability, reputation, regulatory relationship, or compliance with laws and regulations. If not remediated, this risk could escalate to high risk.
Low Risk	The finding could potentially have a minor impact on financial sustainability (<$500K), operational excellence, project excellence, safety, environment and reliability, reputation, regulatory relationship, or compliance with laws and regulations. Recurring "low risk" findings may be elevated to medium risk status.

OVERALL REPORT RATING SCALE

An overall report rating has been assigned as an indication of the overall design, existence and effectiveness of the components of the internal control structure that was subject to the internal audit. The internal audit rating should be considered in conjunction with the definitions noted above.

- *Effective:* control and risk management practices provide reasonable assurance that business process objectives will be achieved and may include minor improvements and/or opportunities for improvement.
- *Generally Effective*: control and risk management practices require more than minor but less than significant improvements to provide reasonable assurance that business process objectives will be achieved.
- *Requires Improvement*: control and risk management practices require significant improvements in high risk and/or core areas to provide reasonable assurance that business process objectives will be achieved.
- *Not Effective:* control and risk management practices are not designed and/or are not operating effectively.

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#	Finding	Management Action	Management Action Status as of March 10, 2017	Risk Rating
1	**Project estimates are not at a sufficient level of accuracy prior to the execution phase.** As per OPG's BCS requirements and the Association for the Advancement of Cost Engineering ("AACE") standards, cost estimates should be developed to at least a Class 3 estimate prior to execution (see Appendix B). For certain projects, a Class 2 estimate may be used as a "check estimate" once construction work packages are complete and just prior to the start of field execution to confirm accuracy of the Class 3 estimate submitted as part of the Execution Phase BCS. In order to come to a more precise estimate, detailed engineering must be substantially complete to determine material and labour requirements. It was noted that of the six projects sampled in the execution phase, all six projects did not have an Estimate at Completion ("EAC") for the project established at either a Class 3 or Class 2 level and they were still performing detail engineering work while in their execution phase. In some cases, the true EAC value for the entire project is not identified until the project is in the advanced stages of execution when a significant portion of the execution costs have already been incurred. (Refer to Appendix A for sample projects reviewed in the execution phase).	As part of the Nuclear Projects "Project Excellence" initiative, an estimating Centre of Excellence ("COE") is now in place within the Planning and Project Controls group; all 2016 AISC Project New Starts greater than $5 Million will require estimate review by the COE, consistent with the Gated process (See Finding 3). Gated process will also provide increased oversight in the release phase of projects and cost and estimate accuracy and contingency management.	Management completed the following to close the finding: **Closed – April 28, 2016** • Issued a series of Estimate "checking" requirements into the gated process on April 28, 2016. They include "Plan" documents for how to review Gate Packages with respect to estimates as well as a series of checklist forms which must be approved as part of gate reviews. Including requirements for approvals by centre-led Estimating Manager and solidifying the Centre of Excellence concept for estimating. **Closed – April 19, 2016** • Evidence provided showing Centre of Excellence (COE) for Estimating is in place. Gated process, when issued, will require all projects to follow Gated Process which will require a review of all estimates > $5Million by the Estimating COE. Initial focus will be on all 2016 New Starts and any projects that	High

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#	Finding	Management Action	Management Action Status as of March 10, 2017	Risk Rating
			require a Business Case to be presented to the Board. Later in 2016, the process will be expanded to all projects.	
2	**Cost and Schedule Control Baselines ("CSCB's") are not keeping pace with approved project changes.** Cost and Schedule Control Baselines ("CSCB's") are the primary control for measuring cost and schedule performance on a project. When setup correctly (i.e. Built upon reliable project estimates and front-end planning), they provide an indication of which work packages on a project are ahead or behind on cost and schedule performance, the magnitude of these variances and their net impact on the overall project. CSCB's on three out of 13 projects sampled were found not to be keeping pace with cost and schedule baseline changes being requested and approved in Business Case Summaries ("BCS's") and Project Change Request Authorization Forms ("PCRAF's"). The reliability of contractor data has contributed to this issue. This lack of accurate and timely data has contributed to Cost Performance Index ("CPI") measurements being skewed at work package levels. In addition to the above, two of the projects were found to be without CSCB's entirely. The P&M group has indicated that they are in the process of implementing project planning and control protocols with their Engineer-Procure-Construct ("EPC") vendors to ensure vendor schedules are received at the start of projects and that CSCB's are created, beginning with new	P&M is reviewing the Project Controls work processes executed by CSAs in planning and controlling projects and the amount of project work which will be executed by P&M through the Business Plan period. This information will help in determining the resource gap with CSAs. Once the gap has been determined, an appropriate resourcing strategy will be implemented. This review will include the review of BCSs and PCRAF approval processes to determine opportunities to reduce time of approval.	Management completed the following to close the finding: **Closed – September 23, 2016** Implemented the Cost and Schedule Baselines Action Plan (Dated September 22, 2016) to review the Project controls work processes executed by CSAs (const Schedule Analysis) in planning and controlling projects and the amount of project work which will be executed by P&M through the Business Plan period. This information will be issued to assess the resource gap with CSAs. Once the gap has been assessed a resourcing strategy will be implemented. The review also included the BCS and PCRAF approval process to determine opportunities to reduce time of approval which relates to approvals for implementing Cost and Schedule baselines and approved changes	Moderate

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#	Finding	Management Action	Management Action Status as of March 10, 2017	Risk Rating
	project starts for 2016.		to baselines. The review was conducted in three areas: a) P&M Work Program based on the business plan b) Simplify it - by reviewing the PCRAF and BCS processes to identify low or no valve activities which can reduce the work burden on the CSA and project team. c) Gated Process Review for Readiness to process	
3	**A Gating Process for AISC Portfolio Projects has not been formally implemented.** A gating process is meant to define a clear list of requirements, deliverables, and expectations a project should follow in order to be granted approval to proceed to its next phase within the typical five phases of a project's life cycle. In addition to the above, a robust gating process also requires that a project be defined and associated work scope be estimated to specified levels of accuracy. Although the AISC acts as a de facto Gate Review Board for AISC projects, the gating process outlined in the Nuclear Projects governance (N-STD-AS-0028) and Project Management Manual (N-MAN-00120-10001-GRB) has not been fully implemented for AISC projects. At present, the primary control used for gate approval between phases in the AISC project life cycle is the BCS process. While this is an important	The Nuclear Projects Gated process will become the standard approach for P&M AISC projects beginning with 2016 Project New Starts. This change has been approved by the SVP/CNE and VP, P&M and an initiative is underway to align and implement the Gated process. Finance will be involved in the gate review process. Implementation requires the following actions: 1. Establish a common Gated process for all Nuclear Projects. 2. Through a Change Management Plan, prepare and issue desktop guides for Project Life Cycle to AISC	Management completed the following to close the finding: **Closed – April 19, 2016** 1. Management has developed a common Gated process for Nuclear Projects. An update to N-STD-AS-0028 reflecting the new common Gated process will was issued on April 28. 2. N-MAN-00120-10001-GRB and the associated forms/check sheets have been updated and issued on April 29 in governance. A change management presentation summarizing the changes was	Moderate

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	requirement, the BCS process does not constitute a complete list of all the deliverables required at each gate approval, nor formalize the challenge process that should take place regarding the approval of each deliverable. Management has indicated that they are in the process of formalizing a gating process for AISC projects in Q1 2016.	Members and Project Managers. 3. Preparation and Issuance of AISC Terms of Reference to AISC Members and Project Managers.	developed and presented at an AISC meeting in Q2 2016. **Closed – April 26, 2016** 3. AISC Terms of Reference guideline – N-GUID-00120-10016– Dated April 19, 2016.	
4	**Governance and Procedures specific to AISC projects require improvement.** There are three key gaps identified in governance and procedures that should be addressed: 1. A formal Terms of Reference ("TOR") document does not exist to govern the role, accountabilities, and operation of the AISC; 2. Although Nuclear Projects Governance should apply to AISC funded projects, this principal is not adequately documented as AISC projects follow existing Finance governance. To reduce this confusion, some AISC specific processes should be defined including: a. The scope and change management process involving PCRAF's should be substituted with the current process in Nuclear projects called CCF; b. The gating process, including the requirements and deliverables for each gate; and c. The process for establishing and integrating vendor schedules, establishing forecast inputs,	Recommendations 1 and 2: Action plan for Finding 3 will include issuance of AISC Terms of Reference and a desktop guide to assist projects under AISC authority in the use of Nuclear Projects Governance, specifically the gated process. Recommendations 3: Nuclear Projects is in the process of developing standardized reports using Ecosys. Phase 1 implementation will be in Nuclear Refurbishment and Phase 2 will be in P&M.	Management completed the following to close the finding: **Closed – April 26, 2016** • Recommendations 1 and 2 of Finding No. 4 were closed under Finding No.3. Project Controls provided AISC Terms of Reference and revised Nuclear Gating Process on the associated due date. • Recommendation 3: Rollout to P&M for P&M projects in Ecosys was scheduled to be completed by Dec 2016, whereas rollout for AISC projects in Ecosys was to be completed in Q1 2017. IA accepted evidence consisting of 28 active P&M project reports available in Ecosys as of Dec 13,	Low

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	work breakdown structure requirements, etc. 3. Requirements for month-end performance reports and record keeping are undefined. Each project manager runs their project using a different set of month-end reports and reports are not formally stored by project in a central directory for future reference.		2016 (evidence: list and samples), together with evidence that AISC projects in Ecosys were to be rolled out in Q1 2017 and were tracked via RMO action #6602. P&M reports were considered a standardized template for both P&M and AISC projects. Thus "Standardize reporting for AISC projects" is done. IA Confirmed that all of P&M data are loaded. It consists of P&M's non NR projects and totals over 100 projects. • Supplementary evidence provided showing that gated process has been implemented. P&M provided the list of AISC 2016 "New Starts" projects indicating that respective Gate Packages has been filed.	