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November 23, 2016

VIA RESS AND COURIER

Kirsten Walli
Board Secretary
Ontario Energy Board
P.O. Box 2319
2300 Yonge Street, 27th Floor
Toronto, Ontario M4P 1E4

Dear Ms. Walli:

RE: EB-2016-0160 Hydro One Networks Inc. ("Hydro One") Transmission Rates Application – Internal Audit Reports

In accordance with the Board's Procedural Order No. 5 issued November 22, 2016, enclosed for filing are the following Internal Audit Reports:

- Audit of Investment Planning #2014-29 (January 30, 2015); and
- Transmission Lines Preventive Maintenance Optimization #2015-33 (April 7, 2016).

Yours truly,

McCarthy Tétrault LLP
Per:

Gordon M. Nettleton
GMN

INTERNAL AUDIT REPORT

INVESTMENT PLANNING

To:

Mike Penstone
Vice President, Planning

Distribution:

Carm Marcello	President and Chief Executive Officer
Sandy Struthers	Chief Operating Officer & EVP Strategic Planning
Ali Suleman	Acting Chief Financial Officer
Paul Brown	Director, Distribution Asset Management
Randy Church	Director, Network Connections & Development
Kathleen McCorriston	Manager, Investment Planning and Prioritization
Scott McLachlan	Director, Transmission Asset Management
Bing Young	Director, System Planning
Brad Bowness	Director, Project Management, E&CS
Mike Boland	Director, Station Services, Stations & Operating

Final Report Issued: January, 30, 2015
Draft Report Issued: December 31, 2014
Report Number: 2014-29

Auditor: Atul A. Solanki

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GLOSSARY:

AA	Asset Analytics – A support tool that focuses on asset risk prioritization to enable planners to make optimal asset decisions at any point in time (30+ year timeline)
AIP	Asset Investment Planning – A support tool that evaluates investment alternatives based on corporate risks and financial objectives to produce an optimized investment plan
BCS	Business Case Summary (used for Project approval)
BPC	Business Planning and Consolidation – A support tool that delivers an integrated financial model to support business planning, budgeting, and forecasting
BV	Business Values – These are the values that enable the achievement of the Company's strategic goals by forming the criteria against which investments are developed, risks are managed, and trade-offs are facilitated between investments.
IPP	Investment Plan Proposal – The output of the prioritization process that feeds into the Corporate Business Plan
OAR	Organizational Authority Register
PN	Potential Need notification (as documented in SAP against a specific asset)
SICA	Station Investment Capital Approval (used for "station centric" bundled program approval)
UPC	Unit Price Catalogue / Unit Price Cost

EXECUTIVE SUMMARY

Hydro One has adopted an Asset Management model since its inception to separate accountability for asset and system investment decision making from the execution of work. The Planning Organization is accountable to produce an annual Investment Plan Proposal (IPP) detailing investments (and resulting work) required to develop and sustain asset and system capabilities over the next five years. The IPP is a major input to the Hydro One's Corporate Business Plan that is approved annually by its Board of Directors. The IPP also forms a basis for the Transmission and Distribution rate filing with the Ontario Energy Board. The IPP is put together based on the results of customer, asset and system need evaluation using criticality, performance, and condition as key factors. The plan goes through a risk-based optimization to ensure the maximization of corporate business values[1] (such as safety, reliability, customer satisfaction, shareholder value, etc.). The plan is further adjusted by Management to ensure that it is executable, meets financial objectives, and reduces plan risks to an acceptable level.

We are pleased to observe that the Planning organization is able to deliver an annual IPP on schedule. The introduction of support tools such as Asset Analytics (AA) and Asset Investment Planning (AIP) has resulted in timely availability of asset information for analysis as well as optimization of investment selection based on specified constraints. The Planning organization has a good mix of experienced and new planners, as well as managers, who bring varied perspectives. A recent move towards "station centric" sustainment investment planning is expected to improve planning and execution efficiencies. However, several key challenges remain to consistently determine, develop, optimize and release investments required to meet customer, asset and system needs.

Based on the specific areas reviewed, we conclude that controls are often ineffective and significant improvements are needed to ensure that a consistent investment planning process is used to produce a risk-based Investment Plan Proposal to address customer, asset and system needs.

Our conclusion is based on the following key observations:

- Ineffective governance and controls over the investment planning end-to-end process.
- Inconsistent identification, assessment, prioritization and action on asset and system needs.
- Lack of risk-based alternatives with a thorough cost-benefit analysis for most plans.
- Inefficient investment plan prioritization process that is not well-understood by the planners and service providers.
- Lengthy approval process that delays release of major investments.

Action plans have been developed by management to address the areas noted above and are summarized in the Summary of Actions (Appendix H). We would like to thank the management and staff in Planning, Engineering & Construction, and Stations for their assistance and open discussions during this review.

Atul A. Solanki, Audit Associate

[1] "Corporate business values" is the term used in the Asset Investment Planning (AIP) optimization process. These are actually the Corporate Strategic Objectives.

OBSERVATIONS AND RECOMMENDATIONS

The Investment Planning audit focused on the following five areas:

1. Effective governance structure and control environment over the "end-to-end" Investment Planning process
2. Appropriate identification and assessment of customer, asset and system needs requiring investment
3. Development of risk-based investment alternatives to meet the identified needs
4. Optimization of investment plans selecting alternatives that maximize corporate business values.
5. Timely release of sufficiently detailed investment plans for execution by the Service Providers.

A sample of 16 investments from the 2015-2019 Investment Plan Proposal (IPP) were selected for review during this audit.

The following are our observations and recommendations related to the above five areas.

1. Ineffective governance and controls

Background:

An effective governance structure and adequate control activities are a must for an organization to achieve its stated objectives while managing the risks it faces to a level that it is willing to accept. The governance and controls set the tone at the top regarding management's expectation of how its business activities are to be performed and an expected standard of conduct for the employees performing those activities. Management sets the control environment by developing, reviewing, approving and communicating appropriate policies, standards, processes, procedures and guidelines in sufficient details. Management ensures that appropriately qualified and trained employees are equipped with adequate tools to perform the tasks assigned to them. An effective governance structure and control environment also requires that adequate supervision, monitoring and quality assurance are in place to meet the organization's key deliverables.

Observations:

We are pleased to observe the following:

1.1 The Planning organization has been developed and released an increasing work program in recent years with a largest work program release of $2.8 billion (gross) for 2015. The 2015-2019 IPP was approved as part of the Hydro One Business Plan at the November 2014 Board meeting.

1.2 A recent reorganization combining the asset management and system development divisions into a single business unit has resulted in a management team of varied experience and background.

1.3 Monthly management reports are being put together to communicate work progress in each department and division.

1.4 An Approvals, Customers, Estimates, and Releases (ACER) review process has been put in place where executive, director and manager level monthly reviews occur between planning and executing lines of businesses to discuss and resolve issues related to large and complex plans (>$1 Million and/or customer impact) prior to their full release.

1.5 The majority of planners are experienced and knowledgeable about the customer, asset and system needs. In most cases, junior planners are teamed with senior planners for mentoring and knowledge transfer. The planners have tools such as Asset Analytics (AA), Asset Investment Planning (AIP), SAP and other databases to perform their assigned tasks.

1.6 AIP training is provided prior to start of the annual investment planning cycle. Detailed PowerPoint training presentations and job aids are posted on the SharePoint site.

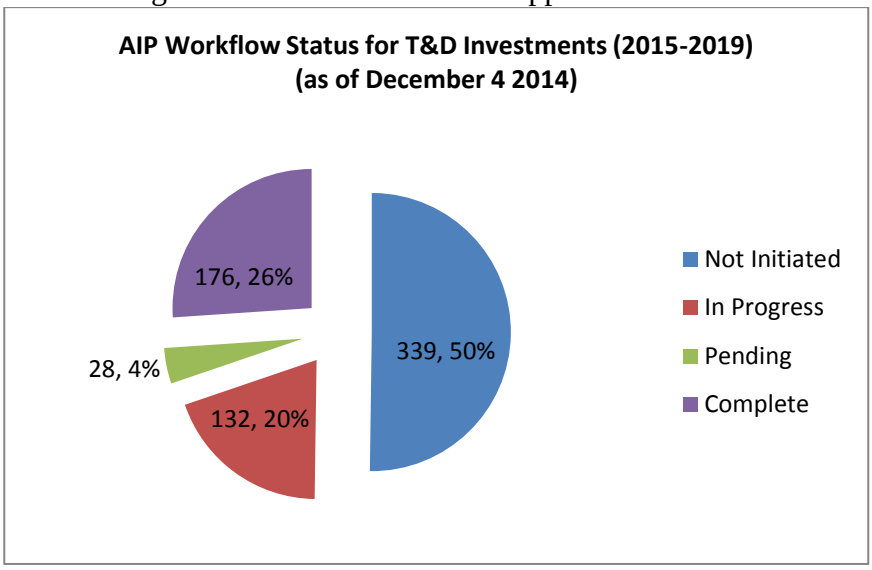
We also observed the following opportunities for improving controls:

1.7 There has been no recent and formal business risk assessment of the overall Planning business unit's objectives completed as per the Enterprise Risk Management Policy (SP0736).

1.8 Approximately 44 approved policies and directives are in place for planning and asset management. However, most of these documents are over 3 years old and do not have a review date. It is unclear if these policies are being followed by the planners as there were no references to any of these policies in the 16 investment planning documents that were reviewed during this audit. A key policy titled "*Asset Investment Planning Risk Assessment Corporate Operational Policy*" was developed in 2013 but was never approved by Management.

1.9 Approximately 363 business process models related to managing asset information and investments are documented in the ARIS Business Process modelling and management software, which is the official source of record for Hydro One business processes. The majority of these were developed during Cornerstone Phase 1 and 2 and have never been incorporated in the Hydro One Business Process Modelling Notation (H-BPMN). Only 42 process models have been mapped to process area "*01.02 Manage Asset Investments*" and "*01.03 Manage Asset Information*", which are the focus of this audit. Most of these process models are in "draft" form, have references to outdated process steps and work groups and have missing integration points with other business processes. Most planners are not aware of these process models and seldom follow them. Some departments have simplified versions of these processes in PowerPoint format for training and discussion purposes. Process clarification and guidelines are often communicated via e-mail or in training presentations.

1.10 There is no formally documented Quality Assurance process with related measures to assess the effectiveness of the "end-to-end" planning process. The "Investment Approval Process" within the training presentation indicated that all Investment plans (or ISR) prepared by an Investment Owner (Planner) were to be sent to the Driver Owner (Manager) for review and approval. All programs greater than $15M and all projects > $10M required additional review and approval by the Portfolio Owner (Director). These reviews and approvals were to occur through AIP workflows. The following is a summary of the AIP Workflow status for T&D investments where the Investment Summary Report (ISR) produced for each investment plan was to be routed to Management for their review and approval.



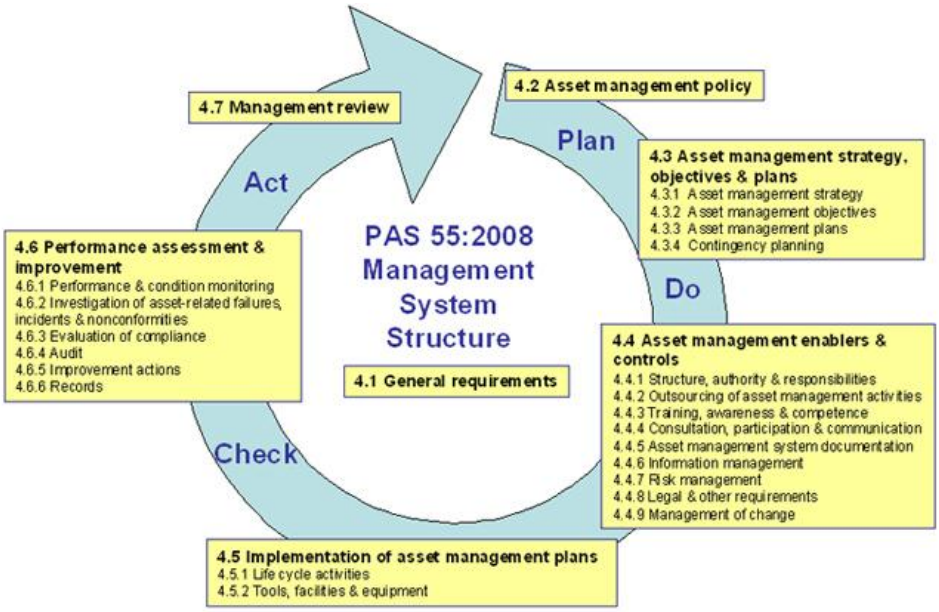
The above results show that half of the investments were never sent by planners to Management for review and approval. About 20% were sent for approval but were neither approved nor rejected by Management. Only the remaining 30% of the plans were either formally approved or rejected. Management has indicated that verbal reviews and approval did occur for all investments but the statuses were not updated in AIP due to time constraints. It was not possible to validate the quality of management reviews in the absence of appropriate documentation.

1.11 There is a lack of a clearly defined process and guidelines for the level of input to be sought by the planners and to be provided by the service providers during the investment plan development. For some plans, service provider input is only sought after an Investment Plan Proposal (IPP) has been put together. For other plans, service provider input is sought and incorporated during the early stages of plan development. Service providers have indicated a preference to be involved as early as possible during the plan development but this could lead to plans being influenced by the service providers' capability to execute rather than risk based customer, asset and system needs.

1.12 There is no formal training for the overall "end to end" planning process. However, there is informal training on use of tools. None of the training is tracked and refreshed as the process and tools evolve.

1.13 There is no formal lessons learned documentation for continuous process improvement. A Lessons Learned presentation was put together for discussion following completion of the 2013 planning cycle. However, it is unclear if any of these lessons were incorporated in the process that was followed during 2014 planning cycle.

1.14 At a high-level, the overall Investment planning process does seem to be aligned with the PAS55:2008 specification for the optimized management of physical assets with its "plan, do, check and act" phases as detailed below. However, significant opportunities exist to define an appropriate asset management strategy & objectives, implement appropriate enablers and controls, monitor performance and practice continuous improvement.



Source: Key Features of PAS55:2008, http://pas55.net/features.asp

Risks: 

- Lack of well-defined, communicated and understood policies, standards, processes, procedures and guidelines could lead to inconsistent decision making leading to poorly defined investment plans that are unable to adequately address the asset and system risks and needs.
- Inadequate specification of accountabilities, training and suitable tools would lead to staff performing their assigned duties on a best effort basis leading to poor quality output and resulting rework.
- Insufficient monitoring of process effectiveness and quality assurance of process outputs would lead to an increased risk of errors and degradation of output quality.
- Lack of continuous improvement through lessons learned would lead to inefficient processes that will have a lower chance of being adopted by the users.

Recommendations:

We recommend that Management:

1.1 Perform a formal risk assessment as per ERM Policy (SP0736) on an annual basis to ensure that business risks facing the planning organization are identified and mitigating actions are developed and tracked. (related to Observation 1.7)

1.2 Develop, review and approve sufficiently detailed policies, standards, procedures and guidelines to ensure a consistent risk-based approach to planning and decision making. This would require a review of the existing governance documents and ARIS process models for their accuracy and validity. Management has informed us that a Policy Review project is currently underway to consolidate policy and directive documents. (related to Observations 1.8 and 1.9)

1.3 Clarify the timing and level of input to be sought by the planners from the service providers as they develop their plans. (related to Observation 1.11)

1.4 Implement a formalized Quality Assurance process and related performance measures to assess the effectiveness of the end-to-end planning process. This would include quality expectations for plans being prepared by the planners and the quality of reviews and feedback being given by management prior to approving those plans. (related to Observation 1.10)

1.5 Formalize and track all process and tool related training being given to planners in their Learning Management System. Establish refresher training requirements whenever there are significant changes in process and tools. (related to Observation 1.12)

1.6 Document and communicate lessons learned after each planning cycle and use them for continuous improvement of the planning process. (related to Observation 1.13)

Management Response:

All recommendations have been agreed to by Mike Penstone, VP Planning. They are assigned for action as follows:

1.1 Randy Church, Director, Network Connections and Development
1.2 Luis Marti, Director, Reliability Studies, Strategies and Compliance
1.3 Kathleen McCorriston, Manager, AM Processes & Tools
1.4 Scott McLachlan, Director, Transmission Asset Management
1.5 Mike Penstone, VP Planning
1.6 Kathleen McCorriston, Manager, AM Processes & Tools

Proposed Action Plan: *(Accountable Manager, above in Management Response)*

1.1 Planning will work with ERM Group to conduct a risk workshop to identify risks in achieving the planning business objectives.

1.2 Conduct a review of processes, procedures, standards and guidelines to determine the need, effectiveness, currency and to ensure they are aligned with and support the Corporate Operational Policies. Establish a review cycle for these documents.

1.3 At the annual LOB kick off, AM Processes and Tools will identify and seek input from the service providers to obtain their feedback on ideal timing and level of input required. Planning will also be in attendance to ensure agreement and consistency in approach.

1.4 Quality expectations and the required metrics for the end-to-end process will be established and communicated by the Planning Organization.

1.5 The Planning Organization will assess all training requirements including the frequency of refresher training and mechanism for tracking training completion. We will develop an implementation plan that defines the accountabilities for creation and delivery of training material.

1.6 AM Processes & Tools will document and communicate lessons learned after the 2016-2020 planning cycle.

Completion Dates:

1.1 Q4, 2015
1.2 Q4, 2015
1.3 Q1, 2015
1.4 Q3, 2015
1.5 Q4, 2015
1.6 Q3, 2015

2. Inconsistent Customer, Asset & System Need Assessment

Background:

Hydro One's Transmission and Distribution (T&D) investment plans consist of four major categories of investments related to sustainment (maintain existing capability), development (add new capability to ensure secure and reliable supply), operation (operate and monitor assets and systems) and common corporate investments. For this audit, the focus was on T&D Station sustainment and development investments.

Key steps in investment planning process include:

i. the determination of investment needs from various stakeholders (including customers),
ii. collection and analysis of supporting data (e.g. asset data), and
iii. assessment of needs.

Sustainment investment needs are primarily identified using asset condition data collected during routine maintenance, inspections and testing, performance history, asset utilization, age, and criticality. Asset Analytics (AA) is a new tool available to planners to collect and analyze this data. An Overview of AA is provided in Appendix F. Development investment needs are primarily identified by system changes that include demand, performance, and configuration as well as changes

to standards, codes and market rules. New customer connection requests as well as changes in Local Area Supplies and network transfer capabilities also result in development investment needs.

Both sustainment and development investment needs are assessed by focusing on mitigating risks associated with the likelihood and consequences of asset failures as well as maintaining T&D system performance and satisfying customer expectations.

Observations:

We are pleased to observe the following:

2.1 There has been a recent move towards "station centric" sustainment investments with a goal of bundling sustainment investments at a given transmission station every seven years.

2.2 The Potential Need (PN) notifications in SAP are being used by field staff to alert the planners of future asset sustainment needs. This requirement and related process is formally documented in HODS as "Potential Need (PN) Notification Administration Guide (SP1546)".

2.3 For transmission station refurbishment, a detailed "desk-side station assessment" listing all asset conditions and needs is being documented by the planner and discussed with the field staff.

We also observed the following opportunities for improving controls:

2.4 There is inconsistent documentation and tracking of asset and system needs for later follow-up. Most planners have their own spreadsheets in which they capture needs discovered during field visits, e-mail discussions with field service specialists or recommendations from maintenance technical services. Customer needs and manufacturers' recommendations are also tracked in various e-mails and documents. For most investments, there is no tie back of earlier identified needs to the investments being made. There is no consistent documentation showing which customer, asset and system needs were received, reviewed, accepted/rejected and actioned.

2.5 The PN Notification process outlined in SP1546 is not being consistently followed. In 2014, 307 PN notifications for TS assets were created and 273 (89%) of these have not yet been reviewed by the planners, while only 10 PN notifications were created for DS assets and none of them have been reviewed by the planners. According to the SP1546, "*Asset Management is responsible for assigning a PN notification to every planned replacement and refurbishment candidate in the current business plan*". There is no evidence to support that this has consistently occurred in 2014.

2.6 There is inconsistent use of AA data to assess individual asset needs. There are no documented procedures or guidelines on how to validate AA Risk Index data and translate them into asset needs. Most planners use the AA data as a starting point for further discussion with the service providers to confirm asset needs.

2.7 The AA data quality remains a concern. The quality of underlying data (accuracy, completeness and timely availability of recent data) being used from SAP and other databases for risk index calculations is unknown. It was noted that:

- Only 44% of DS and 51% of TS Supporting Factor data used for risk index calculation is considered "Normal". The remaining data are statistical calculations or default values.
- Percentage of assets with missing Asset Risk Index data (ARI = 0) is as follows:

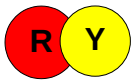
AA Data Quality – Missing ARI						
ARI	**Condition**	**Demographics**	**Criticality**	**Economics**	**Utilization**	**Composite**
Distribution Station	54%	54%	10%	54%	70%	10%
Transmission	8%	8%	0%	7%	63%	0%

AA Data Quality – Missing ARI						
ARI	Condition	Demographics	Criticality	Economics	Utilization	Composite
Station						

- Gage TS, where major refurbishment is planned, currently shows a composite station level risk index as 27. According to the Risk Index guide, a risk index between 15 to 30 is considered "Good" condition. Dunneville TS, the reputedly the worst ranked station in the province, has a composite station level risk index of 36, which is on the better end of "Fair" condition scale of between 30 to 50.
- Breaker counter reading is one of the supporting factors used for the Utilization ARI calculation. The counter reading is supposed to be recorded twice a year during station inspections but the Aguasabon SS T1L1 breaker last had a counter reading of 292 recorded on August 7, 2012 in SAP. This data is obviously outdated and as a result the Utilization ARI for this breaker is suspect.

2.8 System development projects are based on area supply studies requiring power system historical data related to load flows, voltages, asset connectivity and statuses. These data are not available in AA.

2.9 There are no clearly documented asset strategies against which individual asset needs are assessed. However, work has recently started on developing Asset Strategy Documents for 30 key asset groups. These documents will detail key strategies in managing risks of a given asset group against which the individual asset needs will be assessed by the planners.

Risks: 

- Absence of a well-managed process to capture, review, assess, prioritize and action needs increases the risk of critical needs not being addressed in a timely fashion
- Absence of well-understood and quality asset information increases the risk of inadequate need assessment resulting in a less than optimal investment decision.
- Absence of clearly documented asset strategies increases the risk of inconsistent need assessment and investment decision.

Recommendations:

We recommend that Management:

2.1 Develop, implement and monitor an effective Need Identification Process. This may require review and enhancement of SP1546 to include both sustainment and development needs. This process should address a consistent mechanism for tracking details related to need identification, acceptance, review, prioritization, action as well as investment that has been made to meet the need. (related to Observations 2.4 and 2.5)

2.2 Develop detailed guidelines about how the planners should validate and use AA Risk Factors for the need assessment. (related to Observation 2.6)

2.3 Request an audit of Asset Analytics data sources and algorithms to confirm that quality data and appropriate calculation methods are used for calculating the six Asset Risk Indexes for individual assets as well as asset groups. (related to Observation 2.7)

2.4 Consider expanding the scope of the Asset Analytics tool to include up-to-date power system historical data such as load flows, connectivity, voltages, statuses, etc. (related to Observation 2.8)

2.5 Continue to develop sufficiently detailed Asset Strategy Documents for all asset groups and ensure that all future asset needs are assessed against these documented strategies. (related to Observation 2.9)

Management Response:
All recommendations have been agreed to by Mike Penstone, VP Planning. They are assigned for action as follows:

2.1 Scott McLachlan, Director, Transmission Asset Management
2.2 Scott McLachlan, Director, Transmission Asset Management
2.3 Randy Church, Director, Network Connections and Development
2.4 Bing Young, Director, System Planning
2.5 Scott McLachlan, Director, Transmission Asset Management

Proposed Action Plans: *(Accountable Manager, Title above in Management Response)*

2.1 This recommendation will be addressed as part of the overall Quality Assurance Process and metrics as outlined in Proposed Action Plan 1.4.
2.2 This recommendation will be addressed as part of the overall Quality Assurance Process and metrics as outlined in Proposed Action Plan 1.4.
2.3 SAP Data Audit on Asset and Maintenance data is already underway. The results of these audits will be used to address the underlying data issues in AA. Workshops with respective LOBs will be held regarding usability of existing algorithms.
2.4 AM Process and Tools will request ISD to add audit recommendation to corporate application roadmap. Key requirement is to have access to NMS information.
2.5 We will continue to develop Asset Strategy Documents.

Completion Dates:

2.1 Q3, 2015
2.2 Q3, 2015
2.3 Q4, 2015
2.4 Q1, 2015
2.5 Q4, 2015

3. Lack of Investment Alternatives

Background:
Developing investment alternatives is the next step required in the Investment Planning process and it is guided by the results from the need assessment. Work bundling opportunities among several programs are also explored while developing alternatives. Some programs are demand driven (such as service upgrades, trouble calls, studies, storm damage, etc.) and have only one alternative that is included in the plan based on historical averages of funding. Projects that are already under execution also have only one alternative. Most other projects and programs should have more than one alternative with varying risks and benefits to allow selection of the best alternative during optimization process. Project alternatives can shift in time, while program alternatives can have varying levels of accomplishments.

For program work, four levels of alternatives are considered as follows:

1. Vulnerable – Minimal short-term funding to meet regulatory and safety risks
2. Intermediate (1..n) – Varying levels of risk exposures with increased funding above vulnerable level
3. Asset Optimal – Balancing point where asset lifecycle costs are minimized. This would be an ideal level of funding.

4. Accelerated – Exceeds asset optimal funding in order to mitigate an oncoming "bow wave" of asset needs.

Further detail on these alternatives is included in Appendix F.

Program work cost is unit priced while project work cost is based on the planner's estimate based on similar projects, budgetary estimate or detailed estimate from the service provider (where available).

The need, objectives, accomplishments, costs and risk assessment for each alternative is documented in the AIP tool by the planners and an Investment Summary Report (ISR) is produced for each investment. Management performs a quality assurance review of the ISR to ensure that a clear and compelling justification is made for each alternative along with uniform use of the risk assessment model.

Observation:

We are pleased to observe the following:

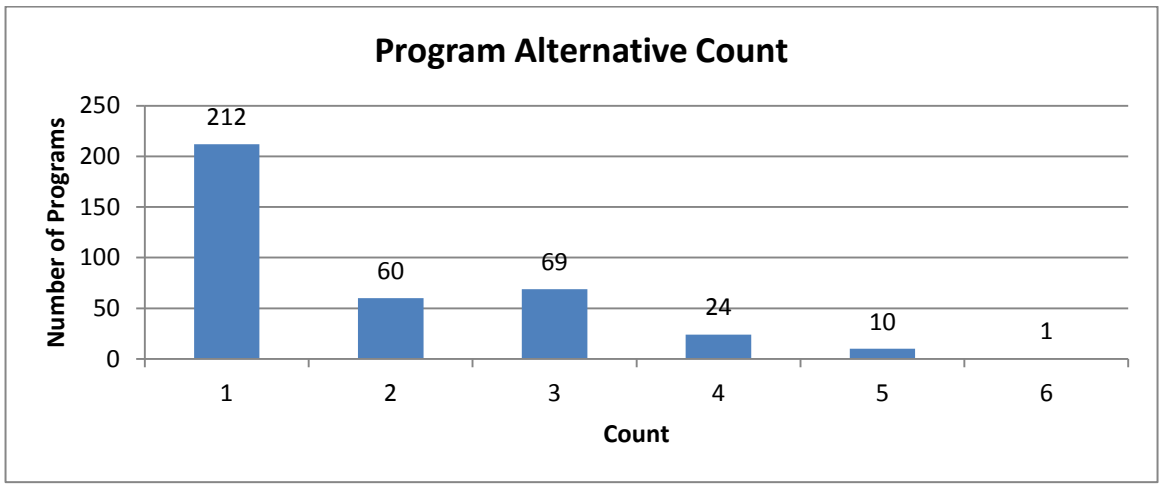
3.1 Investment values were calculated based on a weighted average of 8 corporate business values as follows: Safety (17%), Reliability (17%), Customer Satisfaction (13%), Productivity (13%), Financial Benefit (13%), Employees (9%), Environment (9%) and Shareholder value (9%).

3.2 Baseline and alternative risks for each investment are being evaluated using a sufficiently detailed and a standardized risk matrix based on 6 levels of probability and 9 levels of consequence.

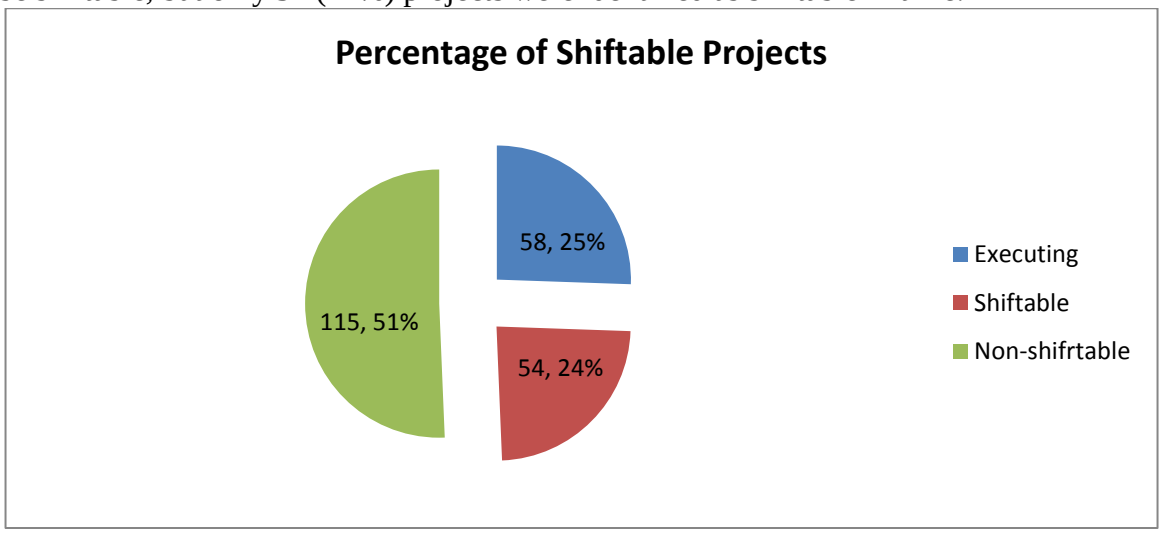
3.3 A risk consequence table was provided to the planners to guide their selection of the appropriate consequence for each corporate business value. A spreadsheet based tool was also developed to guide the planners in determining consequence ratings through a series of questions. Job aids related to risk assessment for each corporate value were also provided and posted on the SharePoint site for planners' use.

We also observed the following opportunities for improving controls:

3.4 For the AIP optimization to be effective, projects should be shiftable in time and programs should have more than one alternative. There are 675 plans for Transmission and Distribution drivers in the 2015-2019 IPP with 448 Programs and 227 Projects. Of the 448 programs, 50 programs are demand driven and 22 programs are already under execution so these are required to have only a single alternative. The remaining 376 are under short term planning and should have had more than one alternative specified. However, 212 (56%) have only one alternative specified. The following is the alternative count for these programs.



Of the 227 projects, 58 are under execution and are not shiftable. The remaining 169 should all be shiftable, but only 54 (24%) projects were identified as shiftable in time.



From the above analysis, it can be concluded that projects and programs do not have sufficient alternatives defined to allow optimal selection of best available alternative.

3.5 Baseline and alternative risks assessed for most investments are mostly subjective with no (or very little) quantitative data to support the assigned probability and consequence for the risks. Although informal guidelines were provided on how to translate AA risk factors into corporate risks, this was not done for most investments. Most planners have indicated that the current risk matrix is confusing and that the provided guidelines are subjective. The provided training and job aid explained the risk matrix but it did not specify how the planners should rank risks (i.e. pick a specific box in the risk matrix). It was left up to the management reviews of risk assessment to ensure that risk ranking is consistent across all investments.

3.6 There was no risk assessment done for transmission system development plans as all of these plans are non-discretionary.

3.7 Sample investments having single alternatives lack appropriate justification documented in the Investment Summary Report.

3.8 There is very little documentation of management quality assurance review of investment plans (including risk assessments). Management has indicated that these type of reviews have occurred with verbal feedback being provided to planners in most cases. Please refer to related observation 1.10.

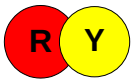
3.9 Some of the unit prices being used for program work are outdated or incorrect. As an example, unit prices for TS maintenance work do not include material cost while the unit prices for DS maintenance work do include material cost. The 2015 PCB Retro fill program is considered “underfunded” by the service provider because the outdated 2013 unit prices were used in determining the funding level.

3.10 There is inconsistent engagement with internal service providers during the development of alternatives. Some investment plans have significant engagement with service providers to confirm start date, in-service date, accomplishment levels, resources or cash flow based on sufficiently detailed estimates provided by the service provider. Most other plans are based on planner’s estimates and desired schedule. The service providers have indicated a preference to be involved much earlier during the investment plan development. Please refer to related observation 1.11.

3.11 There are insufficient documented details on coordination of plans among sustainment and development groups as well as identification of any bundling opportunities between transmission and distribution work.

3.12 There are insufficient details on how the individual plans align with the regulatory filing.

3.13 There is a lack of details for placeholder investments having significant value. The placeholder investments are used for projects that are expected but have very little scope defined. The value of these placeholder investments is based on historical trends and future forecasts. There are 37 placeholder investments in the IPP totalling $914M (Gross) over the 2015-2019 planning period. Service providers are concerned about providing accurate forecasts for these placeholder investments that have no or very little defined scope.

Risks: 

- Lack of available alternatives increases the risk of less than optimal investment plans.
- Inadequate assessment of baseline and alternative risk could result in incorrect risk values being assigned to the alternative.
- Incorrect assumptions related to the timing and costs of investment could result in less than optimal cash flow requirements.
- Undue influence by the service provider during the planning process increases the risk of plans being made based on the service provider's ability to execute rather than on asset needs.

Recommendations:

We recommend that Management:

3.1 Require the planners to define more than one alternative for non-demand driven programs and time shift-able projects. Management should also ensure that appropriate justification is documented and reviewed for plans having only a single alternative. (related to Observation 3.4)

3.2 Simplify the risk assessment matrix and provide suitable training and guideline to planners to perform an effective risk assessment. Specific focus should be on using quantative data from AA and other systems to determine/support appropriate probability and consequence on the established risk matrix. (related to Observations 3.5, 3.6 and 3.7)

3.3 Increase quality assurance reviews and feedback to planners on the quality of their alternatives and risk assessment to ensure uniformity of plans and related risk assessment. (related to Observation 3.8)

3.4 Review and confirm the Unit Price Catalog with the service providers prior to the start of each planning cycle to ensure that the most current unit prices are being used to determine the funding level for the program work. (related to Observation 3.9)

3.5 Define and communicate the required level of engagement with the service provider when investment plans are being developed to ensure that plans are based on asset needs rather than executability by the service providers. Please refer to related Recommendation 1.3. (related to Observation 3.10)

3.6 Require the planners to electronically attach/link supporting data (such as those from AA) and related documentation for each alternative risks assessment to their ISR in AIP. (related to Observations 3.11, 3,12 and 3.13)

Management Response:
All recommendations have been agreed to by Mike Penstone, VP Planning. They are assigned for action as follows:

3.1 Scott McLachlan, Director, Transmission Asset Management
3.2 Scott McLachlan, Director, Transmission Asset Management
3.3 Scott McLachlan, Director, Transmission Asset Management
3.4 Chong Ng, Project Development
3.5 Kathleen McCorriston, AM Processes & Tools
3.6 Scott McLachlan, Director, Transmission Asset Management

Proposed Action Plans: *(Accountable Manager, Title above in Management Response)*

3.1 We will define the framework for investments including the expectations outlining the definition and governance of programs and projects and requirements for program alternatives and time shift-able projects. Document and communicate these requirements.
3.2 We will improve the guidance on the use of the risk assessment matrix through the provision of practical examples.
3.3 This recommendation will be addressed as part of the overall Quality Assurance Process and metrics as outlined in Proposed Action Plan 1.4.
3.4 We will establish a process to ensure costs included in the investment plans are agreed upon between Planning and Operations (executing LOBs).
3.5 This recommendation will be addressed as part of the Proposed Action Plan 1.3 related to the timing and level of input to be sought from LOBs.
3.6 This recommendation will be addressed as part of the overall Quality Assurance Process and metrics as outlined in Proposed Action Plan 1.4.

Completion Dates:

3.1 Q3, 2015
3.2 Q4, 2016
3.3 Q3, 2015
3.4 Q4, 2015
3.5 Q1, 2015
3.6 Q3, 2015

4. Inefficient Investment Plan Optimization

Background:
Hydro One uses an Asset Investment Planning (AIP) tool for risk-based optimization to ensure that selected investments will result in the maximization of corporate business values. During each planning cycle, the AIP tool is set up with appropriate investment master data from SAP (such as driver, LOB, Appropriation Request Number, etc.), historical and forecast finance data, corporate value function and other constraints. The risk assessment, costs, schedule and accomplishments for each investment alternative is then input by the planners in to the AIP tool. Once all input is completed, the optimization process starts during which the AIP tool selects the best of the several alternatives of each investment based on the timing of investments that will maximize risk mitigation and financial benefits while satisfying pre-determined constraints and dependencies. The aggregation of work programs and projects selected from available alternatives during the optimization process yields the preliminary Investment Plan Proposal (IPP).

An enterprise engagement takes place whereby each line of business (planning, executing and finance) is represented at review meetings to discuss the preliminary IPP. Management discretion is used to adjust the IPP to ensure that appropriate resources are available to execute the plan, financial and regulatory objectives are met, and the level of risk imposed by the plan is acceptable.

Observations:

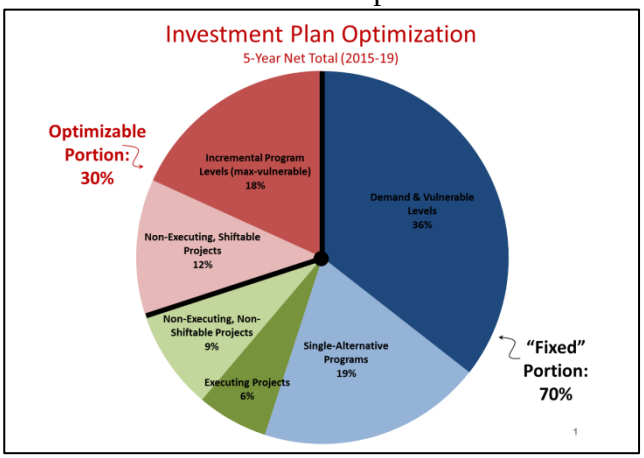
We are pleased to observe the following:

4.1 For the 2015-2019 Investment planning, a detailed schedule was developed and communicated to ensure that the optimization process and IPP review was completed by end of June 2014. The planned tasks on this schedule were completed on time and a weekly workflow status report was issued to management to indicate progress.

4.2 A detailed procedure exists for set up of the AIP tool at the start of the prioritization process.

We also observed the following opportunities for improving controls:

4.3 Only 30% of the plans in 2015-2019 IPP were optimizable within AIP.



Source: Director Review June 2 v2.pptx from Kathleen Kerr

4.4 The AIP tool was only available for a limited time resulting in planners having insufficient time for thorough documentation of their plans and management having insufficient time to review those plans in detail. The planned and actual schedule dates for the 2015-2019 planning cycle were as follows:

Event	Planned	Actual
LOB approval of Unit Price Catalog	April 11	No official signoff was received
Setup of AIP Tool Complete	April 11	April 11
AIP open for Planner Input	April 14	April 14
Investment Approval Workflow Submission deadline	May 9	May 9 – Workflow status reports were issued weekly to Management
Investment approval deadline	May 16	May 20 – Extra weekend was given for management review and approval
Start of Optimization	May 20	May 20
Optimization results review (Prelim. IPP)	June 2	June 2
LOB and Stakeholder review and input	June 13	June 13
IPP adjustments complete	June 30	July 4

Planners were given 4 weeks to complete their input into AIP and management was given 1 week to review it. As of May 15, one day before the plan approval deadline, only 49% of the

plans had workflow initiated for review and approval by management. Please refer to related observation 1.10.

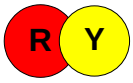
4.5 Manual workarounds are in place to update AIP data from SAP and other systems. Spreadsheet based tools are being used for data uploads. These uploads are based on a snapshot of available data from the originating system (such as SAP) and they became stale as soon as the snapshot is taken since the originating system is continually updated. As an example, forecast costs and in-service date changes are continually being updated in SAP by the service providers, but these changes are not reflected in AIP once the snapshot of data is taken from SAP and uploaded to AIP.

4.6 Enterprise engagement is occurring at the director level and above with a focus on comparison with previous year's plan to identify what has changed and discuss why. A line by line review is only occurring for major / complex plans. The LOB engagement for 2015-2019 IPP occurred over a four day period from June 9 to 13, but the service providers have indicated that they need more time to review each investment line item in IPP in sufficient detail with their project and program managers to ensure that the IPP can be executed as planned.

4.7 Adjustments and changes to the optimized IPP are logged in a spreadsheet based change log. This change log does not seem to capture all changes. As an example, total gross funding has significantly changed for DS preventive and corrective maintenance, TS preventive maintenance, P&C Maintenance and P&C NOEA support, but these changes are not logged in the change log. Service providers have also indicated that some of their project and program specific input was incorporated while others was not. They have also indicated that there was a lack of communication about why some input related to in-service date and cash flow changes was not accepted.

4.8 It is unclear what changes to the optimized plan would require the plan to be run through the optimization process again. The IPP, once optimized, is simply adjusted based on changes recommended during the enterprise engagement reviews. The resulting adjusted IPP may not be a fully optimized plan. It was noted that the preliminary IPP was adjusted and re-issued to LOBs approximately 10 times before being finalized.

4.9 It is unclear how multi-year in-service additions are being treated in the IPP. In all cases, the "station centric" multi-year programs are being shown as in-serviced in the final year of the program. The reality is that these programs are in-serviced each year as the work progresses.

Risks: 

- An insufficient number of optimizable plans defeat the benefits of overall plan optimization.
- Insufficient time to provide quality input to the optimization process and to review the results of the optimization process increases the risk of having less than optimal plan.
- Inadequate communication around changes to the optimized plan increases the risk of diminishing the plan's credibility and less acceptance of the plan by its users.

Recommendations:

We recommend that Management:

4.1 Increase the number of investments that are optimizable. (related to Observation 4.3) Please refer to related Recommendation 3.1.

4.2 Make the AIP tool available year around to allow the planners to input and update their plans and risk assessments throughout the year. Management has indicated that plans are already underway to upgrade the AIP tool to allow this to occur in 2015. (related to Observation 4.4)

4.3 Consider AIP tool integration with other systems and tools such as AA (for asset risk factors), SAP (for AR and driver related data), BPC (Business Process Consolidation, for LOB forecast

and accomplishment data) and UPC (Unit price catalog, for unit price data) to ensure that information in AIP is kept up-to-date with other systems. (related to Observation 4.5)

4.4 Increase the enterprise engagement period to allow a detailed line by line review of unreleased work in the IPP by the project and program managers who will be executing the plan. This will allow better feedback on cash flows and in-service dates from the service providers based on the established scope. (related to Observation 4.6)

4.5 Implement a formal change log to document all recommended changes. This should also include appropriate review, approval and incorporation of changes with appropriate communication back to the requestor of the change. (related to Observation 4.7)

4.6 Determine and document which types of changes to the individual plans require the IPP to be run through the optimization process again to ensure that the resulting plan remains optimal. (related to Observation 4.8)

Management Response:

All recommendations have been agreed to by Mike Penstone, VP Planning. They are assigned for action as follows:

4.1 Scott McLachlan, Director, Asset Management)
4.2 Kathleen McCorriston, Manager, AM Processes and Tools
4.3 Kathleen McCorriston, Manager, AM Processes and Tools
4.4 Kathleen McCorriston, Manager, AM Processes and Tools
4.5 Kathleen McCorriston, Manager, AM Processes and Tools
4.6 Kathleen McCorriston, Manager, AM Processes and Tools

Proposed Action Plans: *(Accountable Manager, Title above in Management Response)*

4.1 This recommendation will be addressed as part of the action plan for recommendation 3.1.
4.2 This recommendation will be addressed upon implementation of AIP tool upgrade.
4.3 AM Process and Tools will request ISD to add audit recommendation to corporate application roadmap.
4.4 Enterprise Engagement period will be revised and incorporated into the revised schedule for the 2016-2020 planning cycle.
4.5 All changes will be recorded in the accomplishment file change log and/or documented in the meeting minutes.
4.6 AM Process & Tools will document conditions and requirement for the IPP to be run through the optimization process again into the Investment Optimization Management Procedure.

Completion Dates:

4.1 Q3, 2015
4.2 Q3, 2015
4.3 Q3, 2015
4.4 Q3, 2015
4.5 Q1, 2015 – COMPLETED
4.6 Q2, 2015

5. Lengthy Investment Plan Approval and Release Process

Background:
After the completion of IPP prioritization and review/adjustment by Senior Management, the adjusted IPP is included in the Corporate Business Plan for approval by the Hydro One Board of Directors. Subsequently, individual investments are then released to the service provider for execution. Programs work is approved at Board level and released annually while project work is released after a review and approval of Business Case Summary (BCS) by the appropriate Organization Authority Register (OAR) authorities.

The planners ensure that BCS showing cash flow based on detailed estimates, start date and in-service date as agreed with the service providers and customers (if required) is prepared and approved by appropriate OAR authorities prior to releasing funds to the service provider through SAP.

In May 2013, changes to the project/program definition and approval limits were implemented as per recommendations by Finance and approval of the Executive Committee (EC). A key change was to apply the interpretation of "program" to include component replacement/refurbishment, including bundling of such work. This resulted in a number of "station centric" bundled programs (often referred to as "projam" because they have a scope and schedule similar to project work but are funded through approved programs using unit pricing) of significant value being approved at a director level using Station Investment Capital Approval (SICA) even though the value of the "projam" exceeded the director level OAR authority.

Observation:
We are pleased to observe the following:

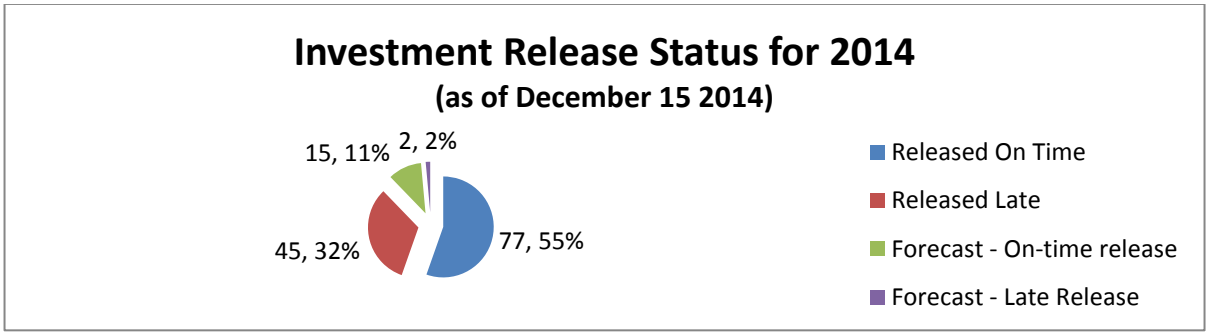
5.1 The approval and release process has not changed over the last several years. Appropriate training presentations, templates and job aids are available to planners for development of the BCS and directing it to the appropriate OAR authority.

5.2 87% of 2015 and 46% of 2016 transmission capital work program have already been released to Engineering and Construction.

We also observed the following opportunities for improving controls:

5.3 A requirement has been put in place recently to treat all "projam" greater than $20M as projects requiring an approved BCS by the appropriate OAR authority prior to release. However, it is unclear how the remaining "projam" investments will be approved and progress will be monitored.

5.4 100 projects and 39 "station centric" programs were scheduled to be released in 2014 using a BCS or SICA. The following is a summary of their release statuses as of December 15 2014.

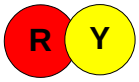


From the above analysis, we conclude that release dates are often optimistic.

5.5 Of the 45 projects that were released late in 2014, only one had its in-service date pushed back due to late release. The service providers are concerned about the timing of work release as they can't execute the work without a release. They have requested that changes in the release date need to be tied to changes in the in-service date to ensure that it will be met.

5.6 The primary cause for a delayed release is a delay in availability of detailed estimates.

5.7 A BCS requiring board approval goes through a series of reviews at director, VP, SVP/COO/CFO, President/EC and BT Committee of the Board. All these reviews require timely submission of information and if there are any questions or concerns raised during the review, the process is delayed. A detailed "Investment Review Schedule" showing earliest and latest submission dates for approval at specific committee or board meeting date is available to planners. It shows that, in most cases, the review and approval process needs to start a minimum of 6 to 8 weeks ahead of the Board meeting date.

Risks: 

- Delayed release of investments increases the risk of not meeting the approved in-service date.
- Lengthy review and approval process of BCS requiring Board Approval increases the risk of delayed release.

Recommendations:

We recommend that Management:

5.1 Clarify the approval requirement and progress monitoring for "projam" investments. Review the project and program approval process with specific focus on shortening the approval timeline. This may include appropriate escalation triggers as well as clarification of requirement for timely review / approval. (related to Observation 5.7)

5.2 Ensure that realistic release dates are considered by the planners as they develop their plans. (related to Observation 5.4, 5.5 and 5.6)

Management Response:

All recommendations have been agreed to by Mike Penstone, VP Planning. They are assigned for action as follows:

5.1 Mike Penstone, VP Planning

5.2 Scott McLachlan, Director, Transmission Asset Management

Proposed Action Plans: *(Accountable Manager, Title above in Management Response)*

5.1 This will be incorporated into annual review of OAR.

5.2 This recommendation will be addressed as part of the action plan for recommendation 1.4.

Completion Dates:

5.1 Q3, 2015

5.2 Q3, 2015

BACKGROUND

Hydro One has adopted an Asset Management model, since its inception, to plan, approve and implement work related to customers, assets and system needs. The Asset Management function is responsible for defining and planning work, while the Work Execution function is responsible for delivering asset and customer based services in accordance with work defined and planned by Asset Management. The primary responsibility for identifying needs, decision making, planning and defining work related to transmission and distribution assets lies with Asset Management, while the primary responsibility for design & engineering, construction, operation & maintenance and customer care services lies with the Work Execution function.

The Planning Organization, reporting to the Chief Operating Officer, has accountability for all planning activities related to programs and projects, including: Asset Management, Project Development, Network Development, Regional Planning, as well as accountability for reliability strategies, initiatives and compliance with electricity regulatrions. A key part of the Asset Management is the Investment Planning process, which is the focus of this audit. This process has never been audited before and the objective and scope of this audit is included in Appendix B.

The output of the investment planning process is the Investment Plan Proposal (IPP) which details the work plan, funding levels and accomplishments for a five year period. This plan is determined based on the assessment of identified needs using an iterative risk-based prioritization and optimization process that takes into account corporate business values (such as safety, reliability, customer satisfaction, shareholder value, etc.), investment strategies, financial constraints and resource/outage availability. The IPP is a major input to the Hydro One's Corporate Business Plan that is approved annually by its Board of Directors. The IPP also forms a basis for the Transmission and Distribution rate filings with the Ontario Energy Board. Although the IPP includes all investments related to the development and sustainment of transmission and distribution assets, operating assets and common corporate assets (such as IT, fleet, facilities, etc.), this audit specifically focuses on the development and sustaining investments being made at the transmission and distribution stations only.

A high-level Investment Planning process is summarized in Appendix D. Key steps of the process are as follows:

1. Identification of customer, asset and system needs
2. Data collection and assessment of needs
3. Development of risk-based Investment alternatives
4. Selection of Investments using an optimization process to maximize corporate business values within identified constraints
5. Approval and release of investments to Work Execution function

The above process steps result in an IPP showing the best portfolio of investments that achieve the optimal balance of cost effectiveness, customer expectations, asset and system needs within the financial, material, resource, outage availability as well as customer rate impact constraints. A thorough management review and appropriate adjustment of the optimized IPP ensures that the IPP is executable, financial objectives are met and the risks that the plan imposes are acceptable.

AUDIT OBJECTIVES & SCOPE

Audit Objective:
The primary objective of this audit was to provide management with assurances that processes and controls for investment planning within Hydro One Networks are effective. This was a high-level "end to end" process audit with future audits being recommended in specific areas of concern.

Scope of the Audit:
The scope of this audit was limited to the following areas related to development of the Investment Plan Proposal (IPP) with focus on the Transmission and Distribution stations assets only:

- Determine asset needs
- Develop Investment Plans
- Prioritize Investment Plans
- Approval and release of Investment Plans

Redirection and Change Control processes were out of scope as these processes are applied after IPP is approved and implemented. This review included work related to the development of the 2015-2019 Investment Plan Proposal and related documentation produced as of November 30, 2014.

Approach:
This audit involved the following activities:

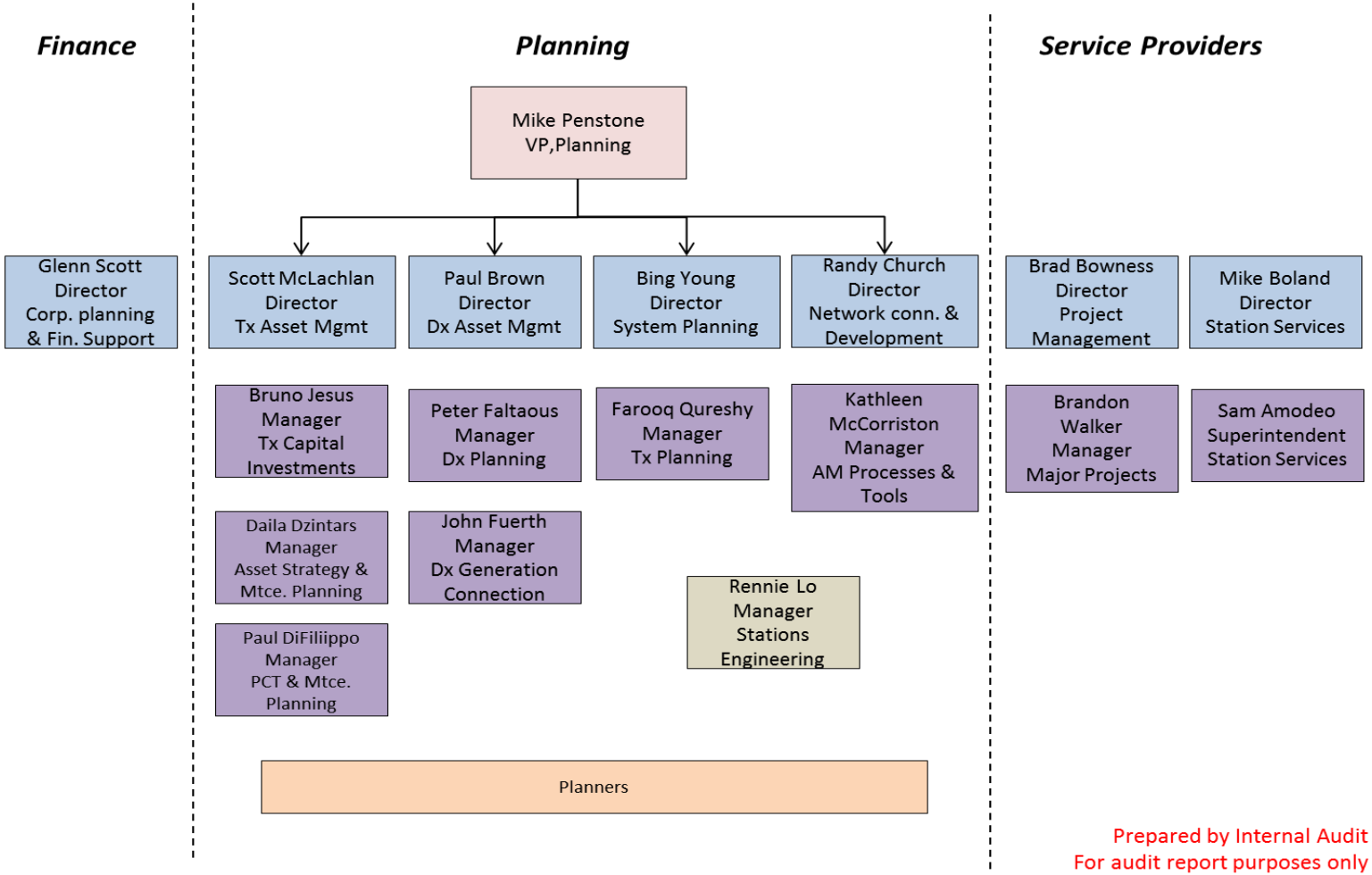
1. Review the existing investment planning process documents and examples of current investment plans.
2. Confirm and update our understanding of the investment planning processes and tools by having discussions with management and staff.
3. Document the process for audit purposes.
4. Update our understanding of the key controls that provide assurance relative to the audit objectives.
5. Interview and discuss with the accountable management, staff and stakeholders regarding control effectiveness.
6. Test a sample of investments and records related to the scope for control effectiveness.
7. Brief management on any control issues throughout the review.
8. Recommend improvements, where appropriate.

Disclaimer
In this report, we provide suggestions for improving controls to mitigate the risks identified. These recommendations may not be the only solution, nor are they intended to be prescriptive as to management's action. It is management's responsibility to ensure that they develop and implement action plans that are both cost-effective and address the risks identified in the report.

APPENDIX C

AUDIT CONTACTS

INVESTMENT PLANNING PROCESS AUDIT CONTACTS (for Tx and Dx Station only)



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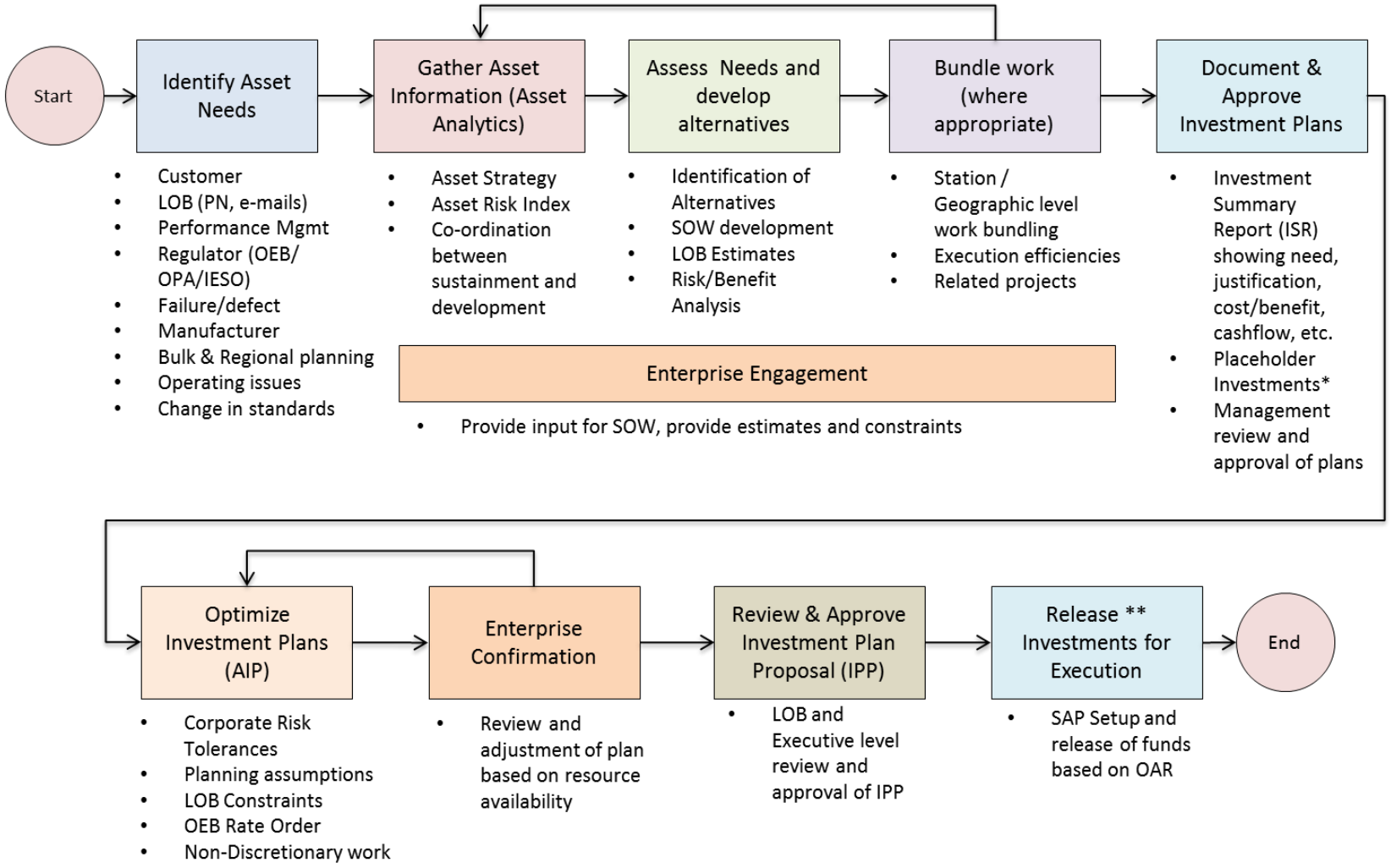
For audit report purposes only

APPENDIX D

INVESTMENT PLANNING PROCESS (HIGH LEVEL)

HIGH-LEVEL INVESTMENT PLANNING PROCESS (for Tx and Dx Station only)



* Large investment with limited scope definition at the time of business planning
** High priority projects are released ahead of time or while the process is going on

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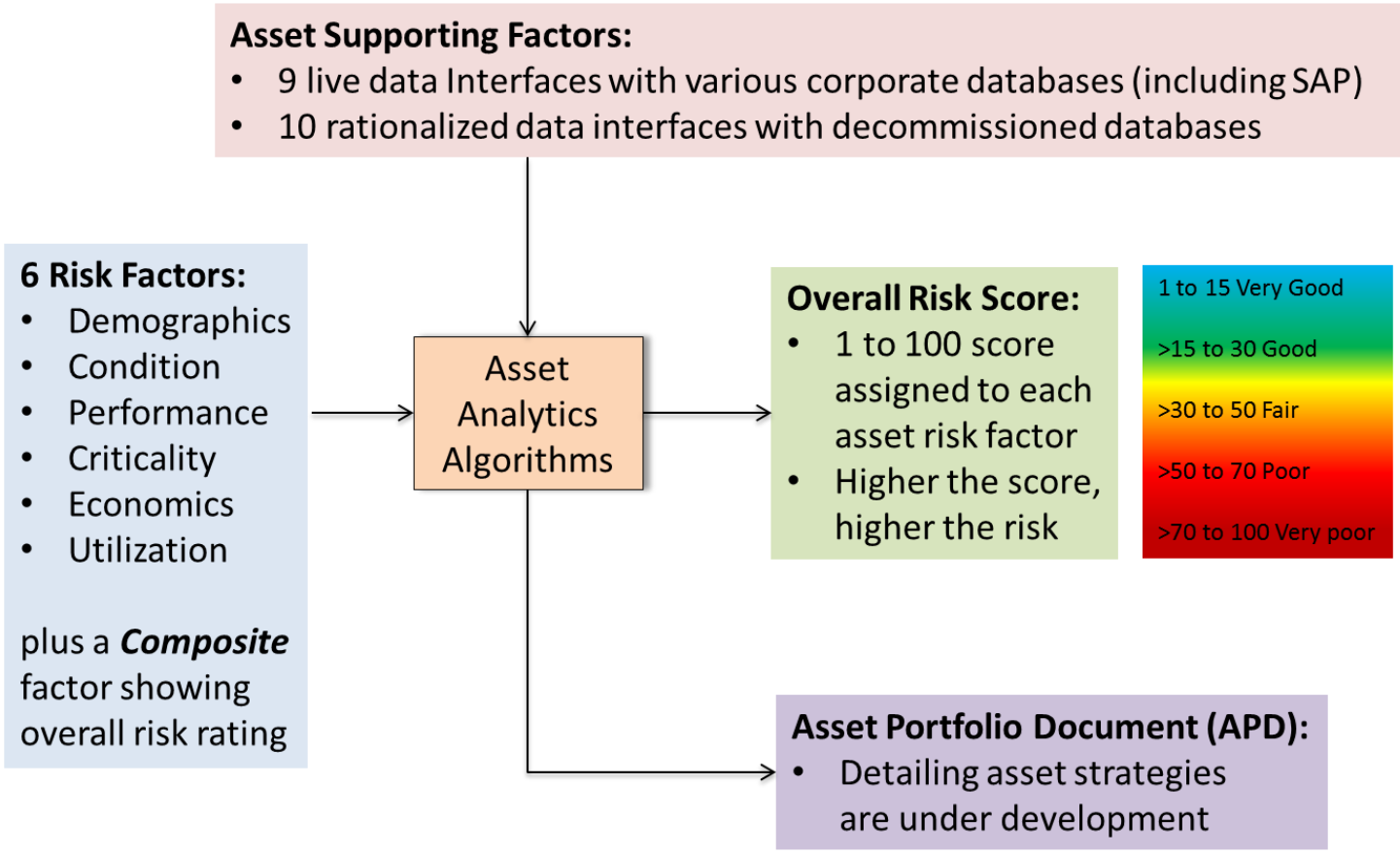
APPENDIX E

ASSET ANALYTICS (AA) OVERVIEW

Asset Analytics (AA) Overview



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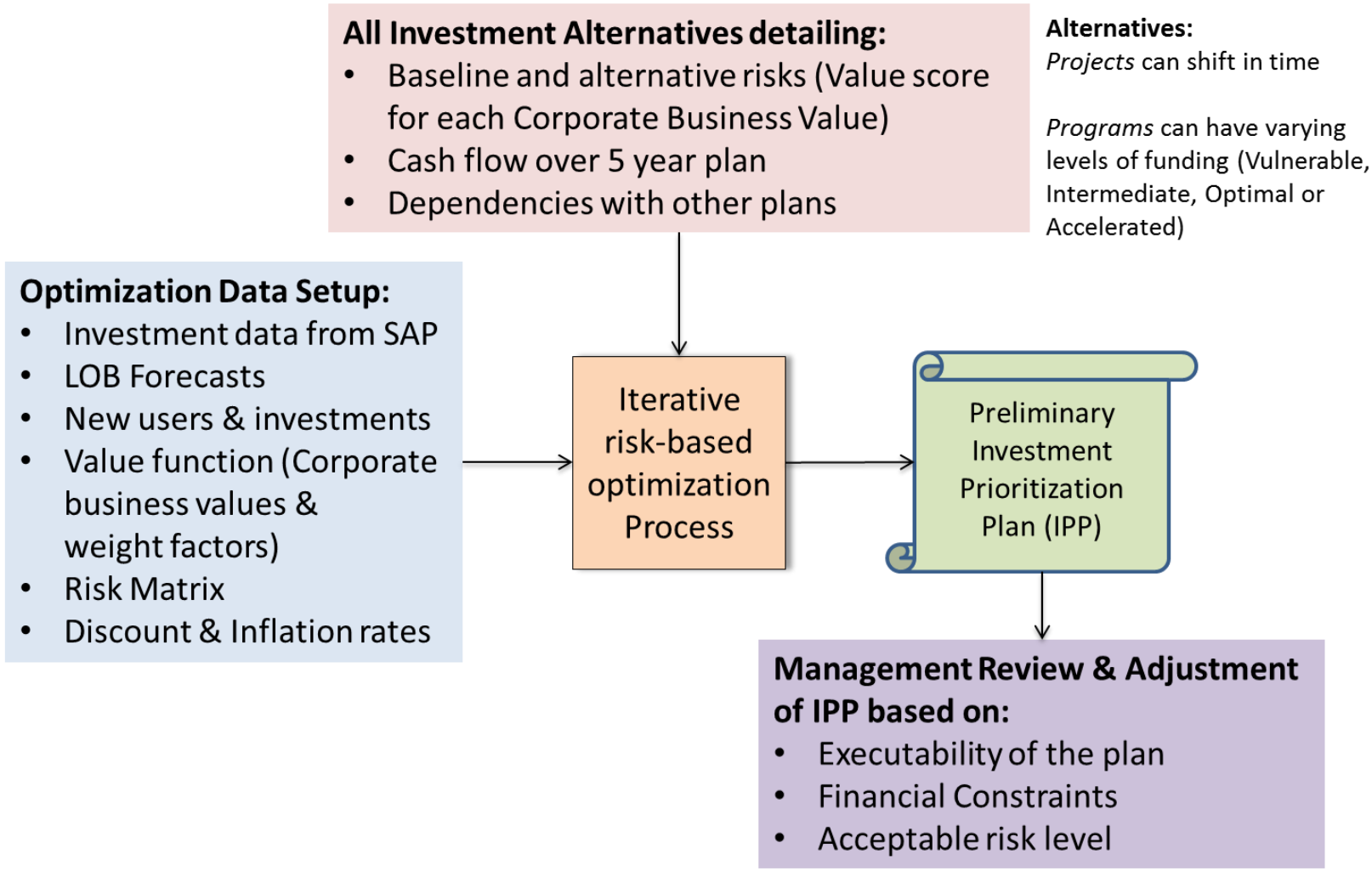
APPENDIX F

ASSET INVESTMENT PLANNING (AIP) OVERVIEW

Asset Investment Planning (AIP) Overview



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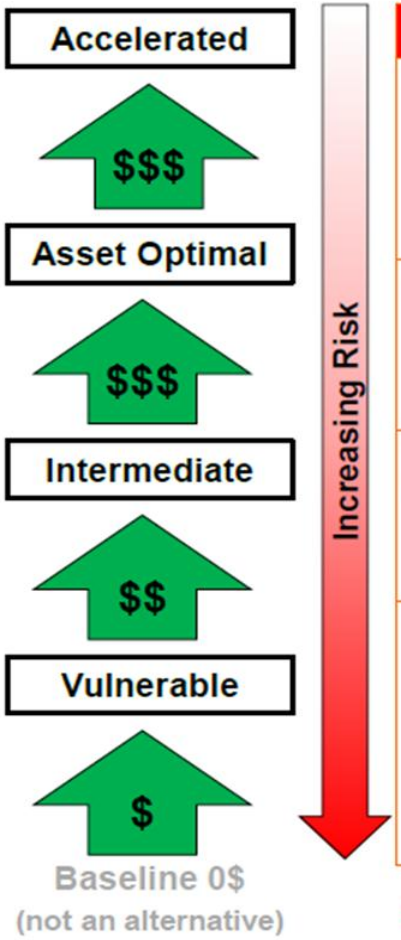
INVESTMENT ALTERNATIVES OVERVIEW

Concepts and Definitions

Investment Alternative Names (for Programs)



Alternative	Definition
Accelerated	▪ This investment alternative exceeds "Asset Optimal" in order to mitigate a coming "bow wave" of asset needs. ▪ It is normally only applied where in a future year there will be a jump in required investment beyond what can be resourced or reasonably executed, so a 'head start' is necessary to ensure that the "Asset Optimal" investment level is achievable in future years
Asset Optimal	• This investment alternative represents the ideal balance point, where total lifecycle costs (not unit cost) of the asset are minimized and risk is low • Asset needs are fully met and there is a high degree of confidence that the assets will perform as aligned with the Asset Strategy which in turn aligns with the Corporate Strategy
Intermediate (1..n)	• These investment alternatives represent materially less risk exposure and materially more cost than "Vulnerable" but remain below "Asset Optimal" and therefore are less than ideal • All intermediate levels lie between "Vulnerable" and "Asset Optimal" in terms of cost and risk
Vulnerable	▪ This investment alternative is tolerable for only brief periods and exposes the company to significant risk of the asset not performing. ▪ Asset maintenance and/or replacement needs are not fully met. Future performance of the asset is uncertain, and is almost certain to drop below acceptable levels beyond 5 years if the level of investment is not increased. ▪ Short-term, strict regulatory compliance and safety is reasonably assured, but little else; the level of residual risk at the end of the 5 year planning period is just outside the "red zone" which is tolerable only in the near term and is not sustainable

Note: Projects will only have one alternative (which can be named the same as the project name)

Source: Business Concepts
2015-19 Investment Planning, April 2014, PPT Presentation

SUMMARY OF ACTIONS

(R) #	Observations	Risk	Recommendations (R)	Action Plan	Accountability	Completion Date
1. Governance and Controls						
1.1	There has been no recent and formal business risk assessment of the overall Planning business unit's objectives completed as per the Enterprise Risk Management Policy (SP0736).	M	Perform a formal risk assessment as per ERM Policy (SP0736) on an annual basis to ensure that business risks facing the planning organization are identified and mitigating actions are developed and tracked.	Planning will work with ERM Group to conduct a risk workshop to identify risks in achieving the planning business objectives.	Randy Church, Director, Network Connections and Development	Q4, 2015
1.2	Policies, processes, procedures, standards and guidelines are missing, incomplete, outdated or not being used consistently	H	Develop, review and approve sufficiently detailed policies, standards, procedures and guidelines to ensure a consistent risk-based approach to planning and decision making. This would require a review of the existing governance documents and ARIS process models for their accuracy and validity. Management has informed us that a Policy Review project is currently underway to consolidate policy and directive documents.	Conduct a review of processes, procedures, standards and guidelines to determine the need, effectiveness, currency and to ensure they are aligned with and support the Corporate Operational Policies. Establish a review cycle for these documents.	Luis Marti, Director, Reliability Studies, Strategies and Compliance	Q4, 2015
1.3 3.5	There is a lack of a clearly defined process and guidelines for the level of input to be sought by the planners and to be provided by the service providers during the	M	Clarify the timing and level of input to be sought by the planners from the service providers as they develop their plans.	At the annual LOB kick off, AM Processes and Tools will identify and seek input from the service providers to obtain their feedback on ideal timing and level of input required.	Kathleen McCorriston, Manager, AM Process & Tools	Q1, 2015

	Observations	Risk	Recommendations	Action Plan	Accountability	Completion Date
	investment plan development. There is inconsistent engagement with internal service providers during the development of alternatives.		Define and communicate the required level of engagement with the service provider when investment plans are being developed to ensure that plans are based on asset needs rather than executability by the service providers.	Planning will also be in attendance to ensure agreement and consistency in approach.		
1.4 2.1 2.2 3.3 3.6 5.2	There is no formally documented Quality Assurance process with related measures to assess the effectiveness of the "end-to-end" planning process.	H	Implement a formalized Quality Assurance process and related performance measures to assess the effectiveness of the "end-to-end" planning process. This would include: • a Need identification and tracking process • guidelines on use and validation of AA data to assess needs and risks • QA reviews of Investment Summary Reports and feedback to planners • Supporting document availability and review, and • realistic investment release dates	Quality expectations and the required metrics for the end-to-end process will be established and communicated by the Planning Organization.	Scott McLachlan, Director, Transmission Asset Management	Q3, 2015
1.5	There is no formal training for the overall "end to end" planning process. However, there is informal training on use of tools. None of the training is tracked and refreshed as the process and tools evolve.	M	Formalize and track all process and tool related training being given to planners in their Learning Management System. Establish refresher training requirements whenever there are significant changes in process and tools.	The Planning Organization will assess all training requirements including the frequency of refresher training and mechanism for tracking training completion. We will develop an implementation plan that defines the accountabilities	Mike Penstone, VP Planning	Q4, 2015

	Observations	Risk	Recommendations	Action Plan	Accountability	Completion Date
				for creation and delivery of training material.		
1.6	There is no formal lessons learned documentation for continuous process improvement.	M	Document and communicate lessons learned after each planning cycle and use them for continuous improvement of the planning process.	AM Processes & Tools will document and communicate lessons learned after the 2016-2020 planning cycle.	Kathleen McCorriston, Manager, AM Process & Tools	Q3, 2015
2. Customer, Asset and System Need Assessment						
2.3	The AA data quality remains a concern. The quality of underlying data (accuracy, completeness and timely availability of recent data) being used from SAP and other databases for risk index calculations is unknown.	H	Request an audit of Asset Analytics data sources and algorithms to confirm that quality data and appropriate calculation methods are used for calculating the six Asset Risk Indexes for individual assets as well as asset groups.	SAP Data Audit on Asset and Maintenance data is already underway. The results of these audits will be used to address the underlying data issues in AA. Workshops with respective LOBs will be held regarding usability of existing algorithms.	Randy Church, Director, Network Connections and Development	Q4, 2015
2.4	System development projects are based on area supply studies requiring power system historical data related to load flows, voltages, asset connectivity and statuses. These data are not available in AA.	M	Consider expanding the scope of the Asset Analytics tool to include up-to-date power system historical data such as load flows, connectivity, voltages, statuses, etc.	AM Process and Tools will request ISD to add audit recommendation to corporate application roadmap. Key requirement is to have access to NMS information.	Bing Young, Director, System Planning	Q1, 2015

	Observations	Risk	Recommendations	Action Plan	Accountability	Completion Date
2.5	There are no clearly documented asset strategies against which individual asset needs are assessed. However, work has recently started on developing Asset Strategy Documents for 30 key asset groups.	M	Continue to develop sufficiently detailed Asset Strategy Documents for all asset groups and ensure that all future asset needs are assessed against these documented strategies.	We will continue to develop Asset Strategy Documents.	Scott McLachlan, Director, Transmission Asset Management	Q4, 2016
3. Investment Alternatives						
3.1 4.1	For the AIP optimization to be effective, projects should be shiftable in time and programs should have more than one alternative. Only 30% of the plans in 2015-2019 IPP were optimizable within AIP.	H	Increase the numbers of investments that are optimizable by requiring the planners to define more than one alternative for non-demand driven programs and time shift-able projects. Management should also ensure that appropriate justification is documented and reviewed for plans having only a single alternative.	We will define the framework for investments including the expectations outlining the definition and governance of programs and projects and requirements for program alternatives and time shift-able projects. Document and communicate these requirements.	Scott McLachlan, Director, Transmission Asset Management	Q3, 2015
3.2	The current risk matrix is confusing and that the provided guidelines are subjective.	M	Simplify the risk assessment matrix and provide suitable training and guideline to planners to perform an effective risk assessment. Specific focus should be on using quantative data from AA and other systems to determine/support appropriate probability and consequence on the established risk matrix.	We will improve the guidance on the use of the risk assessment matrix through the provision of practical examples.	Scott McLachlan, Director, Transmission Asset Management	Q4, 2016

	Observations	Risk	Recommendations	Action Plan	Accountability	Completion Date
3.4	Some of the unit prices being used for program work are outdated or incorrect.	M	Review and confirm the Unit Price Catalog with the service providers prior to the start of each planning cycle to ensure that the most current unit prices are being used to determine the funding level for the program work.	We will establish a process to ensure costs included in the investment plans are agreed upon between Planning and Operations (executing LOBs).	Chong Ng, Director, Project Development	Q4, 2015
4. Investment Plan Optimization						
4.2	The AIP tool was only available for a limited time resulting in planners having insufficient time for thorough documentation of their plans and management having insufficient time to review those plans in detail.	M	Make the AIP tool available year around to allow the planners to input and update their plans and risk assessments throughout the year. Management has indicated that plans are already underway to upgrade the AIP tool to allow this to occur in 2015.	This recommendation will be addressed upon implementation of AIP tool upgrade.	Kathleen McCorriston, Manager, AM Process & Tools	Q3, 2015
4.3	Manual workarounds are in place to update AIP data from SAP and other systems.	L	Consider AIP tool integration with other systems and tools such as AA (for asset risk factors), SAP (for AR and driver related data), BPC (Business Process Consolidation, for LOB forecast and accomplishment data) and UPC (Unit price catalog, for unit price data) to ensure that information in AIP is kept up-to-date with other systems.	AM Process and Tools will request ISD to add audit recommendation to corporate application roadmap.	Kathleen McCorriston, Manager, AM Process & Tools	Q3, 2015

	Observations	Risk	Recommendations	Action Plan	Accountability	Completion Date
4.4	Enterprise engagement is occurring at the director level and above with a focus on comparison with previous year's plan to identify what has changed and discuss why. A line by line review is only occurring for major / complex plans. The LOB engagement for 2015-2019 IPP occurred over a four day period from June 9 to 13, but the service providers have indicated that	H	Increase the enterprise engagement period to allow a detailed line by line review of unreleased work in the IPP by the project and program managers who will be executing the plan. This will allow better feedback on cash flows and in-service dates from the service providers based on the established scope.	Enterprise Engagement period will be revised and incorporated into the revised schedule for the 2016-2020 planning cycle.	Kathleen McCorriston, Manager, AM Process & Tools	Q3, 2015
	they need more time to review each investment line item in IPP in sufficient detail with their project and program managers to ensure that the IPP can be executed as planned.					
4.5	Adjustments and changes to the optimized IPP are logged in a spreadsheet based change log. This change log does not seem to capture all changes.	M	Implement a formal change log to document all recommended changes. This should also include appropriate review, approval and incorporation of changes with appropriate communication back to the requestor of the change.	All changes will be recorded in the accomplishment file change log and/or documented in the meeting minutes.	Kathleen McCorriston, Manager, AM Process & Tools	Q1, 2015 Complete

	Observations	Risk	Recommendations	Action Plan	Accountability	Completion Date
4.6	It is unclear what changes to the optimized plan would require the plan to be run through the optimization process again. The IPP, once optimized, is simply adjusted based on changes recommended during the enterprise engagement reviews. The resulting adjusted IPP may not be a fully optimized plan. It was noted that the preliminary IPP was adjusted and re-issued to LOBs approximately 10 times before being finalized.	M	Determine and document which types of changes to the individual plans require the IPP to be run through the optimization process again to ensure that the resulting plan remains optimal.	AM Process & Tools will document conditions and requirement for the IPP to be run through the optimization process again into the Investment Optimization Management Procedure.	Kathleen McCorriston, Manager, AM Process & Tools	Q2, 2015
5. Investment Plan Approval and Release						
5.1	A requirement has been put in place recently to treat all "projam" greater than $20M as projects requiring an approved BCS by the appropriate OAR authority prior to release. However, it is unclear how the remaining "projam" investments will be approved and progress will be monitored.	H	Clarify the approval requirement and progress monitoring for "projam" investments. Review the project and program approval process with specific focus on shortening the approval timeline. This may include appropriate escalation triggers as well as clarification of requirement for timely review / approval.	This will be incorporated into annual review of OAR.	Mike Penstone, VP Planning	Q3, 2015

INTERNAL AUDIT REPORT

Transmission Lines
Preventive Maintenance Optimization

To:

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Vice President, Planning

Distribution:

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Final Report Issued: April 7, 2016
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Report Number: 2015-33

Lead Auditor: Atul A. Solanki
Audit Manager: Jeff Schaller

EXECUTIVE SUMMARY

Preventive Maintenance programs are in place for Hydro One Networks' transmission and distribution system assets to ensure safe and reliable operation of these systems while meeting regulatory maintenance requirements for these assets. The Planning Organization is accountable for developing and funding Preventive Maintenance Optimization (PMO) programs for transmission and distribution assets, ensuring cost-effective preventive maintenance is performed on the right equipment at the right time to maintain system functions. The PMO programs include periodic visual inspections, diagnostic testing, as well as intrusive inspections and maintenance (such as cleaning, lubrication and worn out parts replacements) based on observed test results and asset conditions.

The primary objective of this audit was to provide assurance that the governance and controls within the Planning organization are effective for the development and management of PMO programs. This area was audited in 2003 with specific focus on end-to-end preventive maintenance processes. Due to resource limitations within Transmission Asset Management – Stations at the present time, our audit focused on transmission lines and distribution stations, as well as lines PMO programs for this interim report. Separate audit reports were produced for Transmission and Distribution business areas. *This* report focuses on PMO in the transmission business. We suggested to management that the observations and recommendations within this report also be considered for application to the Transmission Stations PMO program.

Our work included:

- Interviews with management and planners within both the Planning organization and the Forestry division to determine effectiveness of existing controls.
- Review of governance documents related to maintenance planning (strategies, policies, processes, procedures, training, etc.).
- Review of the annual maintenance plans developed for 2013, 2014 and 2015, including cost and accomplishment variance reports as well as maintenance plans setup in SAP.
- Review of the regulatory maintenance compliance reporting for transmission line right-of-way (ROW) maintenance.

We noted that the following success factors were in place:

- The PMO program mandate and accountabilities are well-understood within the Planning organization.
- High-level PMO program strategy and policy documentation are in place.
- Annual PMO programs are developed and released to the service providers for execution as per agreed investment planning schedule.
- There is on-time regulatory compliance reporting for transmission line ROW maintenance.
- Formal reports are available on demand from work management system (SAP) for PMO program variance monitoring. They are used by management for program redirection.
- Communication between Planning and Service Providers for PMO program development, work execution and technical support has recently improved over that of previous years, driven by management's efforts.

We have discussed our observations with management throughout the audit. The recommendations we made, which management has accepted and for which action plans have been developed include:

- Ensure details for overhead lines, underground cable and right-of-way maintenance among various PMO investment planning documents are consistent and up to date.

- Update and approve the PMO planning process to ensure consistency across all asset types; then ensure that appropriate process training and/or knowledge transfer is in place for new planners.
- Document risk-based asset strategies that detail what maintenance needs to be performed at what interval and for which reasons, along with the risks for delaying maintenance. This strategy can then be applied for consistent identification of risk-based alternatives for vulnerable, intermediate, optimal or accelerated investment funding levels.
- Perform an annual review of the maintenance strategy for further optimization opportunities based on observed asset performance and condition, selection of optimal maintenance task and frequency, and work bundling opportunities with other work programs (such as asset replacement).
- Ensure that the annual maintenance plan has supporting data for risk based prioritization of investment alternatives, accurate unit price based costs, and appropriately documented input and agreements on plan executability.
- Ensure that regulatory maintenance compliance reporting is performed directly from SAP where cost and accomplishment are tracked, rather than from an off-line spreadsheet.
- Develop an appropriate process and accountabilities for defining new assets and their maintenance plans in SAP along with creation of maintenance work orders that are consistent with the agreed annual maintenance plan.
- Ensure appropriate tracking of management redirection actions based on observed program costs and accomplishments variances.
- Ensure consistent reporting, analysis and use of asset condition data to determine any revision or adjustment to annual maintenance plans.

Based on the specific areas reviewed as of December 1, 2015, we concluded that some control improvements are needed to ensure that the Preventive Maintenance Optimization program is able to plan and release cost-effective asset maintenance plans.

Management has developed action plans to mitigate the identified risks and address our recommendations, as summarized in Attachment "A" of this report. Additional details are available upon request.

We would like to thank the management and staff in the Planning organization and Forestry division for their assistance and open discussions during this review.

ATTACHMENT A

OBSERVATIONS, RECOMMENDATIONS AND MANAGEMENT ACTIONS

(R) #	Observations	Risk[1]	Recommendations	Action Plan	Accountability	Completion Date
1.0 Governance						
1.1	Governance documents are developed, reviewed, approved and communicated by Management to set the expectations around how Transmission Line Preventive Maintenance Optimization (TL PMO) planning work is to be performed. We observed the following deficiencies in the existing governance documents for overhead lines, rights-of-way and underground cable maintenance planning: • Asset-specific strategy documents were not in place at the time of the audit, however we were advised by management that they are currently being developed. • Asset Planning documents for overhead lines and underground cables have not been updated since 2013. They are required to be reviewed and updated annually during each planning cycle. • Investment Summary Reports are missing details of risks and accomplishment levels. • Scope of Work documents have minimal and inconsistent details of work accomplishment and reporting requirements. • Work Standard Documents are in place	M	Ensure completeness and consistency of details within various PMO investment planning documents across all asset types such as asset strategies, planning documents, investment summary reports, scopes of work and work standard documents.	The format of planning documents will be reviewed for content consistency. Templates will be developed and posted to the Tx AM Lines SharePoint site for use by the Planners.	Walter Kloostra, Manager, Transmission Lines Asset Sustainment & Secondary Land Use	Q4 2016

[1] Residual Risk levels applied are described in the Legend that follows this table (Page 11).

(R) #	Observations	Risk[1]	Recommendations	Action Plan	Accountability	Completion Date
	for underground cables, but not for overhead lines and rights-of-way. ***Risk:*** *Poorly defined, inconsistent or missing governance documents increase the risk of confusion around strategy, policy, risk-analysis as well as work plan, execution and reporting requirements.*					
1.2	Appropriate work process and related training are required for consistent and efficient execution of work. We found that a detailed asset life-cycle management process is in place, but the planners were not aware of it. Management informed us that a process is being developed specifically for maintenance planning. Planners are currently following their own program-specific planning process based on their experience and understanding of what needs to be done. All three planners for overhead lines, rights-of-way and underground cable maintenance have been in their position for less than two years with little, or no initial or ongoing knowledge transfer or process training. ***Risk:*** *Lack of well-defined, communicated and understood work process and related training could lead to poorly defined maintenance programs that are unable to address asset and system needs.*	M	Update and approve the Maintenance Planning process to ensure consistency across all asset types and ensure that appropriate maintenance planning process training and/or knowledge transfer is in place for new planners.	The Transmission AM draft maintenance planning process will be stakeholdered and finalized.	CK Ng, Director, Transmission Asset Management	Q4 2016

(R) #	Observations	Risk[1]	Recommendations	Action Plan	Accountability	Completion Date
1.3	A risk assessment record for the Transmission Lines asset maintenance planning process does not exist. ***Risk:*** *Missing business risk assessment and mitigating actions could lead to the business being exposed to unacceptable levels of business risks.*	L	Perform a formal risk assessment of the Maintenance Planning process in accordance with Hydro One's Enterprise Risk Management framework	Maintenance planning risks will be assessed with the process and asset strategy being updated as required.	CK Ng, Director, Transmission Asset Management	Q4 2016
2.0 Preventive Maintenance Strategy						
2.1	High-level maintenance strategies identified in Hydro One Network's regulatory submissions are being followed, however the planners are continuing with these existing high-level strategies without adequate knowledge of how they were developed, or what needs to be monitored to ensure their effectiveness. Planners have informed us that the current strategies were developed based on industry best practices at the time, but they are unaware of any recent changes or evolution of those industry best practices. Example: the right-of-way maintenance is primarily driven by NERC regulatory requirement, which while prescribing a minimum standard for all of North America, may not necessarily be optimal in all Hydro One situations. ***Risk:*** *The absence of a well-defined asset maintenance strategy would result in less than optimal maintenance planning.*	H	Document risk-based, asset-specific maintenance strategies that detail what maintenance tasks need to be performed and how often, criteria to identify opportunities and associated risk of delaying maintenance. This strategy can then be applied for consistent identification of risk-based investment alternatives (vulnerable, intermediate, optimal or accelerated).	Asset strategy documents have been developed and will be reviewed to ensure inclusion of asset-specific maintenance planning strategies.	Walter Kloostra, Manager, Transmission Lines Asset Sustainment & Secondary Land Use	Q4 2016

(R) #	Observations	Risk[1]	Recommendations	Action Plan	Accountability	Completion Date
2.2	Currently there is a limited review of existing maintenance plans with focus on which maintenance could be delayed rather than which maintenance plans could be eliminated or have their frequencies adjusted. There is a limited review of asset performance and condition data to determine whether to delay or bring forward planned maintenance. The annual maintenance plan is based on the planners' subjective understanding of asset criticality, last maintenance date and service provider's input on work executability. Exploration of work bundling opportunities at the maintenance planning level is limited or non-existent. Instead, most work bundling is done by the service provider at the work execution level. ***Risk:*** *Inadequate periodic review and adjustment of maintenance strategy would lead to less than optimal maintenance plan. Not identifying work bundling at the planning stage can limit work and equipment outage bundling opportunities.*	M	Perform an annual review of the asset specific maintenance strategies for further optimization opportunities: • Identify, collect and analyze key asset performance and condition information to validate that maintenance plans are optimal. • Delay or reduce maintenance of non-critical assets to determine optimal maintenance tasks and frequency. • Identify and implement maintenance bundling opportunities with other work programs.	a) Maintenance strategy documents will be reviewed annually for further optimization opportunities as per the Asset Strategy document referred to in 2.1 above. b) Existing collaboration with the TSOG process will be enhanced to investigate and consider outage bundling opportunities for planned PM work.	Walter Kloostra, Manager, Transmission Lines Asset Sustainment & Secondary Land Use	Q4 2016
3.0 Annual Maintenance Plan						
3.1	Planners are required to develop risk-based alternatives for prioritizing maintenance investments. The planners' risk assessments for various maintenance investment alternatives are mostly subjective with no consistency in using asset performance or condition data to support their risk evaluation. Available funding levels are the primary factors for	M	Clearly document supporting data and/or planner judgments that are used for risk-based prioritization of various funding levels along with asset-specific planned accomplishments for each funding level.	AIP risk assessments will be reviewed with the intent to capture supporting data and any qualitative information used for risk assessment.	Walter Kloostra, Manager, Transmission Lines Asset Sustainment & Secondary Land Use	Q4 2016

(R) #	Observations	Risk[1]	Recommendations	Action Plan	Accountability	Completion Date
	risk assessment rather than asset condition or performance data. Example: A 10% cut in right-of-way maintenance funding level necessitated corresponding cuts in planned accomplishments. ***Risk:*** *Inadequate assessment of baseline and alternative risks could lead to high-risk assets not being maintained at appropriate intervals.*					
3.2	Unit costs being used for the 2016 to 2020 business plan are inconsistent with the agreed Unit Price Catalog. Planners have indicated that they have informal discussion and agreement with the service provider on the unit prices, accomplishment levels and resulting funding levels. ***Risk:*** *Use of incorrect or outdated unit prices could lead to the maintenance investment plan being underfunded for specified number of accomplishments.*	M	Ensure that the unit costs being used to determine funding levels are as per current Unit Price Catalog agreed with the service providers.	a) The planners will document in AIP any changes to unit prices that they have agreed with the service providers and inform Investment Management of these changes. b) Investment Management will update the UPC with newly revised unit prices when advised by either the planners or service providers.	a) Walter Kloostra, Manager, Transmission Lines Asset Sustainment & Secondary Land Use b) Kevin Mancherjee, Manager, Investment Management	Q4 2016
4.0 Asset and Maintenance Plan Setup in SAP						
4.1	NERC compliance reporting for Right-of-Way regulatory maintenance is managed by the service provider in an off-line spreadsheet using periodic data download	H	Ensure that NERC impactive circuits and their vegetation maintenance accomplishments are tracked and reported from SAP,	a) A formal report from FMS will be developed for regulatory reporting	Tom Jackson, Director, Forestry Services	Q4 2016

(R) #	Observations	Risk[1]	Recommendations	Action Plan	Accountability	Completion Date
	from the Forestry Management System (FMS). ***Risk:*** *Reliance on off-line manual tracking of maintenance accomplishments for regulatory reporting increases the risks of errors and omissions.*		which is the official source for maintenance costs and accomplishments tracking.	purposes replacing the manual spreadsheet based report. b) FMS will be used instead of SAP for accomplishment reporting as FMS is the system being used by the Service Providers for accomplishment tracking.		
4.2	The planners are accountable to create appropriate work orders in SAP for each asset to execute the planned work program. The process and accountabilities for ensuring that appropriate maintenance work orders are created for new assets is unclear. For right-of-way maintenance, the service provider creates required work orders in SAP to execute the agreed work program but there is no planner validation to ensure that appropriate work orders are created and used by the service provider. ***Risk:*** *Missing assets and work orders in SAP could lead to planned maintenance not being performed on specific assets.*	H	Develop a process and clarify accountabilities to ensure that appropriate Work Orders are created in SAP to monitor the annual work accomplishments.	Tx Lines AM will document a process and accountabilities for work orders released in SAP, and monitor with monthly reporting.	Walter Kloostra, Manager, Transmission Lines Asset Sustainment & Secondary Land Use	Q4 2016
5.0 Variance Monitoring and Change Management						
5.1	Planners currently do not document results of their monthly variance discussions with the service providers or any redirection decisions that are made during these discussions for later implementation and	M	Ensure that discussions and decisions resulting from monthly variance monitoring meetings are documented and action items are monitored for completion. This	Meeting minutes from quarterly meeting with the service provider will be documented.	Walter Kloostra, Manager, Transmission Lines Asset	Q3 2016

(R) #	Observations	Risk[1]	Recommendations	Action Plan	Accountability	Completion Date
	monitoring. ***Risk:*** *Missing or poor documentation of redirection decisions can lead to confusion around which maintenance should be delayed or deferred.*		includes changes resulting from funding reductions and ability to execute the work (maintenance unit swapping).		Sustainment & Secondary Land Use	
5.2	The "PP-177 Schedules A&C Gross Report" from SAP is used to monitor accomplishments and maintenance costs. The 2015 PP-177 report for Overhead lines has budget accomplishments listed as zero resulting in no variance monitoring for planned monthly and annual accomplishments. ***Risk:*** *Errors and omissions in variance reports can lead to incorrect management redirection decisions based on observed variances.*	M	Ensure that Overhead Line accomplishment budget is identified in the PP-177 Report (currently missing).	Tx Lines AM will ensure that service providers report on the Statistical Key Factor (SKF) in each quarterly meeting (related 5.1).	Walter Kloostra, Manager, Transmission Lines Asset Sustainment & Secondary Land Use	Q3 2016
5.3	There is no planning issue log to capture and track timely resolution of various process and data issues raised during maintenance planning and monitoring phases. ***Risk:*** *Absence of timely identification and resolution of planning issues could lead to delays or cost overruns in maintenance plan development and execution.*	M	Develop and maintain a planning issue log to capture and resolve various process and data issues raised during planning and execution discussions on a timely basis.	Tx Lines AM to implement a planning issue log to identify issues and track actions to resolution.	Walter Kloostra, Manager, Transmission Lines Asset Sustainment & Secondary Land Use	Q3 2016

(R) #	Observations	Risk[1]	Recommendations	Action Plan	Accountability	Completion Date
6.0 Continuous Process Improvement						
6.1	Asset condition reports are a key input into determining asset risks and maintenance needs. Although asset conditions are being reported by the service providers in most cases, there is no evidence to indicate that recorded asset conditions are being actively used by the planners to revise / adjust asset maintenance plans. Planners have indicated that condition reports are primarily used for defect management and corrective maintenance. It was also noted that overhead lines and underground cable condition reporting is done in SAP while right-of-way condition reporting is done off-line in SharePoint spreadsheets. ***Risk:*** *Lack of maintenance review and adjustment based on reported asset condition can increase the risk of failure for rapidly deteriorating or aging assets.*	M	Ensure consistent reporting, analysis and use of asset condition reports for asset maintenance needs and adjustment.	Review and incorporate the requirement for consistent reporting, analysis and use of asset condition reports into the asset strategy document and into the maintenance planning process (see 1.2).	Walter Kloostra, Manager, Transmission Lines Asset Sustainment & Secondary Land Use	Q4 2016
6.2	Planners indicated that they obtain and incorporate best practices and new knowledge for the maintenance planning process, but it is unclear what knowledge has been gained and incorporated in the existing maintenance strategies. ***Risk:*** *Inability to incorporate industry best practices could result in less than optimal maintenance plans.*	L	Planners should continue to share their maintenance planning knowledge with their peers with a goal of identifying best-practice opportunities with other utilities and incorporating best-practices into existing processes and tools.	Tx Lines AM will document and incorporate best-practices into the asset strategy documents.	Walter Kloostra, Manager, Transmission Lines Asset Sustainment & Secondary Land Use	Q4 2016

(R) #	Observations	Risk[1]	Recommendations	Action Plan	Accountability	Completion Date
6.3	There are no active efforts to extract lessons learned from resolved planning issues. It is unclear how these issues and lessons are communicated and incorporated into the current process and future plans. ***Risk:*** *Lack of continuous improvement through lessons learned could lead to inefficient maintenance processes that will have a lower chance of being adopted by the users.*	L	Identify and extract lessons learned from various issues resolved during maintenance planning and execution. Ensure timely communication of these lessons learned and other stakeholder feedback among the planners for on-going process improvements.	Planning lessons learned during Quarterly meetings with service provider (see 5.1) will be documented.	Walter Kloostra, Manager, Transmission Lines Asset Sustainment & Secondary Land Use	Q2 2016

LEGEND: RESIDUAL RISK CLASSIFICATION:

RESIDUAL RISK[1] CLASSIFICATION	Assessment Indication
LOW: Unable to make year over year planning process and efficiency improvements.	L
MEDIUM: Unable to meet planned cost and accomplishment targets or address asset performance and condition issues through maintenance.	M
HIGH: Unable to identify assets and maintenance requirements, comply with regulatory requirements or increasing maintenance backlog.	H

OPPORTUNITIES FOR IMPROVEMENT
The following opportunity for improvement was identified during this audit and is provided to Management for their consideration (the anticipated LoB accountability is identified in parenthesis): Review the PMO process for Transmission Stations assets and take actions identified in this report for similar observations. (*CK Ng, Director, Transmission Asset Management*).