ONTARIO POWER GENERATION

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March 17, 2016

RESS & OVERNIGHT COURIER

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

Dear Ms. Walli:

Re: Application by Ontario Power Generation Inc. for 2017-2021 Payment Amounts (EB-2016-0152) – Confidential Treatment re Undertaking Responses (J2.10 Attachments 1 and 2 and J5.7 Attachment 1)

In accordance with Rule 10 of the Ontario Energy Board's ("**OEB**" or the "**Board**") *Rules of Practice and Procedure* and section 5.3 of the OEB's *Practice Direction on Confidential Filings* (the "**Practice Direction**"), OPG hereby requests confidential treatment for portions of three documents, J2.10 Attachment 1, J2.10 Attachment 2 and J5.7 Attachment 1, arising from the February 28, 2017 and March 6, 2017 oral hearings. The affected documents are listed in **Appendix 'A'**, which also identifies the specific page numbers where the redactions are located in each document and the specific reasons for each request.

OPG brings to your attention that the redacted documents that OPG is filing publicly in response to undertakings are non-confidential. This is regardless of whether the documents themselves may be otherwise marked as "Confidential" or "OPG Confidential". Such notations would have been applicable at a prior time in the history of the document.

Below, OPG sets out the reasons for its confidentiality requests, including the potential harm that could result from public disclosure of the relevant information.

Based on the various categories of confidential information requests, OPG has organized the responses and documents into the following attachments, which are included with the hard copy of this letter. For the electronic copy of this letter, filed through the RESS, only this letter and the non-confidential attachments are included. The attachments are as follows:

Attachment A: *Non-Confidential*, redacted versions of the documents that are the subject of this request. These items are intended to be placed on the public record. Please note that while some of these items may inadvertently be marked "Confidential", these versions that contain redactions are no longer confidential.

Attachment B: *Confidential*, unredacted versions of the documents that are the subject of this request. These items are intended to be treated confidentially, and

should only be provided to intervenors or their representatives who sign or have already signed, a Declaration and Undertaking in the prescribed form in this proceeding. The specific portions of these documents that constitute the confidential information are marked with red boxes.

OPG will provide each intervenor that signs or has already signed a Declaration and Undertaking in the prescribed form and files or has filed it with the OEB a copy of the confidential materials that are included in Attachment B.

On a final determination, should the OEB grant OPG's request for confidentiality, OPG proposes that the OEB order the confidential information to be disclosed, subject to any conditions the OEB may find appropriate, to only those persons that by then have signed, or that subsequently sign, a Declaration and Undertaking in the prescribed form in this proceeding.

In addition, consistent with section 6.2 of the Practice Direction, OPG requests that during oral proceedings any reference to information, which the Board has determined to be confidential, be conducted *in camera* so as to preserve its confidential nature.

At the conclusion of the proceeding, or in the event that the confidentiality request is refused, in whole or in part, and OPG in turn requests that some or all of the information that is the subject of this request be withdrawn in accordance with section 5.1.12 of the Practice Direction, all persons in possession of the said information will be required to promptly destroy or return the information to the OEB Secretary for destruction.

Reasons for Requesting <u>Confidential Treatment</u>

OPG is requesting confidential treatment relating to confidential information contained in the documents, which based on its nature can largely be categorized as (a) OPG's commercially sensitive information, and (b) contractor/vendor or third party references that may lead to reputational harm to those persons. OPG's reasons for requesting confidential treatment are set out below for each of these categories. The specific rationale for each particular request, listed by page number, is set out in **Appendix 'A'**.

(a) Commercially Sensitive Information of OPG and/or Third Parties

These items should be protected as confidential because they include OPG commercially sensitive information with respect to project cost contingencies and ongoing commercial negotiations, or aggregate information that would allow determination of such commercially sensitive information. Disclosure of this information could prejudice OPG's competitive position as well as significantly interfere with negotiations being carried out by OPG. Similar information was treated as confidential by the OEB either in this proceeding as approved in the Decision and Order on Confidentiality dated January 21, 2017 and in the oral hearing (Hearing Transcript, Vol. 8), or in OPG's previous applications, EB-2010-0008 and EB-2013-0321.

(b) Contractor/vendor or Third Party References

These documents contain certain commentary on the performance of specific contractors in the Darlington Refurbishment Program or OPG's internal assessment of a third party's information. Public disclosure of this information could potentially prejudice the competitive positions of the relevant parties and could also give rise to adverse impacts on existing relationships (contractual or otherwise) that OPG has with the parties or on relationships those parties have

with others. In EB-2013-0321, the OEB agreed that disclosure of this type of information could lead to reputational harm to contractors. Accordingly, the OEB ordered this type of information to be treated as confidential (Hearing Transcript, Vol. 12). The OEB also accepted confidential treatment of information relating to performance of vendors in Procedural Order No. 3 of this proceeding.

Yours truly,

[Original signed by:]

Barbara Reuber

Cc: John Beauchamp (OPG) via email
Charles Keizer (Torys LLP) via email
Crawford Smith (Torys LLP) via email

APPENDIX 'A'

Affected Attachments

J#	Response or Attachment	Location of Confidential Information	Reason(s) for Confidentiality Request
J2.10	Attachment 1	pp. 1-3 of 25	Commercially sensitive information – Contingency
		p. 3 of 25	Contractor/Vendor or third party references
		p. 4 of 25	Commercially sensitive information – Contingency and Contractor/Vendor or third party references
		pp. 5-6 of 25	Commercially sensitive information and Contractor/Vendor or third party references
		p. 8 of 25	Contractor/Vendor or third party references
		pp. 10-11 of 25	Contractor/Vendor or third party references
		pp. 14-16 of 25	Commercially sensitive information – Contingency
		pp. 17-18 of 25	Contractor/Vendor or third party references
J2.10	Attachment 2	p. 2 of 5	Contractor/Vendor or third party references
		p. 3 of 5	Commercially sensitive information – Contingency and Contractor/Vendor or third party references
		pp. 4-5 of 5	Contractor/Vendor or third party references
J5.7	Attachment 1	pp. 4 of 220	Contractor/Vendor or third party references (previously granted confidential treatment by the OEB)
		pp. 5 of 220	Contractor/Vendor or third party references (first redaction previously granted confidential treatment by the OEB)
		pp. 9-10 of 220	Contractor/Vendor or third party references (previously granted confidential treatment by the OEB)
		p. 13 of 220	Contractor/Vendor or third party references (previously granted confidential treatment by the OEB)
		p. 21 of 220	Contractor/Vendor or third party references (previously granted confidential treatment by the OEB)
		p. 29 of 220	Contractor/Vendor or third party references
		p. 32 of 220	Contractor/Vendor or third party references
		p. 38 of 220	Contractor/Vendor or third party references
		p. 40 of 220	Commercially sensitive information – Contingency and Contractor/Vendor or third party references
		p. 41 of 220	Contractor/Vendor or third party references

J#	Response or Attachment	Location of Confidential Information	Reason(s) for Confidentiality Request
		pp. 51-53 of 220	Contractor/Vendor or third party references
		p. 117 of 220	Contractor/Vendor or third party references (previously granted confidential treatment by the OEB)

ATTACHMENT 'A'

Non-Confidential, Redacted Documents

OPG Confidential Exclusive

ONTARIO POWER GENERATION

FOR INFORMATION to the Darlington Refurbishment Committee

March 9, 2017

DARLINGTON REFURBISHMENT PROGRAM

REASON FOR REPORT

This report provides the current status of the Darlington Refurbishment Program (DRP) including a review of strategic initiatives and program performance highlights for the quarter ending December 31st, 2016. This report augments the monthly Unit 2 Execution Status Report.

HIGHLIGHTS AND CONCLUSIONS

The execution of Unit 2 commenced on October 15th, 2016 as planned. Key program highlights for the quarter ending December 31st are listed below.

- At year-end, the combined OPG and contractor All Injury Rate (AIR) was 0.50 against a target of 0.24. There have been no lost time injuries.
- One quality incident occurred in the period associated with delays in placing SHIM mode operation in-service. SHIM mode operation is now in-service on all four Darlington Units and was utilised as planned on Unit 1 to support Unit 2 Refurbishment critical path.
- Defueling was completed on January 11th, 26 days ahead of the working schedule and 39 days ahead of the high confidence schedule. As a result, 13 days of schedule contingency valued at [redacted] has been returned to the Program General Reserve.
- Since the completion of defueling, the project has transitioned to vault preparations. As of end of February, due to unanticipated work, vendor performance, and vendor and OPG integration issues, the schedule gains achieved during Defueling have been consumed. Management anticipates that Segment 1 will be complete on March 30th, as per the original working schedule commitment.
- Some Unit 2 non-critical path activities are behind the working schedule and are impacting the Schedule Performance Index (SPI). Recovery plans have been implemented, and schedule performance of ES Fox work has greatly improved. Weekly performance monitoring is in place to ensure appropriate focus is placed on all activities to avoid impacts on critical path.
- The targeted 2016 in-service dates for the 3rd Emergency Power Generator (3rd EPG) and the Containment Filter Venting System (CFVS) projects were not achieved and this impacted the 2016 Corporate Scorecard results. Both projects are progressing through commissioning and are forecast to be placed in service mid-March.
- The DRP work completed to date has been performed for slightly more than budgeted, as reflected in the overall program Cost Performance Index (CPI) of 0.97, however, the program is holding adequate contingency for these variances. Life-to-date spending is $3.2 Billion, $79 Million below plan mainly due to lower than planned OPG resources and schedule delays.
- At the closure of 2016, 46 of 47 Integrated Implementation Plan (IIP) tasks committed to the Canadian Nuclear Safety Committee (CNSC) were completed. A late request has been approved by the CNSC to extend the CFVS in-service commitment from December 31st to April 28th, 2017. OPG continues to demonstrate to the regulator that completion of this project is a priority.

PROGRAM PERFORMANCE IN THE PERIOD

DARLINGTON REFURBISHMENT PROGRAM PERFORMANCE DASHBOARD

Safety		Status	Trend	Schedule Performance Index (SPI)		Status	Trend
All Injury Rate (#/200k hrs worked)	0.50			Current	0.97		
# Level 1 Work Protection Events	2		-	Previous Report	0.96		-
Quality				**Cost Performance Index (CPI)**			
# Event Free Day Resets	1		–	Current	0.97		↓
# Regulatory Non-Compliance	0			Previous Report	1.01		

SAFETY

The 2016 year-end combined All Injury Rate for OPG and contractor employees is 0.50. The AIR exceeded our target of 0.24 injuries per 200,000 hours worked; however, there were no lost time injuries. Safety is our number one priority and zero injuries remains our goal. For comparison purposes, DRP safety performance is seven times better than the construction industry in Ontario.

OPG and our vendor partners are actively communicating the importance of safe work practices in the field. Vendor safety performance has shown continuous improvement since November. OPG has developed a "Seven Life-Saving Rules" campaign which communicates industrial safety to all trades noting that adherence to these rules is mandatory with no tolerance for violations.

Since Unit 2 breaker-open, Radiation Safety Performance has been good with no unplanned exposures.

Additional details on conventional and radiological safety performance, including the "Seven Life-Saving Rules" campaign, are provided in Appendices 1 and 2.

QUALITY

One quality event occurred in the period when the adjuster rod SHIM mode operation could not be placed in service due to a set-point error made during design. A corrective action plan was implemented and the modification is now in-service on all 4 units.

Additional details on quality performance are provided in Appendix 3.

SCHEDULE PERFORMANCE

The DRP SPI reflects schedule performance against the aggressive working schedule, and includes execution of the Unit 2 refurbishment as well as the Facility & Infrastructure (F&IP) and Safety Improvement Opportunity (SIO) projects.

Over the period, the overall program SPI has remained relatively stable and is 0.97, indicating that the DRP is slightly behind plan. The performance is largely due to delayed completion of the F&IP and SIO projects, the construction of the Re-tube Waste Processing Building (RWPB), and execution of some of the non-critical path activities within Unit 2. Details on the delays, including the impact and mitigation activities, are discussed in the following sections of this memo.

UNIT 2 REFURBISHMENT

Defueling was completed on January 11th, 26 days ahead of the working schedule and a full 39 days ahead of the high confidence schedule. As a result, 13 days of risk based schedule contingency valued at [redacted] has been returned to the Program General Reserve.

Since that date, through the vault preparation and bulkhead installation work, the schedule gains achieved during Defueling have been consumed. Key contributors to the delays are unanticipated work (10 days), Vendor Performance (6 days), and vendor and OPG integration (3 days). Vault preparation activities are being managed in an integrated fashion between the Refurbishment project, SNC/Aecon and Darlington station to protect the overall progress on critical path.

Based on current performance and continued challenges with equipment and integration, it is anticipated that additional delays to critical path will occur while executing vault preparations with a forecast completion of the Containment Pressure Test, and Segment 1 of the refurbishment, on March 30th. This is in alignment with the working schedule commitment, and would result in 17 days of high confidence schedule contingency, allocated to the Vault Preparation phase, being unused and returned to the Program General Reserve.

Some near-critical path work, such as the pre-requisite projects, is progressing behind plan; however, OPG, together with the vendors, is actively managing near-critical path activities to recover schedule and avoid any impacts to critical path. The Schedule Performance for the month of January was good with 99% of the 88,500 hours planned for the period being earned. This is a significant improvement over December. In order to reduce the backlog, the program needs to earn more hours than planned, and have a period SPI greater than 1.00. Significant progress was made in the month of January within the Balance of Plant projects. ES Fox schedule performance was greatly improved, including recovery of the Vault Vapour Recovery System (VVRS), Conventional Dry Air, and Breathing Air system projects. This, however, was off-set by delays within the Re-tube Waste Processing Building.

In summary, on March 30th, at the completion of Segment 1, Unit 2 is forecasting to be on plan against the working schedule, and a full 30 days ahead of the high confidence schedule.

Additional details on Unit 2 critical path, including Segment 2, are included in Appendix 4 with further details provided in the monthly Unit 2 Execution Status Report.

COST PERFORMANCE

Since the November report to the DRC, the overall program CPI has declined from 1.01 to 0.97 which indicates that work is being performed for slightly more than budgeted. The decline in the period is largely due to higher costs to complete the remaining F&IP and SIO projects. Additional details on the estimate to complete for these projects, as well as the commercial performance, are included in the following sections of this memo.

FINANCIAL SUMMARY - TOTAL PROGRAM COST

Life-to-Date Cost (M$)			At Completion of Program (M$)				
Actual	Plan	Variance	Forecast	Plan	Variance	◯	↓
3,206	**3,284**	**(79)**	**12,800**	**12,800**	**0**		
Total Program Contingency (M$)							
	Budgeted		Allocated		Unallocated	◯	–
2,007	100%		[redacted]				

The life-to-date cost for the program is $3,206 Million, $79 Million below plan. Primary contributors to the under spend are lower than planned OPG resources, delays in executing some non-critical path Unit 2 work, and timing variance for Unit 3 planning and material procurement. These under spends are off-set by $11 Million of over spend within the F&IP and SIO projects. The forecast to complete the program remains within the approved budget of $12.8 Billion.

In last quarterly report to the DRC, program contingency was reported against the $2,006 Million Release Quality Estimate approved in November 2015. Since then, the program contingency has been reconciled to the Unit 2 Execution Estimate approved in August 2016, which excludes [redacted] of previously drawn contingency that was transferred to the projects prior to approval of the Unit 2 Execution Estimate. The total program contingency that has been allocated since August 2016 is [redacted]. This reflects forecast contingency draws for the F&IP and SIO projects, off-set by returns to contingency as a result of retired risks and interest re-calculations.

FACILITIES & INFRASTRUCTURE AND SAFETY IMPROVEMENT PROJECTS

In the period, work on the remaining F&IP and SIO projects has progressed, and the in-service of both the 3rd EPG and CFVS projects is forecast as mid-March. The cost estimates to complete the work exceed the established budgets, including contingency. [redacted] OPG continues to work through the contract management processes to resolve these issues, and mitigate further impact to the program cost.

Containment Filter Venting System – The equipment was successfully commissioned at the end of January; however, there were some components that were damaged during installation and required replacement prior to final acceptance by OPG. The vendor is currently replacing the deficient components, which has delayed the final in-service date until mid-March. OPG met with the CNSC prior to the end of December to seek an extension to the regulatory obligation and continues to demonstrate to the regulator that completion of this project is a priority. The IIP change control process was initiated, and a revised completion commitment for placing the system fully into service by April 28th, 2017 has been accepted by the CNSC. The target date to have the deficiencies corrected and the system fully in service is mid March, in advance of the CNSC commitment.

The forecast cost to complete the project is $101 Million, an increase of $7 Million since the last report.

3rd Emergency Power Generator – Commissioning of the 3rd EPG continues, and the forecast in-service date is mid March, in advance of the revised IIP commitment of March 31st. The generator is connected to station systems to support completion of the site acceptance testing, and has been started and synchronized. The final connection of the unit to the emergency power bus is planned for the first week of March. The building is completed structurally and final application of exterior cladding and interior painting remain.

The forecast cost to complete the project is $140 Million, an increase of $7.1 Million since the last report.

Heavy Water Storage Facility – Civil construction progressed in the period with the completion of the steel structure, second floor slab and installation of the external building precast panels. The schedule and cost estimate to complete the project is undergoing review with the vendor and OPG, and the final cost to complete the facility will exceed the current budget. Additional details, including mitigation strategies, are discussed in the Commercial and Contractor Performance section of this memo.

The SPI for the F&IP and SIO projects has increased from 0.89 to 0.91 in the period, and will continue to approach 1.00 as the projects are completed. The CPI has declined over the period, and is 0.83. The CPI will continue to decline as potential cost increases are realised.

Based on the current forecasts to complete the F&IP and SIO projects, [redacted] of contingency is required above the $17.9 Million of contingency allocated during Unit 2 Execution Estimate. This will be funded from returns to General Program Reserve.

Additional details on the remaining F&IP and SIO projects are provided in Appendix 6, and Appendix 11 provides photographs of construction activities underway.

RISK, OVERSIGHT AND ASSURANCE

RISKS

During the Defueling and early part of the vault preparation phase, active risk management has been an area of focus. Deployable risk mitigation strategies contributed to the success of Defueling; when risks occurred, plans were well established to mitigate and minimize the impact. Further, risks related to Primary Heat Transport motor failure did not occur resulting in a return of 13 days, and the associated [redacted] in contingency, back to the Program General Reserve.

As expected, while some risks have been retired without events, other events have occurred where risks and appropriate mitigation strategies were not in place. The leadership team has recognized this and has implemented a weekly risk look-ahead process to improve the identification and resolution of any risks, to the extent possible.

The Project Controls team is currently developing a risk tracking report that will show the status of all risks, including those that triggered and their impact, any new risks, and retired risks. This will be integrated with the forecasting process, and will be in place prior to the next quarterly DRC report.

Notwithstanding the fact that there have been a number of minor risk events in the period, there have been no changes to the key program risks since the last report, however, vendor performance risk is a focus area as discussed throughout this report. Details on the program risks, including the mitigation status are provided in Appendix 7.

PROJECT OVERSIGHT AND ASSURANCE

OVERSIGHT FINDINGS

There have been no significant emerging oversight findings identified by the Project and Program Oversight groups in the period. Details regarding current low level and past findings reported to the DRC are documented within the quarterly DRP Assurance Report.

AUDIT AND EXTERNAL OVERSIGHT

In the fourth quarter, there were 10 Internal and Nuclear Oversight audits conducted related to the DRP. Findings were identified in three areas relating to the implementation of Project Manager training, [redacted]'s procurement surveillance tracking, and the monitoring and recovering of costs associated with defective work. Corrective action plans are in place to address the findings and are on-track.

There were two CNSC Type II inspections conducted in the quarter in the areas of On-boarding and Oversight Training Requirements, and Quality Management and Oversight of Project Execution. These inspections noted a number of strengths, and there were no directives issued.

REFURBISHMENT CONSTRUCTION REVIEW BOARD (RCRB)

The Refurbishment Construction Review Board (RCRB) concluded its third visit on December 2nd, and provided three critical areas of focus for the Refurbishment team to improve project performance:

- Work execution needs to improve to prevent future impacts to schedule.
- Schedule stability needs to improve to facilitate schedule execution.

- Tailored Project Reporting which aligns high level program metrics with lower level project and departmental metrics is needed to drive accountability and behaviour.

A number of initiatives were completed to correct the underlying contributors to these observations. They include streamlining the existing project meeting calendar to focus on work readiness and schedule compliance; re-enforcing Project Manager accountability; supplementing both the OPG and vendor organizations with resources to drive work performance and address the backlog of work; and increasing work readiness and ownership of the plan by trades supervision.

A brief follow-up assessment was conducted in early February to status the implementation of the previous reports recommendations. The RCRB noted improvement in the refocus and accountabilities of the Project Manager, an improved scope stability, and an improved schedule performance and SPI with the exception of the RWPB project.

The following positive observations were also noted:

- Critical path performance on defueling has progressed very well, reflecting good team work.
- Good progress has been made with recruitment and on-boarding of staff.
- Steps taken for islanding of Unit 2 are very effective.
- Engineering field change process is working well with efficient issue resolution.
- There is good evidence of the shift to execution; however, continued effort is needed to further simplify processes to support schedule stability.

The RCRB reiterated that the project's most important focus area remains on improving schedule compliance which includes completing the required work that supports the project schedule. They offered a number of additional insights and suggestions to further improve work execution and schedule stability. These suggestions are currently being implemented in Refurbishment.

COMMERCIAL AND CONTRACTOR PERFORMANCE

SNC/AECON COMMERCIAL ISSUES

[redacted] OPG has initiated the following activities to mitigate the potential impact:

1. OPG is performing an independent assessment of the current project status and cost to complete to facility.
2. OPG is working with SNC/Aecon to understand their schedule basis, the reasons for the delays, and the basis for their estimate to complete the facility.

[redacted]

OPG continues to work through the contract management processes to resolve these issues.

ES FOX – PERFORMANCE IMPROVEMENT

[redacted] both OPG and the vendor have prepared plans for improved performance and fieldwork execution. OPG staff has been seconded to ES Fox to help drive the needed improvements. The plan developed by ES Fox focuses on five key areas: leadership and engagement, safety, quality of work, schedule completion, and accountability. Implementation of the improvement activities continues, and initial results with Unit 2 refurbishment projects are positive. Quantified improvement has been observed in the following areas:

- Project Management – Paired OPG and ES Fox Project Managers are fully engaged in driving work readiness and completion, and have produced notable improvement in safety performance.

- Near critical path projects – Completion has improved on near-critical path projects as reflected in the performance of the Breathing Air and Vault Vapour Recovery modifications.
- Backlog Reduction – Field performance has resulted in a significant reduction in the number of labour hours behind plan.

[redacted]

Additional details on vendor performance are provided in Appendix 8.

COMMUNICATION ACTIVITIES

TACTICAL COMMUNICATIONS FOR THE REFURBISHMENT TEAM

As previously reported, Corporate Relations & Communications (CRC) continues to undertake a number of initiatives to expand communication channels, build greater understanding of the project, and re-enforce behaviours expected of employees and trades. The messaging shifted in the fourth quarter of 2016 to the project pillars for execution success; turning on the 'construction switch'; as well as a strong emphasis on meeting our execution schedule commitments.

A number of programs are in place to ensure employees and contractors are aligned and informed. These include:

- An internal employee refurbishment website with weekly stories, daily communications, and access to critical production reports is in place and actively updated with over 70,000 visits per month.
- Monthly leadership messages are now sent from the SVP and senior leaders, supported with a video message. The weekly "Minute with Mike" videos continue to be produced and are receiving positive reviews.
- A metric dashboard was developed and is issued monthly to educate staff on current Key Performance indicators.
- Monthly leadership cornerstone meetings are held with the management team to align the organization around near-term objectives and recognize successes.
- Bi-monthly Standups! (face-to-face sessions) are also held with staff in multiple locations to recognize success and focus employee's attention on the key near-term outcomes.
- A successful employee and vendor event was held in January to acknowledge the successful completion of the defueling campaign.

COMMUNICATIONS TO THE PUBLIC AND STAKEHOLDERS

In the last quarter of 2016, the communications messaging shifted from planning to an execution posture. The external narrative focused on meeting our commitments by providing assurances of how the detailed planning and preparation safely got the project to the starting gate for breaker open on time and on budget.

A concerted external communications push was initiated to coincide with the start of the project on October 14th to leverage a number of highly visible events. A social media campaign supported by a print campaign in newspapers and a series of media releases was launched on November 1st; this resulted in positive media coverage across the province and increased the visits to the OPG Refurbishment website from an average of 19,000 visits to 155,000 in November. A successful public open house with 1800 visitors was held the same weekend.

To further engage the public and key stakeholders, the refurbishment website underwent a refurbishment of its own. The site is now maintained with new content including monthly performance updates as well as staff and vendor feature articles.

On the key stakeholder front, OPG communicated extensively with politicians at all levels of government and across party lines in the period and reached out to 20 different mayors across Ontario. It met with 22 members of Provincial Parliament, including the Conservative Energy critic, the PC caucus, and the NDP energy critic. Refurbishment was also discussed with 10 members of Parliament in Ottawa, including two Cabinet Ministers. This was tied to the province's consultation for their Long Term Energy Plan and resulted in strong endorsement from such groups as the Nuclear Mayor's Technology Caucus, Ontario Chamber of Commerce and Toronto Board of Trade.

In the first quarter of 2017, the social media campaign continued with a high presence on LinkedIn, Twitter and Instagram. A new Darlington TV commercial was shot in February and will be aired in April.

Additional details on internal and external communications are provided in the dashboard Appendix 9.

KEY DELIVERABLES FOR THE NEXT PERIOD

Focus has shifted to the following deliverables in the first quarter of 2017:

- Unit 2 critical path will continue through the Vault Preparations including completion of the reactor bulkhead installation.
- The Unit 2 Primary Heat Transport System vacuum dry will commence.
- External cladding will be installed on the RWPB.
- The Unit 2 Breathing Air enhancement system will be completed and placed-in-service.
- The CFVS and 3rd EPG projects will be placed in-service.
- Unit 2 Segment 1 work will end with the containment pressure test, which is planned for completion March 30th.

Following completion of Segment 1, the Removal Phase, or Segment 2a, will commence. Appendix 4 provides further details on planned activities remaining in Segment 1, and planned activities included in Segment 2a.

Submitted by:

Dietmar Reiner
SVP, Nuclear Projects

APPENDICES

1. Conventional Safety Performance
    a. Conventional Safety Performance
    b. Seven Life-Saving Rules Campaign
2. Radiological Safety Performance
3. Quality Performance
4. Schedule Performance
    a. Unit 2 Critical Path Schedule – Segment 1
    b. Unit 2 Critical Path Schedule – Segment 2
5. Cost Performance
    a. Program Financial Performance
    b. Program Contingency Management
6. Facilities and Infrastructure and Safety Improvement Projects
7. Key Program Risks
8. Vendor Performance Summary
9. Communications
10. Metrics Legend
11. Photo Catalogue

ONTARIO POWER GENERATION

Darlington Nuclear Refurbishment Program

APPENDIX 1A: CONVENTIONAL SAFETY PERFORMANCE

Bundle and Vendor Performance Year-To-Date

Period Ending: 31-Dec-16

SAFETY PERFORMANCE - YEAR TO DATE (YTD)

OPG and Vendor Refurbishment Staff	Actual		Target	Status	Trend
	Previous	Current			
Combined All Injury Rate (AIR)	0.42 [1]	0.50	0.24		-
OPG ONLY All Injury Rate (AIR)	0.00	0.00	0.24		-

# of Days Since a Lost Time Injury	2,556	Since Jan. 1, 2010

ALL INJURY RATE - 6 MONTH TREND

ote: AIR is reset at Year-End.

BUNDLE SAFETY PERFORMANCE - YEAR TO DATE (YTD)

Line	Project Bundles (Additional Project Bundles will be added as they commence work on site.)	AIR	ASR	Safety Injuries		Safety Incidents		Hours Worked (Thousand)
		All Injury Rate	Accident Severity Rate	# Lost Time Injury	# Medical Injuries	# High MRPH	# Lvl 1 Work Protection Events	
1	Re-tube & Feeder Replacement							
2	Turbine Generator							
3	Fuel Handling & Defueling							
4	Shutdown Lay-up							
6	Steam Generators							
7	Islanding							
8	Balance of Plant							
9	Facilities & Infrastructure and Safety Improvement Opportunity Projects							
10	OPG Refurbishment Staff	-	-	-	-	-	-	1,369.2
9	**Nuclear Refurbishment Performance**	**0.50**	**-**	**-**	**9** [2]	**6** [3]	**2** [4]	**3,612.1**

VENDOR SAFETY PERFORMANCE - YEAR TO DATE (YTD)

Excluding Owner-Only Metrics

Line	Vendors (Additional Vendors will be added as they commence work on site.)	AIR	ASR	Safety Injuries				Hours Worked (Thousand)
		All Injury Rate	Accident Severity Rate	# Lost Time Injury	# Medical Injuries	# High MRPH	# Lvl 1 Work Protection Events	
1								
2								
3								
4								
5								
6								
7	OPG	-	-	-	-	-		1,369.2
8	**Nuclear Refurbishment Performance**	**0.50**	**-**	**-**	**9**	**6**	**2**	**3,612.1**

OWNER-ONLY SAFETY PERFORMANCE - YEAR TO DATE (YTD)

1	Refurbishment Project Office	-	-	-	-	-	-	14.1
2	Re-tube Waste Processing Building	3.42	-	-	4	-	-	234.1

EXPLANATORY NOTES

[1] The 2016 Year-end AIR is 0.50 as a result of 9 medically treated injuries within 2016. There were no Lost Time Accidents. The OPG only AIR is 0.00 as a result of zero medically treated injuries involving an OPG employee. The previous period AIR, September 30th 2016, has been corrected from 0.64 to 0.42 due to understated OPG hours worked. As a result the AIR has declined over the period from 0.42 to 0.50.

[2] Four medically treated injuries occurred in the quarter, including one critical injury. An [redacted] worker on a [redacted] suffered a broken leg when he was struck by an Elevated Work Platform that he was spotting. The injured worker returned to work his next scheduled shift with modified duties. The Ministry of Labour was notified.

[3] Two High Maximum Reasonable Potential for Harm incidents occurred in the quarter. 1) The first incident is related to the previously identified medically-treated injury on the [redacted]. Work was stopped, the crew was stood down and [redacted] implemented a comprehensive improvement plan that included safety. 2) The second incident occurred on the [redacted] when an unqualified [redacted] worker modified a section of handrail while not correctly tied-off, exposing the worker to a falling risk. An inspection of all hand rail and scaffold within the mock-up was conducted to ensure a safe state and communications were rolled out to staff on potential hazards and safety expectations. Performance management of the individuals was conducted.

[4] Two Level 1 Work Protection Events occurred in the period. 1) An [redacted] worker on a [redacted] started to work on, and subsequently operated a valve without authorization. Performance management was conducted. 2) [redacted] workers removed a panel from a transformer cubicle on the [redacted] without having proper work protection in place. Workers were instructed to back out of the work area, and all [redacted] workers were stood down.

Filed: 2017-03-17
EB-2016-0152
J2.10 Attachment 1, Page 9 of 25
Period Ending: 31-Dec-2016

APPENDIX 1B: SEVEN LIFE-SAVING RULES CAMPAIGN

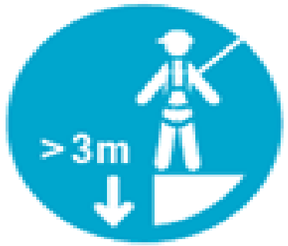
Refurbishment trades safety messaging

SEVEN **LIFE-SAVING RULES** WE MUST ALL ABIDE BY

Following these rules and procedures saves lives. Adherence to these rules is mandatory. **No tolerance for violations.** Breaking the rules may result in discipline up to and including termination.

Care enough to act. Have the courage to intervene if you see an unsafe act or condition or see someone who is unfit for work.

Verify isolation before work begins and use the required protective equipment



Ensure use of fall-arrest or restraint and always maintain 100% tie off

Obtain authorization prior to entry into confined spaces

Operate vehicles safely and stay clear of moving or hoisting equipment

Do not damage or disable safety devices or equipment

Respect work protection. Don't touch guaranteed or tagged equipment

No alcohol, drugs or behaviour that impairs your fitness for duty

Darlington Nuclear Refurbishment Program

APPENDIX 2: RADIOLOGICAL SAFETY PERFORMANCE

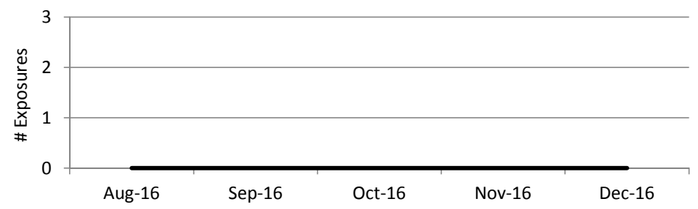
Bundle and Vendor Performance Year-To-Date

Period Ending: 31-Dec-2016

RADIATION PROTECTION PERFORMANCE - YEAR TO DATE (YTD)

OPG and Vendor Refurbishment Staff	Actual	Target	Status	Trend
Unplanned Exposures (>35µCi/l or > 100mrem)	0	0	◯	-

UNPLANNED EXPOSURES - 6 MONTH TREND



↓ is GOOD performance

Unplanned Exposures in Month

Cumulative # Unplanned Exposures - YTD

Note: Cumulative # Unplanned Exposures is reset at Year-End.

BUNDLE SAFETY PERFORMANCE - YEAR TO DATE (YTD)

Line	Project Bundles *Additional Projects will be added as they commence work on site.*	Actual	Target	# Unplanned Exposures	# Precursor EPD Whole Body Dose Alarms	# Unantici-pated EPD Dose Rate Alarms	Precursor Tritium Exposures (>10 µCi/l)	# RP License Violations (Non-PROL)	# Unposted Hazards	# RP Reg Doc. 3-1.1 Violations
		Collective Radiation Exposure (person-rem)								
1	Re-tube & Feeder Replacement									
2	Turbine Generator									
3	Fuel Handling & Defueling									
4	Shutdown Lay-up									
5	Islanding									
6	Balance of Plant									
7	Facilities & Infrastructure and Safety Improvement Projects									
8	OPG Refurbishment Staff	4.4		-	-	1	-	-	-	-
9	Collective Internal Radiation Exposure [All Bundles]	3.7		-	-	-	-	-	-	-
10	**Nuclear Refurbishment Performance**	(1) **16.6**	**18.8**	**-**	**-**	(2) **1**	**-**	**-**	**-**	**-**

VENDOR SAFETY PERFORMANCE - YEAR TO DATE (YTD)

Excluding Owner-Only Metrics

Line	Vendors Additional Vendors will be added as they commence work on site.	***Collective Radiation Exposure (person-rem)***	# Unplanned Exposures	# Precursor EPD Whole Body Dose Alarms	# Unantici-pated EPD Dose Rate Alarms	Precursor Tritium Exposures (>µCi/l)	# RP License Violations (Non-PROL)	# Unposted Hazards	# RP Reg Doc. 3-1.1 Violations
1									
2									
3									
4									
5	OPG Staff	11.5	-	-	1	-	-	-	-
6	**Nuclear Refurbishment Performance**	**16.6**	**-**	**-**	**1**	**-**	**-**	**-**	**-**

EXPLANATORY NOTES

(1) The overall Collective Radiation Exposure (CRE) is below target

(2) There has been one unanticipated Electronic Personal Dosimetry (EPD) dose rate alarm in the quarter. An OPG workers EPD alarmed while they were performing a final vault walk down of all elevations prior to the start of the defueling campaign. An immediate safe back-out from the vault was performed.

ONTARIO POWER GENERATION

Darlington Nuclear Refurbishment Program

APPENDIX 3: QUALITY PERFORMANCE

Bundle and Vendor Performance Year-To-Date

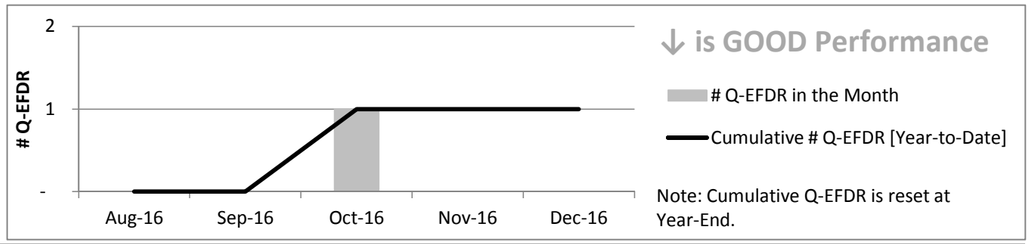
Period Ending: 31-Dec-2017

QUALITY PERFORMANCE - YEAR TO DATE (YTD)

	Status		Trend	Days Since Last Q-EFDR
	Previous	Current		
Overall Quality Performance	○	●	—	88

(1)

QUALITY EVENT FREE DAY RESET - 6 MONTH TREND



BUNDLE QUALITY PERFORMANCE - YTD

Line	Bundles	*Quality Event Free Day Resets (Q-EFDR)*	*Regulatory Non-Compliance Events*	*NCARs*	*OPG SCRs with Major Impact*	*Rework (Execution)*	*Average # of Revisions per Closed-out ECs*
1	Re-tube & Feeder Replacement	[redacted]					
2	Turbine Generator						
3	Fuel Handling & Defueling						
4	Steam Generator						
5	Balance of Plant & Refurbishment Support Facilities						
6	Shutdown, Layup and Services						
7	Unit Islanding						
8	Campus Plan - F&IP and SIO Projects						
9	Refurbishment Operations & Maintenance						
10	NR - Other						
11	**Nuclear Refurbishment Performance**	(1) **1**	(2) **-**	**3**	**-**	**-**	**2.1**

VENDOR QUALITY PERFORMANCE - YTD

Line	Vendors	*Quality Event Free Day Resets (Q-EFDR)*	*Regulatory Non-Compliance Events*	*NCARs*	*Vendor CARs*	*Rework (Execution)*	*Average # of Revisions per Closed-out ECs*
1	[redacted]						
2							
3							
4							
5							
6	OPG	1	-	-	-	-	-
7	**Nuclear Refurbishment Performance**	**1**	**0**	**3**	**-**	**-**	**2.1**

EXPLANATORY NOTES

(1) One Q-EFDR occurred in October on a Balance of Plant project when the adjuster rod SHIM mode operation could not be placed in service due to a set-point error made during the design analysis. A corrective action plan was initiated and the modification is now in-service on all 4 units.

(2) A regulatory non-compliance event previously reported to the DRC in November was related to [redacted], a non-refurbishment project. As such, the event is not included in this report; however, interim actions have been taken to prevent reoccurrence.

(3) Two NCAR have been issued to the [redacted] in the quarter regarding the [redacted]. The findings involved repeat quality records issues and an observed trend of not meeting requirements of the OPG's Approved Supplier Listing. Corrective actions are in place. The NCAR related to [redacted], identified in the previous report to the board, has been removed since it occurred on the [redacted] which is not a refurbishment project. The remaining [redacted] NCAR refers to the previously identified issue related to a less than acceptable safety focus.

**NCAR = Non-conformance and Corrective Action Request; SCR = Station Condition Record; CAR = Corrective Action Request; EC = Engineering Change;*

ONTARIO POWER GENERATION

Darlington Nuclear Refurbishment Program - Unit 2

APPENDIX 4A: UNIT 2 CRITICAL PATH SCHEDULE - SEGMENT 1

Performance of Critical Path against Working Schedule

Period Ending: 14-Feb-17

DARLINGTON REFURBISHMENT Repowering Ontario

S1

Unit 2 Refurbishment: SEGMENT 1 Defuel + Containment Isolation

CURRENT: 161 days: October 15, 2016 – March 25, 2017

Critical Path Windows
Electrical Windows
Conventional Layup
Heat Transport Vacuum Dry
Other required S1 work

Unit 2 Segment 1 Status Update: February 14, 2017 @ 17:00

October 2016 | November 2016 | December 2016 | January 2017 | February 2017 | March 2017 | April 2017

10/2 10/9 10/16 10/23 10/30 11/6 11/13 11/20 11/27 12/4 12/11 12/18 12/25 1/1 1/8 1/15 1/22 1/29 2/5 2/12 2/19 2/26 3/5 3/12 3/19 3/26 4/2 4/9

2 Conventional Side LAY-UP

Drain & Protect (Lay-up) Conventional Systems from Corrosion

21-Oct-16 — OPS Apply Drain OTO's & [illegible] — COMPLETE — 01-NOV-16

Install Dehumidifiers & Establish Airflow Path — COMPLETE — 10-Jan-17 ~~29-Dec-16~~

Commission and Dry Conventional System — COMPLETE — 10-Feb-17 Systems Declared in Lay-up — 22-Feb-17 OTO Permit Application

Deadlegs Drained — 20-Feb-17

To inhibit corrosion damage to secondary side steel piping systems caused by moisture, temporary dehumidified air is provided. (11) Dry Air skids will be installed at various points to force warm air through the pipework in order to achieve acceptable dryness.

Layup Completion for the following systems:

DHA1:	Main Condenser
DHA2:	Boiler Feedwater
DHA3-4:	Main Condensate
DHA5:	Main Steam
DHA6-7:	Extraction Steam
DHA8-9:	Main Steam Reheat
DHA10:	D/A, Condensate Make Up & Storage Tanks
HP1:	PFW Pumps (Main & Aux)

Heat Transport Motors Disconnect and Uncouple 33120-PM1, PM2, PM3, PM4

Remove Heat Transport Motors

Vault Access Coordination for HT Motors due to Vault Access restrictions during Critical Lifts

4 PRIMARY HEAT TRANSPORT SYSTEM VACUUM DRY

The entire HT system must be drained & dried before the retube of the reactor can begin. Once Operators have drained it through normal pipework, the Heat Transport system will be put under vacuum in order to 'boil off' the rest of the water. A Vacuum Drying Skid will be attached to the HT system to perform this. The water vapor will be condensed in receivers and sent through piping to the storage tanks outside of Unit 2. It is expected to take 40 days to completely drain & dry the HT system

Defuel Complete 11-Jan-17 @19:49 ~~06-Feb-17~~

Declaration that Reactor Core is Defueled Before Entering State 3a

16-Jan-17 ~~11-Feb-17~~ — COMPLETE — Vac Dry Prereqs

HTS Bulk Drain

25-Feb-17 ~~04-Mar-17~~ — Heat Transport Vacuum Dry — 19-Mar-17 ~~22-Mar-17~~

30-Mar-17

Unit 2 Shut Do[illegible] 15-[illegible]-16 — COMPLETE

West RAB Brake Repair

Shutdown Unit 2 — First things first...

Unit 2 will start reducing power at 22:00 hrs on Friday Oct 14. At midnight (Oct 15th at 00:00 hrs) Operators will fire Shutdown System #2 to take the Unit deeply sub-critical. The Heat Transport System will be cooled down to 80 C to allow defueling of the reactor to take place. Years of planning has led us to this milestone to open the breaker on the first Darlington Refurbishment Unit!

1 — 308 Channels: Sin[illegible] Flow Defuel — COMPLETE — 29-Nov-16 @11:00 ~~06-Dec-16~~

36 Channe[illegible] End Flow Defuel — COMPLETE — 08-Dec-16 @08:00 ~~02-Jan-17~~

Line [illegible] Defuel — COMPLETE

Window D17 Install APT, End Fitting Caps & Radiation Shielding — COMPLETE

E&W Carriage Removal Complete 4-Feb-17 ~~17-Feb~~ — COMPLETE

Window 23 Bulkhead Installation

Bulkhead Installation Complete — STOP — Containment Pressure Test Declared Complete — 24-Mar-17

Window 24 Containment Pressure Test

To the start of Segment 2 Window 137

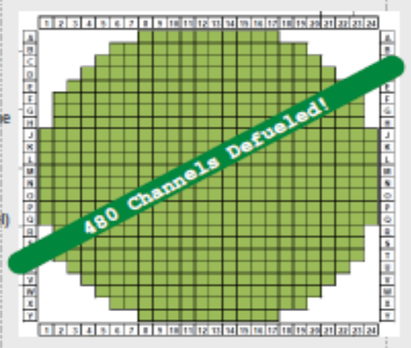
15-Jan-17 ~~8-Feb-17~~ Window D15 Vault Crane Maintenance Complete — COMPLETE

Middle Seal Leak Test — COMPLETE

15-Jan-17 Window 200 Shield plug swap — COMPLETE

1 DEFUEL

The reactor will be entirely defueled prior to turnover to the Joint Venture who are going to be performing the Retube of the Unit 2 reactor and replacing feeders. The majority of the defuel campaign will be accomplished via flow defueling using the Heat Transport pumps however it is estimated that 124 dummy fuel bundles (11 per channel) will need to be installed in the low flow channels allow push defueling to empty the channel.



3 'ISLAND' Unit 2 from the DNGS Operating Units

A large steel bulkhead to bridge the gap where the fueling machines access the U2 reactor will be installed during this window. This bulkhead will form part of the temporary containment boundary which will physically separate Unit 2's containment from the operting units!.

5 VERIFY UNIT 2 is isolated from containment

The containment test is conducted to verify the integrity of the new containment boundary.

New Breathing Air System Installation

Install Mechnical Portion of Breathing Air — COMPLETE — 30-Jan-17

Install Electrical Portion of Breathing Air — COMPLETE — 13-Feb-17 OCD — Commission Breathing Air Outside Vault — OCD 15-Mar-17 — Breathing Air Final Tie-in and AFS 28-Mar-17

16-Feb-17

New Breathing Air Tie-in for Refurbishment use in Unit 2 will be performed at the start of Segment 2

Segment 1 Major Electrical Scope

21-Oct-16 — W126: T9/T[illegible] Maintenance — COMPLETE — 11-Nov-16 — To Odd Electrical Outage (Segment 2)

15-Nov-16 — W127: T10/T12 — COMPLETE — 03-Jan-17 — To TPDS and Odd Electrical Outage in S2

VVRS 3-Way Valve Replacements — COMPLETE — 30-Dec-17

VVRS ByPass Fan Installation — COMPLETE — 8-Feb-17 OCD — 15-Feb-17

To Containment Pressure Test

Window 009: VVRS Modifications

W009: VVRS Modifications — COMPLETE — 30-Jan-17

State 1: Reactor Shutdown Evolution | State 2: Guaranteed Shutdown with Irradiated Fuel Core | State 3a: Defueled State | State 3b: Defueled & Isolated from Containment State

ONTARIO POWER GENERATION

Darlington Nuclear Refurbishment Program - Unit 2

APPENDIX 4B: UNIT 2 CRITICAL PATH SCHEDULE - SEGMENT 2

Level 1 Critical Path Working Schedule for Segment 2

Period Ending: 14-Feb-17

DARLINGTON REFURBISHMENT Repowering Ontario

S2a

Unit 2 Refurbishment: SEGMENT 2a Removal Phase

213 days: March 30, 2017 – October-29, 2017

Critical Path Windows | Electrical Windows | Moderator Windows | Heat Transport Vacuum Dry | Other required S2 work | Near Critical windows | Water Systems

U2 Schedule S2a
February 28, 2017

March 2017 | April 2017 | May 2017 | June 2017 | July 2017 | August 2017 | September 2017 | October 2017 | November 2017

13-May-17 HTS Aux Vac Dry — Window 035
HTS Auxiliaries - Drain & Purge (Layup) — Window 048
40% RH Achieved
HTS Auxiliaries - Rehab — Window 048

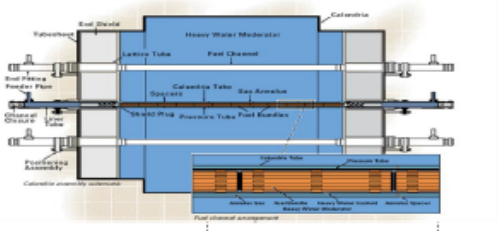
D1711 Outage

Holdout for Boiler Manway Manipulator Arms (Unit 1 Integration Logic)

PHT Vac Dry — Window 029
PHT Vac Dry stops during the Containment Pressure Test
PHT Vac Dry (Continued) — Window 029
13-May-17 Primary Side SG Layup — Window 034
17-Jun-17

6 Primary Side Steam Generator Layup

Following the vacuum dry of the Primary Heat Transport System which includes the Primary Side of the SG's, the SG Primary Side will be put into a dry air layup state. The purpose of the dry air layup is to minimize degradation of existing system assets during planned maintenance and to reduce the tritium hazard to the extent possible.



4 Vault Projects

Once the Air lock doors are open there are various projects to be executed in coordination with the work on Critical Path. The vault project work consists of Piping installation for the Emergency Heat Sink Lines, Periodic Inspection Programs, valve overhauls and install, ignitor cables and Shutdown Cooling cables

Window 104: Vault Projects
Window 105: Vault Projects
Airlock 2 Shielding Curtain Installed for Work to Progress

VERIFY UNIT 2 is isolated from containment — 30-Mar-17
Segment 1 — 8d — 7-Apr-17
Window 025: Install Shielding — 19d — 26-Apr-17
Window 027: Bulk Interference Removals — 23d — 19-May-17
Window 101: Remove FM Bridges & Install RTP — 42d — 30-Jun-17
Window 111: Feeder Cabinet Removal — 16d — 16-Jul-17
RFR JV Vault Access Only
Window 042: Feeder Removal — 51d — 5-Sep-17
Window 192: Dummy FB Removal — 9d
Window 112: Pressure Tube Sever — 14d — 28-Sep-17
Window 113: Sever Bellows — 31d — 29-Oct-17
To the Start of Segment 2b Window 114 End Fitting Removal

1 Opening of Airlock Doors

Window 137: Once the Bulkheads are installed and the Pressure test is complete, the Airlocks will be opened to facilitate large numbers of workers in the vault and critical logistics. VVRS System and By-pass fans are commissioned as well as the final Breathing Air tie-in to remove reliance on use of Breathing Air from the Station Breathing Air system.

2 Vault Setup and Feeder Removal Prep

GETTING THE VAULT READY FOR REACTOR DISASSEMBLY

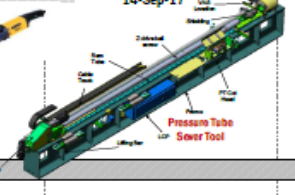
Windows 025, 027, 101, 111

The vault needs to clear of all interferences to make room for tooling and equipment required to disassemble the reactor.

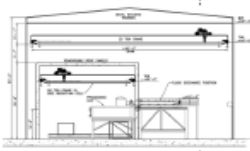
3 Reactor Disassembly

Windows 042, 192, 112, 113

A special platform (Retube Tooling Platform) will be installed to support retube tooling. Feeders will be cut into small, manageable pieces and lowered to the floor where they will be cut up even further for transport to the on-site waste processing building. Once the Feeders are removed. The Pressure tubes will be cut and End Fittings and Bellows will be cut.



14-Sep-17



RWPB Available

The Retube Waste Processing Building (RWPB) is required as part of the RFR project to support the Waste Tooling System (WTS) to optimize Radioactive waste processing and packaging operations.

Retube Waste Processing Building

5 Moderator Drain & Dry

Once the moderator has been drained & flushed, the pipe work can be disconnected to allow vac drying to occur. The calandria is isolated from the lower moderator piping. Calandria Vessel Purge Flow is required to be established for the start of the replacement of the calandria tubes and throughout the calandria tube install series.

Isolate Calandria from Main Pipe work and Hook up Drying Equipment — 10-Jul-17
13-May-17 Moderator Drain & Flush — Window 038
12-Jun-17 — Window 108
Establish Upper Calandria Purge Flow and EW Valve maintenance — Window 103 — 1-Oct-17
Holdout to Align Resources with Horizontal Flux Detector Replacement
Window 028 — 20-Oct-17 Replace Vertical Flux Detector
Window 098, CTI Release
From Window 035 HTS Aux Vac Dry
Window 067 — EP Modifications and Run Hose for Vac Dry
3-Sep-17 Moderator Valve Rehab
Window 121 — Vac Dry Lower Moderator Pipework
Window 122
28-Sep-17
Window 123 — Remove Vac Dry Equipment
Window 124 — Purge and 33410 - SDC HX 1 Installation

Holdout for Resources
10-Jul-17 Secondary Side SG Clean & Install Access Ports — Window 037 — 28-Aug-17
BBD Ties to CW AWPP

Segment 2a Major Electrical Scope
Hold out for Temporary Containment Boundary Declared & Temp Vault ACU's Installed
16-Apr-17 EPS MCC Rehab — Window 005 — 4-Jun-17
Class 3 Electrical Maintenance — Window 041 — 4-Oct-17
Class 2 Electrical Maintenance — Window 040

Hold out for Warmer Temperatures
3-Apr-17 MOT/UST/IPB/Switchyard Rehab — Window 004 — 15-Sep-17
To RCHP 5

Segment 2a Water Systems Scope
8-Sep-17 PULSW Outage — Window 056
Continued in Segment 2b

State 3a: Defueled State
State 3b: Defueled & Isolated from Containment State

ONTARIO POWER GENERATION

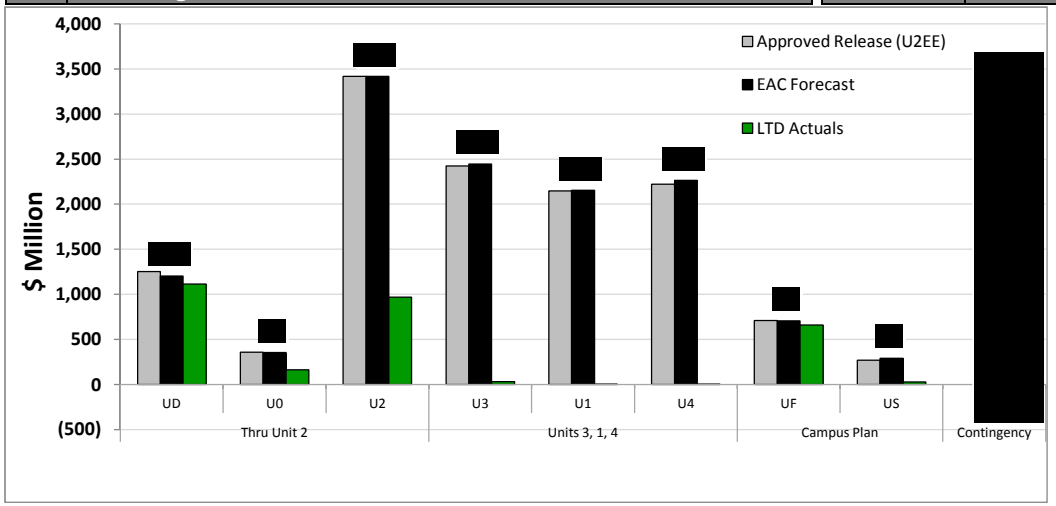
Darlington Nuclear Refurbishment Program

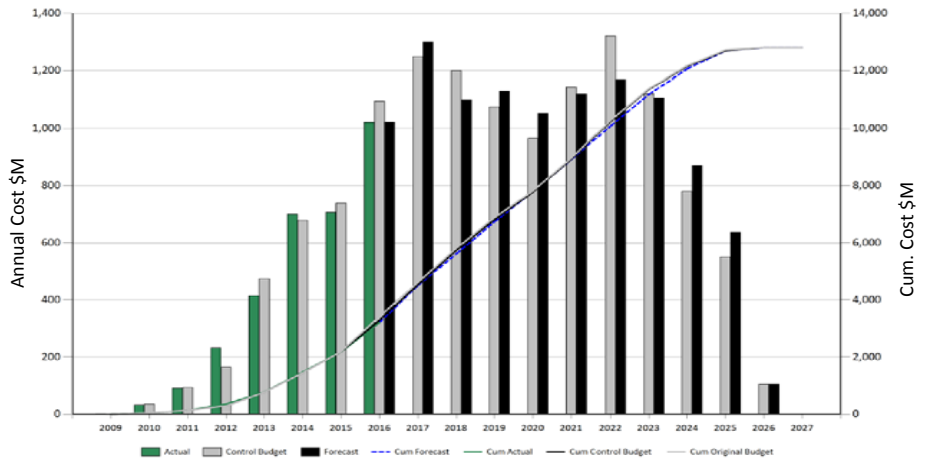
APPENDIX 5A: PROGRAM FINANCIAL PERFORMANCE BY UNIT

Financial status of the Program by Unit

Period Ending: 31-Dec-16

		Cumulative Life to Date			At Completion of Program				
		a	*b*	*c = b - a*	*d*	*e*	*f = d+ e*	*g*	*h*
Line	Description	Plan (PV)	Actual (AC)	Cost Variance From Plan	Approved Plan @ U2EE	Contingency Allocation by Unit	Approved Plan including Contingency	Current Forecast	Approved Funding Release
1	Unit D or Definition Phase	1,105	1,113	**8**	1,251	-	**1,251**	[redacted]	1,251
2	Unit 0 or Unit Common	193	163	**(30)**	359	-	**359**	[redacted]	359
3	Unit 2	1,028	968	**(60)**	2,740	677	**3,417**	[redacted]	3,417
4	**Subtotal Thru Unit 2**	**2,327**	**2,244**	**(83)**	**4,350**	**677**	**5,028**	[redacted]	**5,028**
5	Unit 3	62	31	**(31)**	1,867	557	**2,424**	[redacted]	46
6	Unit 1	9	0	**(9)**	1,739	410	**2,148**	[redacted]	51
7	Unit 4	9	0	**(9)**	1,878	345	**2,223**	[redacted]	5
8	**Subtotal Units 3,1,4**	**81**	**31**	**(50)**	**5,484**	**1,311**	**6,796**	[redacted]	**102**
9	Unit F - Facilities & Infastructure	665	661	**(4)**	690	18	**708**	[redacted]	708
10	Unit S - Safety Improvement Initiatives	254	269	**16**	269	-	**269**	[redacted]	269
11	**Subtotal Campus Plan**	**919**	**930**	**11**	**959**	**18**	**977**	[redacted]	**977**
12	Contingency	[redacted]			2,007	(2,007)	-	[redacted]	*incl. above*
13	**Total Program**	**3,284**	**3,206**	**1 (79)**	**12,800**	**(0)**	**12,800**	**12,800** **2**	**6,104**





EXPLANATORY NOTES

1. As of Dec 31, 2016, actual cost to-date was $3.2 Billion, $79 Million under spent: $83 Million through Unit 2 due to lower than planned resources and rescheduling of planned work; and $50 Million for planning and procurement for subsequent units; offset by a $11 Million over spending in Unit F and S Campus Plan projects and [redacted] of contingency allocation (from the Release Quality Estimate).
2. The cost estimate to complete the 4-Unit refurbishment remains within $12.8 Billion.
3. The total forecast for the Facilities & Infrastructure and Safety Improvement projects is [redacted]. This includes the [redacted] required for the key F&IP and SIO projects discussed in Appendix 6, plus [redacted] of minor miscellaneous projects included within the Campus Plan portfolio.
4. The forecast need for additional contingency will be funded from under-spends held in Program General Reserve. Appendix 5B provides details on contingency use and forecast to date.

Darlington Nuclear Refurbishment Program

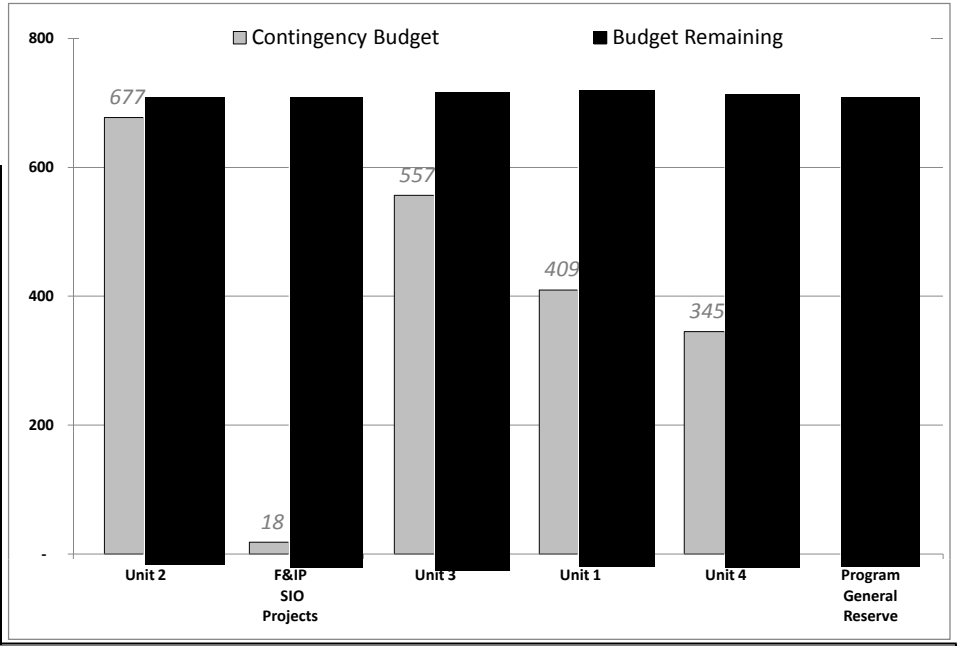
APPENDIX 5B: PROGRAM CONTINGENCY MANAGEMENT

Financial Status of the Program Contingency by Unit

Period Ending: 31-Dec-2016

UNITIZED CONTINGENCY MONITORING AND TRACKING ($ Million)

a	*b*	*d*	*e*	*f*	*g*	*h=d:g*	*i*
Line	Unit	Approved Release @ U2EE (1)	Drawdowns against U2EE	Transfers **to** General Reserve	Transfers **from** General Reserve	**Budget Remaining**	Current Forecasted Need
1	Unit 2	677	[redacted]				
2	F&IP & SIO Projects	18					
3	Unit 3						
4	Unit 1	409					
5	Unit 4						
6	Program General Reserve						
7	**Total Program**	**2,007**					



EXECUTIVE DISCUSSION

1. Contingency in the last Quarterly report was shown against the $2,006 Million original Release Quality Estimate (RQE) budgets. Going forward, contingency will be shown against the $2,007 Million U2EE Board Release approved in August 2016, which excludes [redacted] of contingency drawn and transferred to bundle project base cost as part of U2EE.
2. To-date, there is a net [redacted] contingency draw against U2EE approved budgets:
   - [redacted] drawn was F&IP/SIO projects due to vendor under estimation of costs and quality issues.
   - Within Unit 2, [redacted] of net drawdown is largely a result of [redacted] draw for Balance of Plant projects to address minor scope changes, field execution issues, and revised vendor estimates; [redacted] draw across multiple projects of which [redacted] of due to discrete project risk realization, and [redacted] due to estimating uncertainty; and an off-set of [redacted] of contingency return within the functional projects.
3. A Program General Reserve (PGR) has been established to set aside funding when significant risks are retired. The current [redacted] within the reserve is a result of [redacted] retired high confidence schedule contingency due to the early completion of Defuel, and a [redacted] forecasted interest cost reduction on the nearly complete definition phase. A positive PGR balance represents available contingency funding, whereas a negative balance represents the Program is temporarily consuming more than expected.
4. F&IP and SIO projects are currently forecasting an additional cost over-run of [redacted] which will be funded from surplus held in Program General Reserve.

ONTARIO POWER GENERATION

Darlington Nuclear Refurbishment Program - F&IP and SIO

APPENDIX 6: FACILITIES & INFRASTRUCTURE AND SAFETY IMPROVEMENT OPPORTUNITIES PROJECTS

Cost and Schedule Performance

Period Ending: 31-Dec-2016

COST DETAIL ($ MILLION)

		Cumulative (Life-to-Date)					At Completion of Project				In-Service Date			
		a	b	c=b-a	d	e	f	g	h	j	k	m	n	o
Line	Project Title	Plan (PV)	Actual (AC)	Variance	CPI	SPI	U2EE Budget	Estimate at Completion (EAC)	Variance from U2EE	Variance from Last Period	Need Date	Current Forecast	# Months Float	Variance from Last Period
1	Heavy Water Storage & Drum Handling Facility	346.0	340.9	(5.2)	0.86	0.87	381.2	381.1	(0.0)	0.0	-	Jun 2017	0	1
2	3rd Emergency Power Generator	128.2	135.7	7.5	0.78	0.93	120.4	140.0	19.6	7.1	Mar 2017 (IIP Commitment)	Mar 2017	0	3
3	Containment Filtered Venting System	84.0	93.9	9.9	0.82	1.02	80.6	101.0	20.4	7.0	Apr 2017 (IIP Commitment)	Mar 2017	1	4
4	Shield Tank Over Pressure Protection	21.3	20.5	(0.8)	0.78	0.99	24.1	32.7	8.6	0.0	U1-D1711 U2-DNRU2	U1-D1711 U2-DNRU2	0	N/A
5	Balance of Pre-Requisite Projects In-Service	330.8	327.2	(3.6)	*	*	337.7	328.0	(9.8)	(0.2)	IN SERVICE			
6	**Subtotal Campus Plan Before Contingency**	**910.3**	**918.2**	**7.8**	*	*	**943.9**	**982.8**	**38.8**	**13.9**				
7	**Project Contingency (included)**	*	*	*	*		[redacted]							
8	**Program Contingency**	*	*	*	*									
9	**Total Campus Plan including Contingency**	**910.3**	**918.2**	**7.8**	*	*								
Portion of the Re-tube & Feeder Replacement Bundle														
12	Re-tube Waste Processing Building	144.9	119.2	(25.7)	1.05	0.84	180.7	190.2	9.5	(3.2)	Oct 2017	July 2017	2	1

Notes: * Indicates not applicable. The CPI and SPI calculations exclude project management costs and support tasks which are considered level of effort. PHT = Primary Heat Transport

EXECUTIVE DISCUSSION

1. The Budgets have been adjusted to reflect the Unit 2 Execution Estimate budgets, including the contingency.
2. The Heavy Water Storage Facility in-service date and estimate is at risk. The vendor is preparing a cost and schedule estimate to complete the work, and OPG will fully validate this estimate as well as perform an independent review and estimate to complete. Commercial discussions at the CEO level are already occurring, and contingency measures for heavy water storage for Unit 2 are in place.
3. The estimate to complete the 3rd EPG project has increased since the last report as a result of delays in construction, and commissioning complexity; this has resulted in a delay of the in-service date to March 2017. The IIP Change Control Process was initiated and accepted by the CNSC with a revised need date of March 2017.
4. The estimate to complete for the CFVS project has increased since the last report as a result of delays in construction and additional commissioning costs. The in-service date is forecast March 2017. The IIP Change Control Process was initiated and the revised in-service commitment of April 28th has been accepted by the CNSC.
5. A total of [redacted] of additional contingency, above the contingency allocated during the Unit 2 Execution Estimate, is required to complete the projects based on the current estimates. This will be funded from the Program General Reserve. This is an increase of [redacted] in the period.

ONTARIO POWER GENERATION

Darlington Nuclear Refurbishment Program

APPENDIX 7: KEY PROGRAM RISKS

Risks Being Actively Managed by the Program

Period Ending: 31-Dec-2016

KEY PROGRAM RISKS AND MITIGATION STATUS

Line	Status	Risk Description	Mitigation Plan
1	–	**Vendor Performance** Poor vendor performance will negatively impact safety, quality, cost and/or schedule.	Vendor Performance continues to challenge the Refurbishment program and, although there has been some improvements in the quarter, this remains a high risk. OPG continues to actively manage and assist vendors by removing barriers to work and seconding OPG staff to the vendors. Focus areas in the past quarter have been on 1) supervisory training, 2) work readiness, 3) safety awareness and performance improvements, and 4) increasing project manager accountability. Vendor accountability continues to be reinforced through a number of avenues including a weekly performance meeting with focus on safety, quality, schedule and cost performance; vendor ownership levels are continuing to improve. [redacted] ES Fox performance improvement plan in in place which includes secondment of some OPG staff. Quantified improvement has been observed within the refurbishment projects.
2	–	**Availability/Retention of Project Leadership** Key project personnel with the required skill set will not be in place for the full refurbishment program resulting in impacts on performance.	Focus remains on establishing a strategic resourcing framework with the right organizational design, and ensuring the right leadership pipeline is in place for future unit refurbishments (Units 3, 1, 4). Phase 2 of the Nuclear Fleet Bench Strength Improvement Plan is in progress. The Simplified Hiring item on the Nuclear Refurbishment top 10 priority list have been completed, with the central resourcing team currently in place and single point of contacts assigned to support each organization in the expedition of staffing needs. The resource plans have been compared against RQE staffing forecasts to ensure alignment. The Executive Compensation Framework has been finalized.
3	↑	**Availability of Skilled Craft Resources/ Supervision** Key skilled craft resources may not be available when required for the Execution Phase.	Focus continues on the onboarding for trades workers and the New To Nuclear (NTN) program for Unit 2. OPG participates in labour market information studies to gain insights into labour market issues, including the identification of skilled craft resource needs using tactics that include both short and long term approaches. There is no significant risks perceived for Unit 2, however there is a risk to future units with the start of the Bruce Power Major Component Replacement program in 2019. Discussions and collaboration with Bruce Power continue and it is expected this risk will be mitigated. The current plans and tactics are being evaluated to ensure integration with the Nuclear fleet to minimize the risks in all support areas. Provisions in trades union agreements also provide for resourcing flexibility, all major unions signed Nuclear Project Agreement (NPA).
4	↓	**First of A Kind/First in A While Work and Processes** A lack of recognition of FOAK/FIAW work and processes during design and execution planning results in installations that do not meet requirements causing rework/delay or degraded production post Refurbishment.	A thorough and in-depth review was completed with Engineering, project teams and various execution and functional groups in the Nuclear Refurbishment and Projects & Modifications organizations to flag FOAK/FIAW risks. Specific mitigation actions are defined for FOAK/FIAW risks, and In-depth challenge/review of risks impact/events along with robust tracking of the mitigation actions were put in place. Through the defueling phase, active and deployable risk management contributed to a successful campaign, however, weaknesses in proactive risk identification and mitigation have been seen elsewhere, and, as a result, a weekly risk look ahead process has been put in place to reinforce active risk management. A detailed risk tracking module is currently being developed and will be in place by the end of this period (March 30, 2017).

– No change over period ↑ Improvement ↓ Decline HIGH RISK LOW RISK

Darlington Nuclear Refurbishment Program

APPENDIX 8: VENDOR PERFORMANCE SUMMARY

Core Refurbishment and Facilities & Infrastructure and Safety Improvement Projects

Period Ending: 31-Dec-2016

VENDOR PERFORMANCE INDICATORS

Line	Vendor Name & Key Scope	Safety	Quality	Cost	Schedule	Relationship	Explanatory Notes
1	[redacted]						
2							
3							
4							
5							

Note: The CPI and SPI calculations exclude project management costs and support tasks which are considered level of effort.

ONTARIO POWER GENERATION

Darlington Nuclear Refurbishment Program

APPENDIX 9A: COMMUNICATIONS - EXTERNAL INITIATIVES

Period Ending: 31-Dec-2016

External Initiatives and Outcomes

Q4 2016 (Oct, Nov, Dec)

Narrative Focus: *environmental benefits, jobs and economy; project well planned – started in October as committed*

- Refurbishment website enhancements featuring staff/vendor stories and improvements to navigation
- Public newsletter issued (125K circulation)
- Launched an interactive map listing manufacturers/vendors
- Launched monthly project updates to stakeholders
- Successful public/stakeholder breaker open launch: 1,800 visitors
- Social media campaign launched November 1, supported with a print campaign

SOCIAL MEDIA
TWITTER Q4
37 Number of posts
503 Total interactions

UNIQUE MEDIA STORIES
18 Total
10 Positive
2 Neutral
6 Negative

PRINT ADS PUBLISHED 3

MEDIA RELEASES ISSUES 5

REFURB FALL NEWSLETTER (125K CIRCULATION) 1

MOCK-UP TOURS
PRESENTATIONS Q4
Total
18

STAKEHOLDER COMMUNICATIONS AND PROJECT UPDATE REPORTS 7

OPG Refurbishment Website

OCT	NOV	DEC	Q4
18,975 TOTAL VISITS	155,517 TOTAL VISITS	8,317 TOTAL VISITS	182,809 TOTAL VISITS
17,568 TOTAL PAGE VIEWS	190,664 TOTAL PAGE VIEWS	8,132 TOTAL PAGE VIEWS	216,364 TOTAL PAGE VIEWS

VENDOR INTERACTIVE MAP | 7,755 TOTAL VISITS

Downloads

Future Objectives

- Development of an interactive online project schedule (what's involved in refurbishment)
- Enhanced frequency of project stakeholder update
- Implement enhanced search engine optimization tactics

ONTARIO POWER GENERATION

APPENDIX 9B: COMMUNICATIONS - INTERNAL INITIATIVES

Period Ending: 31-Dec-2016

DARLINGTON REFURBISHMENT COMMUNICATIONS UPDATE

Q4 2016 (Oct, Nov, Dec)

Internal Initiatives and Outcomes

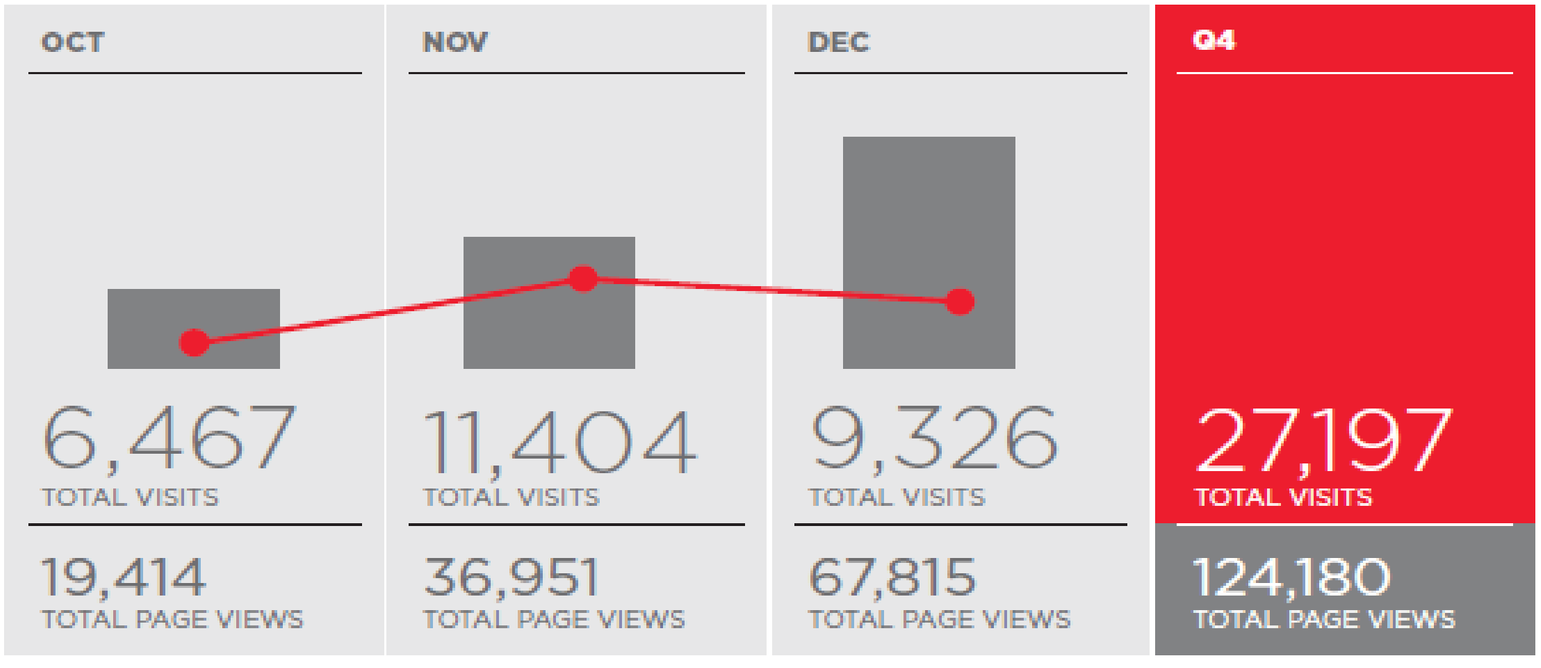
Narrative Focus: *project pillars, turning on the construction switch, OneTeam, shift from planning mindset to execution*

- Re-launched refurbishment website with value-added content and daily updates – paying strong dividends
- Successful employee/vendor breaker-open launch
- Shift to execution posture for communications – numerous daily and weekly updates
- Effective use of weekly video updates to engage staff
- Executed a successful employee/vendor recognition for defuel campaign completion (Q1 2017)

Q4 Combined Results

12 Weekly e-pulse news emails	5 Bi-monthly ***The Pulse*** (newsletter for the trades)	18 Project/leadership videos	
22 Project update stories	37 Refurbishment communications advisories issued	5 Stand-up face-to-face staff alignment meetings	11 Dir of operations/ leadership notes

Refurbishment Employee Website



Future Objectives

- Continue to build traffic to refurb website and enhance user experience and interactions
- Leadership/staff alignment rollout for segment two
- Advancement of communication vehicles targeting trades

ONTARIO POWER GENERATION

APPENDIX 10: METRICS LEGEND

DARLINGTON REFURBISHMENT PROGRAM PERFORMANCE DASHBOARD

METRIC/DESCRIPTION	TARGET	Excellent	Good	Moderate	Poor	↑ – ↓
COST PERFORMANCE INDEX (CPI) Ratio that measures the financial effectiveness. **SCHEDULE PERFORMANCE INDEX (SPI)** Ratio of schedule efficiency to date.	**1.00**	**1.01-1.05**	**1.06-1.09** **0.95-1.00**	**>1.09** **0.91-0.94**	**<0.91**	Managements assessment on the current performance trend. ↑ Performance is IMPROVING – Performance is MAINTAINED ↓ Performance is DECLINING
ALL INJURY RATE (AIR) (# Safety Events/200k hrs worked) Safety events are categorized as the number of fatalities, lost-time injuries, medical treatment injuries and other injuries/illnesses. **The safety statistics include both OPG and contractor performance year-to-date (i.e. reset in January).**	**0.24**	**AIR ≤0.19 AND WP Events = 0** AIR is significantly below target AND zero Work Protection Events in the quarter	**AIR 0.20- 0.37 AND WP Events = 0** AIR is at or below target AND zero Work Protection Events in the quarter	**AIR 0.38-0.41 OR WP Event = 1** AIR is above target within 10% OR 1 Work Protection Event occurred in the quarter	**AIR >0.41 OR WP Event ≥2** AIR is above target > 10% OR ≥2 high Work Protection Event occurred in the quarter	
# LEVEL 1 WORK PROTECTION EVENTS Count of the number of Level 1 Work Protection Events on DRP over the quarter.	**0**					
# EVENT FREE DAY RESETS (EFDR) The number of Darlington Site Event Free Day Resets that occurred within the quarter as a direct result of work being performed within the Darlington Refurbishment Program. The criteria are aligned to the nuclear industry standards and applied consistently across the sites to allow performance comparisons and benchmarking.	**0**	**BOTH at ZERO**	**BOTH at ZERO** Cumulative # of events for the quarter is 0, however previous performance was moderate or poor OR management assessment on low level trending	**EFDR + REG. = 1** Cumulative # of events for the quarter is 1. OR management assessment on low level trending	**EFDR + REG. ≥ 2** Cumulative # of events for the quarter is greater than, or equal to 2 OR management assessment on low level trending	
# REGULATORY NON- COMPLIANCE The number of regulatory non-compliance events related to quality that have occurred within the quarter.	**0**					

FINANCIAL SUMMARY

CURRENT APPROVED RELEASE refers to the total budget of the last release approved by the Board of Directors. The last release was approved by the Board in November 2015, and was to complete the Mobilization Phase.
MOBILIZATION PHASE refers to the work completed Dec 31, 2015 (end of Definition Phase) to October 15, 2016 (Unit 2 Breaker Open).
TOTAL PROGRAM refers to the refurbishment of all 4-units.

METRIC/DESCRIPTION		Excellent	Good	Moderate	Poor	↑ – ↓
LIFE-TO-DATE COST (M$)		Management's assessment based on: Current cost performance; Estimate at Completion; and Contingency allocation.				Managements assessment on the current performance trend. ↑ Performance is IMPROVING – Performance is MAINTAINED ↓ Performance is DECLINING
ACTUAL	Total Program costs incurred to date against the Approved Release.					
PLAN	Planned Program costs to date for the Approved Release.					
VARIANCE	Variance of Actual to Plan. ($) indicates underspend vs. plan.					
AT COMPLETION OF MOBILIZATION PHASE						
FORECAST	Forecast of total Program costs at the end of Mobilization phase.					
PLAN	Planned Program costs at the end of Mobilization phase as per the Approved Release.					
VARIANCE	Variance of Forecast to Plan. ($) indicates underspend vs. plan.					

PROJECT PERFORMANCE INDICATORS AND TRENDS

METRIC/DESCRIPTION	Excellent	Good	Moderate	Poor	↑ – ↓
UNIT 2 EXECUTION PROJECTS **PRE-REQUISITE PROJECTS**	Management's assessment of current performance and risk to Unit 2 Refurbishment Execution.				Managements assessment on the current performance trend.

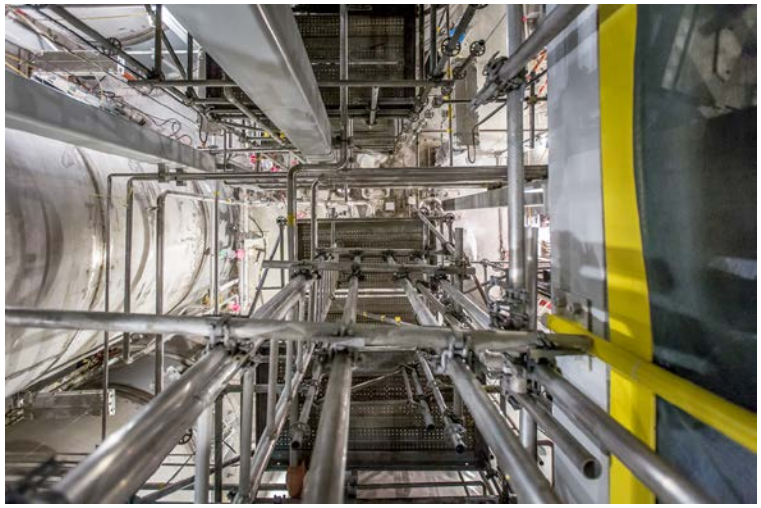
APPENDIX 11: PHOTO CATALOGUE

PROJECT

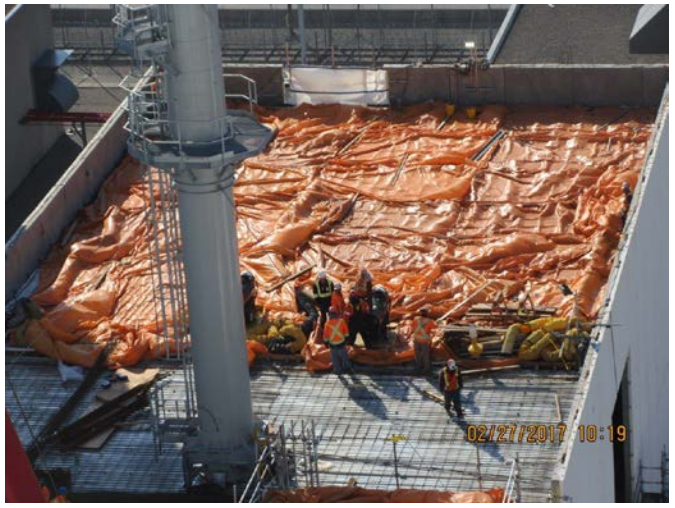
Heavy Water Storage Facility

Completion of Building Envelope

Installation of Landing Scrubber Stack



Installed Pipework



Maintenance (Heating) of Laid Concrete

APPENDIX 11: PHOTO CATALOGUE

PROJECT

3rd Emergency Power Generator

Installation of External Cladding

Roof Concrete Pour

Containment Filtered Vented System

Installation of Exhaust Stack

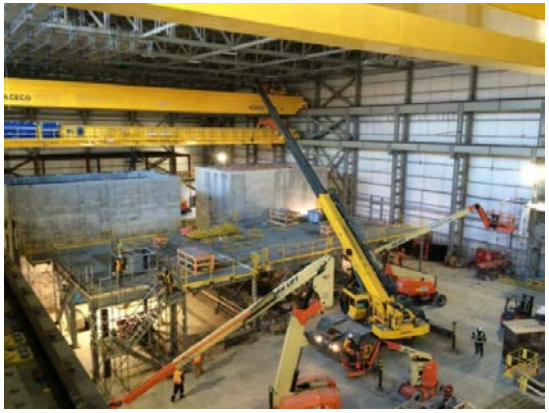
Filed: 2017-03-17
EB-2016-0152
J2.10 Attachment 1, Page 24 of 25
Period Ending: December 2016

APPENDIX 11: PHOTO CATALOGUE

Filter House Interior

PROJECT

Re-tube Waste Processing Building



Installation of Waste Tooling System Platform

Structural Steel Installation

Re-tube Waste Storage Building
(non-Refurbishment funded)

Electrical Room – Roof Pour

T20 Line and Load Terminations

Filed: 2017-03-17
EB-2016-0152
J2.10 Attachment 1 Page 25 of 25
Return Ending: Page 25 2016

APPENDIX 11: PHOTO CATALOGUE

PROJECT

Other On-Site Projects

Vault Prep - Installation of Bulkheads

Breathing Air Installation

Completed Work Control Centre

BURNS McDONNELL

Independent Oversight Report on the Darlington Refurbishment Project

SUBMITTED TO:

Darlington Refurbishment Committee of the Board of Directors for Ontario Power Generation

March 9, 2017

Executive Summary

OPG Management's March 9, 2017 report ("Management Report") to the DRC affirms its forecast for the Darlington Refurbishment Project ("DR Project") remains within the overall RQE control budget of C$12.8 billion and P90 schedule duration of 112 months. The Unit 2 portion of OPG's high-confidence budget is C$3.417 Billion (including C$677 million of contingency) based on an execution duration of 40 months. The DR Project's Execution Phase is currently nearing conclusion of Segment 1, during which the Unit 2 vault is being prepared for its rehabilitation. As of this writing, the DR Project is a net +5 days ahead of the working schedule's critical path since Breaker Open on October 15, 2016. After OPG's Defueling gained 26 days to critical path, 21 days have been lost [redacted] OPG's schedule metrics have significantly improved, allowing the DR Team to identify and mitigate issues, and OPG has increased field oversight in light of early performance, safety and quality trends. Assurance groups continue to be effective in identifying issues.

The Burns & McDonnell/Modus External Oversight Team ("EO Team") has identified certain issues that could have an impact on the Project if they are not addressed, including:

- SNC/Aecon's issues with vault preparation work need to be understood so that lessons learned can be incorporated in future work evolutions;
- [redacted]
- OPG's project controls focus since Breaker Open has been tracking schedule earned value; the team is refocusing on cost forecasting, including tracking the velocity of contractor costs and adverse performance trends, the effectiveness of which needs to be assessed;
- Commercial challenges in Refurbishment and F&IP projects have arisen early in the DR Project which could impact the contractors' momentum and distract OPG's and the vendors' management teams.

It should be noted that the data cut-off date for our report is February 17, 2017. While the Management Report to the DRC accurately reflects the status of the DR Project as of January 31, 2017, some data points differ from those used by the DR Team, as they reflect performance for the first 3 weeks in February.

Evaluation of DR Project Status

Key DR Project Status Indicators

Schedule Performance

	Planned	Complete	Ahead/Behind	SPI	CPI
Total Project	23.4%	19.0%	(123,876)	0.81	N/A

OPG defueled the reactor 26 days ahead of the working schedule though the post-defueling activities resulted in the DR Project losing 21 of those 26 days to date, and performance trends suggest that the bulkhead installation may further challenge the schedule. While the critical path is as of this writing, 5 days ahead, near or non-critical path work has fallen behind by 123,876 hours, with the current composite execution SPI at 0.81; RWPB, as discussed below is the largest contributor. SNC/Aecon will likely drive the critical path schedule until the reactor is fully refurbished in 1Q 2019.

Weekly schedule adherence metrics have shown a persistent problem, with causes ranging from field productivity, late construction work packages, field initiated changes and late reporting of earned value. The DR Team has instituted additional oversight of the critical path work to validate readiness with a goal of raising weekly adherence to 90% of scheduled activities.

Cost Performance	The DR Team has not exceeded the 4-unit Project control budget of $12.8 billion or the Unit 2 budget of $3.4 billion (including $677 million of contingency). Overall, the DR Project is underspent by $59 million which is split between OPG functions (-$32M) and contractor performance (-$27M). To date, contingency draws have totaled a net [redacted]. Though OPG remains resolute in doing so, the vendors' actual hours are not currently being collected for purposes of forecasting based on field productivity.
Vendor Performance	<table><tr><th>Vendor</th><th>Planned</th><th>Complete</th><th>Ahead/Behind</th><th>SPI</th><th>CPI</th></tr><tr><td>SNC/Aecon (RFR)</td><td>20.6%</td><td colspan="4" rowspan="3">[redacted]</td></tr><tr><td>ES Fox (BOP/SDLU)</td><td>29.7%</td></tr><tr><td>SNC/Aecon (TG)</td><td>40.7%</td></tr></table>
SNC/Aecon *Critical Path or Near Critical Path Work*	[redacted] SNC/Aecon's initial critical path work has been affected by discovery work, equipment and field execution issues. The bulkhead installation began on January 27 and is currently scheduled to complete on March 22, which is a key milestone. [redacted] From August 2016 to February 2017, the RWPB has lost [redacted] and approximately [redacted] against its target price estimate. Engineering, which was planned to complete in 3Q 2016, is ongoing and has [redacted] of remaining work. In mid-November, OPG challenged SNC/Aecon to identify its recovery plan for RWPB. [redacted] SNC/Aecon's milestone for completing RWPB is July 31, 2017 is at risk, and further slippage could impact the critical path for Refurbishment. [redacted] SNC/Aecon's work on the Turbine Generator has generally tracked to its schedule and is not a concern at this time.
ES Fox *Critical Path or Near Critical Path Work*	[redacted] ES Fox's management has implemented an improvement plan that addressed all aspects of its performance—safety, quality, schedule management and resources. While ES Fox recovered its schedule, it was not without added cost. With Segment 1 concluding, this is an opportune time to examine future work to ensure that ES Fox can sustain this improvement within budgeted cost and schedule.
Project Controls and Risk Management	The OPG Project Controls team's improved reporting has increased visibility to problem areas. [redacted] The DR Team now is increasing its cost focus to bolster its forecasting. The team is rolling-out additional cost tracking functionality and increasing its use of EcoSys as a forecasting tool. A critical

	component to accurate forecasting depends on obtaining vendors' actual hours and capturing field productivity rates. Obtaining this data will greatly increase the efficacy of OPG's cost forecasting. Risk Management activities are proceeding well with increased senior management support and visibility to successful mitigation of risk events. Contingency tracking and forecasting based upon outstanding risk needs to be validated. The EO Team has some concerns which management is addressing regarding the roll-up of contingency information from the granular to the summary level, which we will address prior to the next DRC report. The risk team is currently improving its ability to forecast potential future contingency draws in order to analyze the remaining contingency.
Construction Checkout and Testing	Vendor performance of the Construction Completion Declaration ("CCD") process and turnover for OPG commissioning/return to service is improving through consolidating turnover packages, performing early reviews of CCD documentation, and assisting vendor conformance. Attention is currently focused on near term (2 week) CCD and turnover requirements with the objective of expanding readiness to a 4+ week window.

Project and Program Assurance

The DR Team's Performance Assurance Group ("PAG"), Enterprise Risk Management and OPG Internal Audit ("IA") are executing robust plans for assurance activities. PAG and Quality Assurance are currently focused on increasing vendor focus on field supervision, safety and quality, and interacting directly with vendors to instruct them on avoiding safety and quality issues. ERM and IA continue to focus on program-level risks and vendor performance. IA is currently planning to audit barriers to field performance through direct surveillance.

OPG Project Team

The DR Team has reacted to the early challenges to critical path by increasing pre-critical path validation and preparation. OPG management has instituted more granular pre-execution reviews with the vendors and integration with key OPG personnel. OPG has also initiated a program to improve accountability which focuses on communications, teamwork, and expectations. This program's focus is on understanding responsibilities, schedule adherence, stakeholder interfaces, and increasing visibility of safety requirements and the potential consequences of non-compliance.

Project Risks and Strategic Considerations

The EO Team offers the following analysis of certain forward-looking risks and strategic considerations that could impact the P90 high-confidence schedule.

Risk Area	EO Team Observations
Performance Reporting	[redacted] The OPG team now needs to increase focus on cost reporting so that Estimates at Completion ("EAC") are accurate, impact costs are transparent and adverse trends are timely identified. Currently, cost forecasting is a *following,* rather than a *leading* indicator as it relies

	on receipt of actual invoices weeks after the work has been performed. The most critical cost trend on the DR Project requires forecasting the number of craft workers needed to accomplish the work, which is calculated based on the vendors' actual hours compared to their budgeted hours. The DR Team's forecasting needs this data to accurately track field productivity trends and to fully utilize the EcoSys cost toolset. Taking these steps will further enhance the accuracy of impacts of newly-identified risks, ongoing commercial issues or other factors that influence EAC. While the weekly progress metrics have improved such that OPG now has clear line of site into performance issues, cost impacts are not being concurrently assessed with the same rigor. Without this balance, OPG's management focus is weighted towards schedule over cost. That may be appropriate at this time, particularly since the critical path is a greater risk, but OPG needs to arrive at a balance of cost and schedule considerations to inform its decisions going-forward.
Commercial Management and Change Management	Effective commercial management involves ensuring the company's contractual position is maintained and asserted as necessary, while also protecting the project management team's focus on the work in the field. Doing so requires having sufficient talented resources in place and a high-level of efficiency in systems used to manage this effort. As anticipated, there has been a significant increase in the volume of work associated with documenting and tracking potential commercial issues. The DR Team currently lacks a formalized or standard way to initiate, respond to and track correspondence notices with vendors; track contractual milestones; monitor schedule and performance issues; or provide prompt notice of vendor deficiencies. Management should address establishing a methodology for bounding potential outcomes for commercial claims and disputes. The Change Management process is in place and seems to be working—however it is not currently automated, which is standard practice for a project of this size and complexity so that there is visibility to in-process changes. We note that the VP of Commercial Management has recognized many of these gaps and has initiated changes in processes and added resources to meet these challenges.
SNC/Aecon Performance	[redacted]
F&IP Projects	The Emergency Power Generator 3 ("EPG3"), Containment Filter Venting System ("CFVS") and D2O Storage Facility each continue to miss targeted schedule dates and cost projections. These projects continue to drain resources from Refurbishment, OPG/vendors' management attention and threaten to utilize additional program contingency for their completion. Moreover, there are trends observed in the vendors' management of those projects and other past F&IP projects that must be eradicated in Refurbishment.

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
Project: Balance of Plant -																	
15128	Design cost increase and schedule delays due to the additional stress analysis re-run	ASDC stress analysis resulted in several nodes not passing as per Code requirements. Additional analysis (NB3200, sensitivity analysis, analytical methods) may be required in order to ensure a clean pass of the stress analysis mandatory for the TSSA registration of the modification. if the risk occurs, then cost and schedule of the project will be impacted.		Active	Katie Stewart	Doina Idita	03-Mar-17	Accept	01-Sep-17	4	1	4	16	4	1	4	16
			Outage Window		**Window Description**												
			124		124 - SDC Rm Work												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13263	PHT & Aux - PHT Pumps Will Require Repairs [window 048]	Event: PHT Pump (2-33120-P3) may require repairs Cause: Due to age of pump, and inability to inspect prior to refurbishment Impacts: Cost and schedule impacts Background: During DNRU2 a single PHT Pump (2-33120-P3) will be inspected to determine the condition of the pump and if any contingency repairs are required. The risk is that the 2-33120-P3 is in poor condition and will require full repairs. This will lead to inspections of 2-33120-P1/P2/P4 and potential additional repairs. This would also impact the scope for the remaining refurbishment unit outages.	1	Active	Katie Stewart	Hassan Baharvandy	07-Mar-17	Monitor	02-Oct-17	2	2	5	10	2	2	5	10
			Outage Window		**Window Description**												
			048		048 - HTS Aux Drain,Purge,Outside Vault												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13641	PHT & Aux - Risk of Project Delays due to Conflicting Work in PHT Pump/Motor Room [Window 48]	The risk is that other work (such as the PHT Pump Motor Installations) will push the execution window for the PHT pump inspection/overhaul work. Any operation of the gantry crane and high rad work in the RMD will cause interruption of other work. Therefore, there is has a high chance of other work affecting the PHT Pump inspections, coupling removal/installation (Mech mtc. or other contractor), seal removal/installation (P&M), motor removal (P&M), and pump contingency overhaul.	1	Active	Katie Stewart	Hassan Baharvandy	07-Mar-17	Monitor	17-Jun-17	2	1	5	10	2	1	5	10
			Outage Window		**Window Description**												
			048		048 - HTS Aux Drain,Purge,Outside Vault												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
15155	Schedule of VVRS impacted by Breathing air	Event: Breathing air can cause delays to the start of vvrs. Cause: Delays from JV. Impact: SCHEDULE IMPACT,COST IMPACT Background: Present schedule is not accounted for manpower requirements i.e. 24/7. schedule of breathing air has an impact on the VVRS commissioning.	4	Active	Katie Stewart	Amanjot Singh	01-Mar-17	Accept	18-Mar-17	3	2	3	9	2	1	2	4
			Outage Window		**Window Description**												
			137		137 - Final Commissioning (VVRS Ph-I, AL&TCD Logic Mods, BU Logic Mod Ph-II)												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
15156	Operation resources support required 24/7 for vvrs commissioning	Event: 24/7 window support from operations may not be available. Cause: Due to defueling advance resources have been tied up in other ongoing projects. Impact: Additional cost will incur and delay to critical path. Background: window 137 requires Operation resources support required 24/7 for vvrs commissioning.	4	Active	Katie Stewart	Amanjot Singh	01-Mar-17	Monitor	15-Mar-17	3	2	3	9	2	1	2	4
			Outage Window		**Window Description**												
			137		137 - Final Commissioning (VVRS Ph-I, AL&TCD Logic Mods, BU Logic Mod Ph-II)												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
15157	Duration for Commissioning could be longer then planned	Font Size Event: bypass commissioning may take longer than expected Cause: Due to FOAK work Impact: Schedule delays Background: VVRS is a first of a kind project . The by pass commissioning can take longer then expected because it has not been done before. This could have a major impact on the project schedule.	4	Active	Katie Stewart	Amanjot Singh	01-Mar-17	Monitor	18-Mar-17	3	2	3	9	2	1	2	4
			Outage Window		**Window Description**												
			137		137 - Final Commissioning (VVRS Ph-I, AL&TCD Logic Mods, BU Logic Mod Ph-II)												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13295	[Window 532] Risk of Fire Protection Emergent Repair Scope	DSRs IP1220-14, IP1300-1, and IP1220-3 are DSRs to perform assessments. Should deficiencies be found during these inspections/assesssments, there is a generic contingency DSR for any work required in Engineering/Testing Scope. Currently, this DSR does not carry any funding to perform the work.	3	Active	Oweis Chohan	Oweis Chohan	01-Feb-17	Monitor	09-Jan-17	4	2	2	8	4	2	2	8
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13295	[Window 532] Risk of Fire Protection Emergent Repair Scope	DSRs IP1220-14, IP1300-1, and IP1220-3 are DSRs to perform assessments. Should deficiencies be found during these inspections/assesssments, there is a generic contingency DSR for any work required in Engineering/Testing Scope. Currently, this DSR does not carry any funding to perform the work.	5405	In Progress	Fire Protection Penetration/Construction Joint Field Inspections	Completion of the final fire penetrations and construction joints is required to assess the extent of repair scope. The first action is to complete the inspections TCD Aug 15. Upon completion of tyhat activity, the action ID will be updated to status when Engineering will complete the inspection analysis to confirm repair scope. That TCD will be established once the inspection reports are generated. Update : OPG Field engineering providing the inspection service. Commencing Jan 2016. Expected finish, first quarter 2016. Inspection analysis ongoing, Update June 29/26 - Field engineering was instructed to perform further analysis of high risk rooms. Expected completion on July 15th 2016. This has pushed the documentation exercise into September 2016. IIP due in December 2016 for documentation. Update Sept 14/16 : Field engineering now complete their further analysis. Documentation has slipped to completion of Oct 7/16 due to amount of drawings to be created. Update 3-Oct-2016: Inspection/documentation updates to be completed by November 2016. Being monitored. Update: BOP Projects to meet with OPG Design on status of IIP Fire Barriers Inspections completion (Target end of year 2016). Action plan to be developed on path forward for BOP projects Sika-Flex Fire barrier field campaign.	Ajay Upadhyaya	Oweis Chohan	31-Mar-17								

Feb 22, 2017: On-going discussions with Design for projects to obtain work-able sample sub-set of sikalfex and scope to complete SOW. Due Date above moved out to March 31 to re-assess.

Extent of penetrations/construction joints confirmed, SoW being drafted to obtain selective sampling to confirm EOC for Sikaflex. Date extended to Jan 2016 to allow for SoW finalization, contract issuance and status of sampling findings.
Update 03-Oct-2016: OPG design & Field Engineering to provide inspection reports/documentations/repair scope to OPG projects by November 2016. Selective sampling for Sikaflex firebarrier replacements to commence thereafter (Scope of work, contract issuance, etc)

Update : 03 Nov 2016
1) EP DCR implementation for 71 existing dwgs - over the next ~2 months (not required to close out IIP) – (340 hrs drafting w/contingency, 200 hrs eng) – Target completion is December 31st.

Update: 17-Jan-2017
OPG Design has completed their portion of field assessments/configuration management of fire barriers. OPG projects is awaiting their feedback now to proceed with IIP OI 024 (Sikaflex removal) - Design input is needed to generate a SOW and execute the work before July 2019 as per the IIP commitment. A meeting with design on this feedback/turnover is to be scheduled in the next week or 2 and a joint effort is establishing the SOW is its main objective.

Outage Window	Window Description
532	532 - Oil Storage Tank Inspections

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13261	PHT & Aux - R002 on 84.0 elevation may contain many hotspots [window 048]	The risk is that the room where the D2O collection tank and vent condenser heat exchagers (2-33810-HX1/2) currently contains a hot spot and may contain many more after the PHT drain. The Heat exchangers are located in Room-002 on the 84.0 elevation, at one of the lowest elevations of the station. During refurbishment, the removal of the D2O in the PHT Auxiliary system will be completed via a gravity drain, causing many particulates and radioactive particles to be drained to the lower elevations of the plant.	1	Active	Katie Stewart	Hassan Baharvandy	07-Mar-17	Monitor	30-Jul-17	3	1	2	6	3	1	2	6

Outage Window	Window Description
048	048 - HTS Aux Drain,Purge,Outside Vault

There are no Draft, Not Started, In Progress Actions associated with the risk.

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13347	PHT Pump Dismantling/Reassembly Tools Unavailable [Window 48]	Event: The Primary Heat Transport (PHT) Pump disassembly/assembly tools required for PHT pump inspection and maintenance may not be readily available for execution Cause: In the event of a forced outage, station maintenance would require the PHT Pump tools for seal replacement. Impact: Schedule delays Background: In the event of a forced outage, station maintenance will need to take back the PHT Pump tools for the use of seal replacement. Also, the vendor needs to confirm availability of all required tools for pump disassembly, inspections and reassembly. This will lead to a contractor stand down until the PHT Pump tools can be obtained to continue PHT pump inspections.	3	Active	Katie Stewart	Hassan Baharvandy	07-Mar-17	Monitor	26-May-17	2	1	3	6	2	1	3	6
			Outage Window		**Window Description**												
			048		048 - HTS Aux Drain,Purge,Outside Vault												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13364	PHT Pump Component Procurement Uncertainty [Window 48]	Event: Cost of material procurement for the PHT Pump long lead components may be higher than anticipated/additional parts may be required Cause: Due to long lead time, and exclusion of all regulatory license approvals with class 5 estimate from the OEM Impact: cost impacts Background: The risk is that there is an uncertainty in the cost of material procurement for the PHT Pump Long Lead components (15 month lead time). Funding was approved in Phase 1 to complete the purchase of the materials but the estimate from the OEM was a class 5 and did not include all the regulatory license approvals. There is also a risk of requiring additional overhaul parts (PHT pump parts over and above the rotating element).	3	Active	Katie Stewart	Hassan Baharvandy	07-Mar-17	Monitor	12-May-17	2	1	3	6	2	1	3	6
			Outage Window		**Window Description**												
			048		048 - HTS Aux Drain,Purge,Outside Vault												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13400	EHS Project - Inability to Perform Construction Walkdown and Risk of High Number of FICs [Windows 68, 104, 105]	The risk is that there has not been a construction walkdown held for the Class 1 portion of this modification due to no planned Unit 2 outages available during the detailed design phase. The design and construction team have not been able to get into the reactor vault, therefore the design is based on available pictures and laserscans for piping layouts and supports. There is a large risk of interferences being present in the current piping runs which are not clearly visible from available pictures. There is a likelihood that there will be a high number of field initiated changes (FICs) during construction.	1	Active	Katie Stewart	Hassan Baharvandy	07-Mar-17	Monitor	29-Jun-18	3	2	2	6	3	1	2	6
			Outage Window		**Window Description**												
			068		068 - Emergency Heat Sink												
			104		104 - Post Feeder Vault Projects												
			105		105 - Vault Projects After Feeder Removal												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13658	EHS - DEC Revisions due to Unavailability of Vendor Information [Windows 48, 53, 68, 104, 105]	The risk is that DEC revisions will be required due to the unavailability of vendor information. The design of the EHS piping and support structures depends on the dimension and weights of the material components (such as manual and check valves, and other items). These items will not be available until 4-6 weeks into procurement of the components, however PO's have not yet been issued for them (in progress).	2	Active	Katie Stewart	Hassan Baharvandy	07-Mar-17	Mitigate	27-Apr-17	3	2	1	6	3	2	1	6
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			9200	In Progress	EHS Follow up on Vendor Drawing Information	The design EC's may require revision if the information according to the vendor drawings for the valves are outside what was assumed in the design (eg. weight & dimensions). This action is to track and follow up on all vendor information to confirm impact to DEC's.	Katie Stewart	Hassan Baharvandy	17-Mar-17	in Progress, most of the vendor drawing are received							
			Outage Window		**Window Description**												
			048		048 - HTS Aux Drain,Purge,Outside Vault												
			053		053 - ESW Rehab												
			068		068 - Emergency Heat Sink												
			104		104 - Post Feeder Vault Projects												
			105		105 - Vault Projects After Feeder Removal												
14568	EHS - Parts Availability May Cause Delays during Construction [window 48, 104]	There is a risk that during construction of Emergency Heat Sink (EHS) refurbishment project, there may be delays to construction due to late delivery of materials. This risk is specific to Class 1 valves and EP pressure test tool material, and will impact the vault projects window (104).	1	Active	Katie Stewart	Hassan Baharvandy	07-Mar-17	Monitor	20-Feb-17	3	1	2	6	3	1	2	6
			Outage Window		**Window Description**												
			048		048 - HTS Aux Drain, DFead Legs and Purge,Outside Vault												
			104		104 - Post Feeder Vault Projects												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14577	PHT & Aux: PHT Pump inspections may be more extensive than originally quoted [window 048]	PHT P3 inspections are required to be performed during unit 2 refurbishment outage to determine extend of condition (as well as gasket replacement to fix the leaks on P3). Based on the results of these inspections, the remaining pumps may require inspections and overhaul to ensure they are reliable to extended life of the unit. As per the Vendor's BOE, it is assumed that inspection will be performed onsite with the OEM present to consult with visual and NDE inspection results; and the assumption was 160 hours of vendor on-site support (i.e. 8hrs x 20days). It has become apparent that the inspections can't logically take place onsite at OPG and the RE needs to be shipped to the OEM's location in the US. There were no provision in the estimate to ship the contaminated pump RE offsite for extended condition assessment.	2	Active	Scott Guthrie	Hassan Baharvandy	07-Mar-17	Monitor	01-Jun-17	3	1	2	6	3	1	2	6
			Outage Window		**Window Description**												
			048		048 - HTS Aux Drain,Purge,Outside Vault												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13753	Risk of Procurement of Miniature fission chambers [No Window Related]	May require procurement of new miniature fission chambers or they are not fit for use.	2	Active	John Stopar	George Naguib	11-Aug-16	Monitor	31-May-17	3	1	1	3	3	1	1	3
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
Project: Balance of Plant - 73308																	
13756	Testing of all private fire main control valves [73312]	Todays Date: 07/March/2017 (Current scope: 14 valves to test) Due to age and obsolescence of position assured open valves - there is a risk that during the testing of these valves (opening/closing) it may cause damage/failure. This was lead to project scope/schedule/cost being impacted.	3	Active	Oweis Chohan	Oweis Chohan	07-Mar-17	Accept	30-Jun-17	2	1	4	8	2	1	4	8
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
Project: Balance of Plant - 73312																	
13654	ES MSA Vendor Capability/Experience	[redacted] A full resource assessment of FOX PMT and Construction resources (against Class 3 estimate FTEs) is required to confirm if current staff are adequate and what changes to staffing are required as projects enter into/out of execution during Unit 2. Also risk is tied to risk ID - 13663	3	Active	Scott Guthrie	Scott Guthrie	23-Jan-17	Mitigate	17-Feb-17	4	3	3	12	2	2	3	6
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13654	ES MSA Vendor Capability/Experience	[redacted]	6529	In Progress	ES Fox Strategic Refurb Resource Planning	This action is associated with Risk 13654 (Fox Refurb resoruce planning). Temporary management staff have been hired by Fox to complete a PMT & Contruction resource review to provide strategic resourcing options to OPG. The scope of this investigation involves assessing FTE resources (by name) against the # of FTEs assigned in the Class 3 estimates. Opportunities to build a dedicated Refurb PMT/Construction team need to be reviewed along (with under/over-allocation gaps) as Unit 2 progresses to determine options to temporarily re-allocate key Fox staff as required. This will ensure experience/continuity/value for money for subsequent unit refurb outages and help to address the current experience/quality gaps for Unit 2.	Scott Guthrie		10-Mar-17							

Weekly review meeting underway with Fox confirming progress of strategic resourcing initiative.
Mar 16/16 status: PMT Class 3 estiamte FTE allocation confirmed against current Fox PMT team. team is approx. 50% under-resourced however after Feb 2018 the PMT workload drop significantly. Fox to provide names of proposed PMT team and insert into PMT allocation curve to determine extent of underallocation post Feb 2018. Construction staff table received ~80 % complete. Construction staff allocation table drafted and review I/P.
Apr 17/16: Conceptual approval received from Gary Rose & Mike Allen wrt PMT/Construction team approach. Presentation to be revised based on feedback & final review completed week of Apr 25 prior to requesting approval from D. Reiner. Support team Scope of Work routed for approval and draft PO sent to Fox for comment. This PO will progress Fox resources/planning in a number of areas. [redacted] BoP resource has been assigned to the look ahead team, Fox and SDLU staff assignment remains pending.
May 13/16: PMT/Construction team update noted in Action 5980. [redacted]
May 30/16 Update: QA/QC resource plan committed to be p

Outage Window	Window Description
000	000 – No Window Related

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
14379	Active	Scott Guthrie	Breanne Stramenga	07-Mar-17	Mitigate	01-May-17	3 1 3 9 2 1 2 4

ID	Risk Title	Risk Description
14379	73312: Tin Whisker Cleaning - ToR Schedule Risk	Event: Relay replacements have only been done a few times at Darlington on a small scale (1-2 at a time). Cause: The volume of work (180 relays) that will need to take place. Impact: The volume of work (180 relays) may result in failed or delayed post maintenance testing, which could cause significant rework to diagnose & repair the problem.

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14379	73312: Tin Whisker Cleaning - ToR Schedule Risk	Event: Relay replacements have only been done a few times at Darlington on a small scale (1-2 at a time). Cause: The volume of work (180 relays) that will need to take place. Impact: The volume of work (180 relays) may result in failed or delayed post maintenance testing, which could cause significant rework to diagnose & repair the problem.	7596	In Progress	Class 2 Relay "Tin Whisker" Maintenance - Develop Spares Plan	Develop Spares Plan, including: 1. Investigate spare relay availability with ABB/EPRI/COG. 2. Confirm existence of 11 spares (put hands on them). 3. Clean of existing spares and subsequent verification of functionality.Meet with Station Engineering to review spares plan.	Ajay Upadhyaya	Breanne Stramenga	30-Apr-17								

Action extended to June 30/16 as OPG PM is on OCC duty until June 20/16. Current status - Tin Whiskers workplan remains on track for OPG approval by June 15/16, other areas pending review by PM upon return.
July 25 Upate: Work plan approval TCD is now July 31, and is at risk. Extended to September.
Aug 10/16 Update: Quotation received from vendors - cost is 5k per unit. Minimum order is 400 (2M$). Further engineering analysis I/P as it is estimated that the cost of a modification to replace the units will exceed the cost of spares.
Sept 28/16 - Action date updated to reflect TCD for analysis.
Oct 4/16: Pre-req workload/vendor oversight and lack of resources challenging completion date. Aug staff request being processed to bring in more project resources. Action extended to Oct 31 to allow additional staff to come into role.
Dec 29th Update: System Engineering spares recommendation will be submitted by Feb 28th, due date changed to reflect new commitment.
Mar 7,2017: System Engineering commitment missed, new due date is end of March

Outage Window	Window Description
000	000 – No Window Related

ID	Risk Title	Risk Description		Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD								
13853	Warranty Period Extension beyond 2 year ES MSA contractual term	Event: There is a possibility that we would need to extend the warranty period for materials beyond the 2 year timeline. Cause: The expectation is that material needs to be procured at arrived at site t-6weeks from the execution window. However, there are instances where the execution work occurs later on within the execution window, especially for work currently assigned to segment windows (131, 132, 133) Impact: Warranty may have elapsed prior to installation resulting in additional cost to cover extra warranty requirement		Active	Scott Guthrie	Kevin Tse	23-Jan-17	Monitor	16-Feb-17	3	2	1	6	3	2	1	6

Outage Window	Window Description
000	000 – No Window Related

There are no Draft, Not Started, In Progress Actions associated with the risk.

ID	Risk Title	Risk Description		Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD								
14380	73312-Tin Whisker Cleaning - Resource Risk	Event: This project requires specialized OPG station resources (DCC group) to perform the work Cause: There is risk of resource availability for future units, as specialized resources are not available outside of OPG Impact: There is a schedule risk due to resource availability during work window which may cause delays.		Active	Scott Guthrie	Breanne Stramenga	07-Mar-17	Monitor	01-Feb-18	2	1	3	6	2	1	3	6

Outage Window	Window Description
000	000 – No Window Related

There are no Draft, Not Started, In Progress Actions associated with the risk.

ID	Risk Title	Risk Description		Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD								
14378	73312: Tin Whisker Cleaning - ToC Relay Spares Risk [No Window Related]	Event: Significant degradation is uncovered during Tin Whisker cleaning/relay inspection; or that we fail PMT due to contact degradation missed during inspection Cause:The relay is obsolete and there are only 7 spares for ~180 relays on U2 only Impact: Spare relays will need to be purchased if results are unfavorable. This poses a significant cost risk to the project since the relays will need to be custom made.		Active	Scott Guthrie	Breanne Stramenga	07-Mar-17	Mitigate	01-Jan-18	2	2	2	4	1	1	2	2

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments

ONTARIO POWER GENERATION

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14378	73312: Tin Whisker Cleaning - ToC Relay Spares Risk [No Window Related]	Event: Significant degradation is uncovered during Tin Whisker cleaning/relay inspection; or that we fail PMT due to contact degradation missed during inspection Cause:The relay is obsolete and there are only 7 spares for ~180 relays on U2 only Impact: Spare relays will need to be purchased if results are unfavorable. This poses a significant cost risk to the project since the relays will need to be custom made.	7596	In Progress	Class 2 Relay "Tin Whisker" Maintenance - Develop Spares Plan	Develop Spares Plan, including: 1. Investigate spare relay availability with ABB/EPRI/COG. 2. Confirm existence of 11 spares (put hands on them). 3. Clean of existing spares and subsequent verification of functionality.Meet with Station Engineering to review spares plan.	Ajay Upadhyaya	Breanne Stramenga	30-Apr-17									

Action extended to June 30/16 as OPG PM is on OCC duty until June 20/16. Current status - Tin Whiskers workplan remains on track for OPG approval by June 15/16, other areas pending review by PM upon return.
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Dec 29th Update: System Engineering spares recommendation will be submitted by Feb 28th, due date changed to reflect new commitment.
Mar 7,2017: System Engineering commitment missed, new due date is end of March

Outage Window	Window Description
000	000 – No Window Related

Project: Balance of Plant - 73335

ID	Risk Title	Risk Description		Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14401	AA & ICFD Replacement Staff Experience [window #21]	This risk is associated with the introduction of new tooling and processes to staff with little experience in performing the work. AA Rod Replacement has never been performed at Darlington and is new to the contractor. Horizontal ICFD is also a FIAW activity that is being performed by a vendor that has never performed the work before. In addition, discharge of flux detectors into the IFB is new to DNGS. The lack of experience is associated with the tooling/work process of replacing/discharging AA rods, assembly/installation of correct AA Rod Types and horizontal flux detector removal/install and discharge into the IFB.		Active	John Stopar	George Naguib	13-Feb-17	Mitigate	31-Oct-16	4	4	4	16	2	2	1	4

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
7886	In Progress	BoP AA/ICFD Mockup and Wet Casket Bay/IFB Training Completion	AA rod removal/wet casket bay training and ICFD/IFB training is required to be implemented in two separate events 1) with a smaller management/supervisory team to validate the procedures, durations and equipment 2) Immediately prior to field work with trades staff/supervision to ensure familiarity with all applicable procedures/tooling. 3) Resource bridging strategy so that a subset of the AA trades are maintained for use in the ICFD window.	John Stopar	George Naguib	15-Mar-17	10 Aug 2016 (J.Stopar): Training for Adjuster and ICFD replacement includes practical evaluation of worker proficiency and knowledge. A high hazard rehearsal is also included at the end of the training program. Training will emphasize the fact that the maintenance activities are taking place in midst of sensitive equipment.

Outage Window	Window Description
021	021 - Replace Adjuster Rods

ID	Risk Title	Risk Description		Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14206	High Dose for HFD Program [Window 73]	ALARA review has been completed and assessed the Horizontal Flux Detector Replacement Program to result in 115 Rem dose to workers. The high dose is due to hotspots in the SDS2 bunker.		Active	John Stopar	George Naguib	21-Oct-16	Mitigate	15-Dec-17	5	2	2	10	4	1	1	4

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
8807	In Progress	HFD Process Cycle Time Validation on Mock-up	The cycle time of the HFD removal and installation processes must be validated on a representative mock-up in order to confirm that the cumulative dose has been properly estimated in the ALARA plan.	John Stopar	George Naguib	15-Dec-17	The dose target is based upon the assessed times for each sub-task as noted in the approved HFD Alara plan. The target dose for completion of this refurbishment activity is 39.4 Rem.

Outage Window	Window Description
073	073 - HFD Replacements

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13299	Radiation Protection Risks with Flux Detector Removals [Window 28, 73]	Due to the highly radioactive nature of the flux detectors, there is a possible schedule delay during execution of FD removals if a detector becomes lodged, stuck, or broken within the chopper tool. The Stern design of the chopper tool includes small contingency tooling to dislodge detectors in the case of minor issues during chopping. This tooling is designed to deal only with specific circumstances (ie. minor blockages). Darlington Reactor Maintenance has made use of a robotic assembly during removals on the outermost FD assemblies on the deck. The execution team cannot rely on this robotic tool due to the wholesale replacement strategy. The deck is far too crowded with safety related drive mechanisms to allow use of a travelling robotic assembly. The purpose of this risk is to document the possibly schedule and cost delays associated with unforseen failure of the chopping tool. EDIT 20NOV2015: This risk is also associated with HFD schedule delays due to radiological interferences with RFR.	2	Active	John Stopar	George Naguib	21-Oct-16	Mitigate	30-Nov-16	3	2	3	9	2	2	1	4

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
6756	In Progress	Contingency Plans for HFD and VFD Replacement	This action is associated with Risk ID 14207. Contingency planning for stuck detectors during the HFD and VFD replacement windows will need to be established prior to executing the work.	John Stopar	George Naguib	31-May-17	8 Aug 2016 (J.Stopar): Two contingency planning sessions have been conducted with the ICFD Tooling supplier and experienced end users who have performed work with the tooling at Darlington, Bruce, Pt Lepreau, Wolsong and Quinshan. Workable contingency plans have been formulated and the details to achieve them are being worked on. 21 Oct 2016 (G. Naguib): OPG and vendors are working on a new strategy to cut HFDs with the chopper tool off the HFD assemblies in order to create ease of execution and contingency planning. The design efforts by Stern to complete this new strategy will begin November 2016.

Outage Window	Window Description
028	028 - Replace Vertical Flux Detector
073	073 - HFD Replacements

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
11337	Reactivity Deck Training Location [No Window Related]	The risk is that current facilities are insufficient for reactivity mechanism training. In the event that the EPC contractor cannot use the existing DNGS training facility, a new facility would be required. This would cause significant cost increase to the project.	3	Active	John Stopar	George Naguib	03-Feb-17	Monitor	15-Jan-17	2	1	4	8	2	1	4	8

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
1723	In Progress	Details of Risk Response Strategy for Risk #11337	Training Plans are to be developped by the EPC vendor for Flux Detectors and AAs. A station integration meeting will be conducted to ensure alignment with the vendor training plan (as shared use of the RMD mock up will be required).	John Stopar		28-Apr-17	VFD and HFD Mock-ups exist in Turbine Hall. Arrangements for shared use required. J.Stopar 30 SEP 2015 : the Unit 2 Level 1 is still under development and the execution windows for Adjusters, VFDs are being shifted. The schedule must be set before meaningful discussions can take place with the Fuel Handling Dept which is the owner of the RMD rehearsal Facility. G. Naguib 02Sept2016: Vendor has prepared training plan for Adjuster Replacement, VFD, and HFD projects. The RM Training Facility is suitable for use with the addition of interferences for a more realistic working space approach. The vendor and BOP will work together to determine the types and extent of interferences required for a realistic mockup. Further assessment of the current HFD guide tube/assembly bundle usability is ongoing. Station integration meeting has taken place and a memo of understanding outlining the Refurbishment's use of the U4 extension RM mockup has been drafted. 21 Oct 2016 (G. Naguib): HFD Mockup assessment will determine if additional location is required. The U4 extension HFD mockup does not include a full length assembly (only a single well extension). Ongoing meetings with vendor and Project will determine if further mock up construction is required. 2 Feb 2017 (J.Stopar) : ES Fox training plan review by OPG has identified gaps. Training plan is being revised.

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current Probability	Current Financial	Current Schedule	Current Score	Post Probability	Post Financial	Post Schedule	Post Score
11332	Reactivity Deck Training Location [No Window Related]	The risk is that current facilities are insufficient for reactivity mechanism training. In the event that the EPC contractor cannot use the existing DNGS training facility, a new facility wou															
			Outage Window		**Window Description**												
			000		000 – No Window Related												
12022	Possible Electrical Cable Insulation Damage When Replacing Flux Detectors [Window 28, 73]	Possible deterioration of existing cable insulation (from the Flux Detector to the Amplifier) when replacing Flux Detectors because aged cable insulation may be very fragile and breakdown upon contact.	3	Active	John Stopar	George Naguib	21-Oct-16	Mitigate	30-Nov-16	3	1	2	6	3	1	2	6
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			8808	In Progress	Order VFD/HFD Spare Pigtails (JP1, JP2 and JP3)	This action is on the BOP Project to order spare pigtails for the ICFD replacement project. UPDATE 03FEB2017: HFD Pigtails will be replaced via EQ PM work. VFD spares exist in stores and an MR will be placed for approximately 10% spare of each type (J1,J2, and J3).	John Stopar	George Naguib	29-Mar-17								
			Outage Window		**Window Description**												
			028		028 - Replace Vertical Flux Detector												
			073		073 - HFD Replacements												
14402	RM Drive Mechanism Damage due to handling and AA Replacement work [window #21 and #28]	This risk is associated with the possible damage to RM Drive Mechanisms during handling (ie. removal and reinstall of AA Drive Mechanisms) as well as surrounding work during AA rod replacement and VFD replacement work.		Active	John Stopar	George Naguib	13-Feb-17	Mitigate	20-Dec-16	3	1	2	6	2	1	1	2
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			7886	In Progress	BoP AA/ICFD Mockup and Wet Casket Bay/IFB Training Completion	AA rod removal/wet casket bay training and ICFD/IFB training is required to be implemented in two separate events 1) with a smaller management/supervisory team to validate the procedures, durations and equipment 2) Immediately prior to field work with trades staff/supervision to ensure familiarity with all applicable procedures/tooling. 3) Resource bridging strategy so that a subset of the AA trades are maintained for use in the ICFD window.	John Stopar	George Naguib	15-Mar-17	10 Aug 2016 (J.Stopar): Training for Adjuster and ICFD replacement includes practical evaluation of worker proficiency and knowledge. A high hazard rehearsal is also included at the end of the training program. Training will emphasize the fact that the maintenance activities are taking place in midst of sensitive equipment.						
			Outage Window		**Window Description**												
			021		021 - Replace Adjuster Rods												
			028		028 - Replace Vertical Flux Detector												
14404	Risk of First Time Full Scale Horizontal Flux Detector Program [window #73]	Although ICFD's have been maintained at DNGS, they have not been replaced on a large scale addressing productivity issues, personnel (dose) and coordination with other work groups and projects.		Active	John Stopar	George Naguib	21-Oct-16	Mitigate	20-Dec-16	3	1	2	6	2	1	2	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			7886	In Progress	BoP AA/ICFD Mockup and Wet Casket Bay/IFB Training Completion	AA rod removal/wet casket bay training and ICFD/IFB training is required to be implemented in two separate events 1) with a smaller management/supervisory team to validate the procedures, durations and equipment 2) Immediately prior to field work with trades staff/supervision to ensure familiarity with all applicable procedures/tooling. 3) Resource bridging strategy so that a subset of the AA trades are maintained for use in the ICFD window.	John Stopar	George Naguib	15-Mar-17	10 Aug 2016 (J.Stopar): Training for Adjuster and ICFD replacement includes practical evaluation of worker proficiency and knowledge. A high hazard rehearsal is also included at the end of the training program. Training will emphasize the fact that the maintenance activities are taking place in midst of sensitive equipment.						
			Outage Window		**Window Description**												
			073		073 - HFD Replacements												
14717	Vendor Project Staff Retention	[redacted]		Active	John Stopar	George Naguib	13-Feb-17	Monitor	30-Jan-17	3	1	2	6	3	1	2	6
			Outage Window		**Window Description**												
			021		021 - Replace Adjuster Rods												
			028		028 - Replace Vertical Flux Detector												
			073		073 - HFD Replacements												
			128		128 - ECI Vault Work												
			129		129 - Temp Fission Chamber Install												

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14717	Vendor Project Staff Retention	[redacted]	155		155 - Adjuster Mechanism Re-Install												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13635	Tooling and Design rework [Window 28, 73]	The risk is that due to complications with storing the In-Core Flux Detectors in the Irradiated Fuel Bay, rework on design may be required to revise the tooling. Should this occur, the impact will be to perform design that is above and beyond the current understood scope.	1	Active	John Stopar	George Naguib	21-Oct-16	Monitor	30-Nov-16	2	2	2	4	2	2	2	4
			Outage Window		**Window Description**												
			028		028 - Replace Vertical Flux Detector												
			073		073 - HFD Replacements												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14025	ICFD Lemo Connector Corrosion [Window 28]	OPEX from previous DNGS ICFD work indicates that there may be heavy corrosion on the U2 ICFD assembly heads, and more specifically on the lemo connectors. This risk is identified for contingency planning in case lemo connectors need be replaced. In more sever corrosion cases, single well may need to be abandoned if detectors cannot be installed. 10 Aug 2016 (J.Stopar): After closer examination of OPEX, the corrosion affecting new detector installation can be dealt with by simple cleaning at the top rim of the well. Spare wiring harnesses JP1, JP2 and JP3 are being ordered in order to have Lemo harness replacements should they be required.		Active	John Stopar	George Naguib	21-Oct-16	Mitigate	30-Nov-16	4	1	1	4	4	1	1	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			8808	In Progress	Order VFD/HFD Spare Pigtails (JP1, JP2 and JP3)	This action is on the BOP Project to order spare pigtails for the ICFD replacement project. UPDATE 03FEB2017: HFD Pigtails will be replaced via EQ PM work. VFD spares exist in stores and an MR will be placed for approximately 10% spare of each type (J1,J2, and J3).	John Stopar	George Naguib	29-Mar-17								
			Outage Window		**Window Description**												
			028		028 - Replace Vertical Flux Detector												
14205	HFD Installation Challenges due to sagged guide tube [Window 73]	There is OPEX which indicates that installation of longer Horizontal detectors, with a dry moderator, may be presented by major challenges due to sagging of horizontal ICFD guide tubes. A response to this challenge may include delaying longer detector installations until after moderator fill. OPEX indicates the possibility that guide tube sag is less apparent with a full moderator. This would have possible impacts to the overall outage schedule if detector installs are pushed out.		Active	John Stopar	George Naguib	21-Oct-16	Accept	30-Nov-16	2	1	2	4	2	1	1	2
			Outage Window		**Window Description**												
			073		073 - HFD Replacements												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14207	Risk of Stuck Detector during HFD Program [Window 73] and VFD Program [Window 28]	There is a risk that, during horizontal in-core flux detector removals, a detector is lodged in the cutting chamber of the Stern ICFD Cutter Tool. Although the tool is built with contingency tooling for a number of "expected" stuck detector positions, contingency planning is required for a variety of other conditions. Due to the already high doses in the SDS2 bunker as well as significat dose rates coming off a stuck detector, contingency planning will need to involve minimizing the amount of time personnel are in the vicinity of the tool, as well as a well docunted process for safe stating the area in the case of stuck detector challenges. 10 Aug 16 (J.Stopar): Less extensive challenges exist for contingency planning associated with the VFDs . A solid plan needs to be formulated for VFDs also.		Active	John Stopar	George Naguib	21-Oct-16	Mitigate	30-Nov-16	2	1	2	4	2	1	1	2
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			6756	In Progress	Contingency Plans for HFD and VFD Replacement	This action is associated with Risk ID 14207. Contingency planning for stuck detectors during the HFD and VFD replacement windows will need to be established prior to executing the work.	John Stopar	George Naguib	31-May-17	8 Aug 2016 (J.Stopar): Two contingency planning sessions have been conducted with the ICFD Tooling supplier and experienced end users who have performed work with the tooling at Darlington, Bruce, Pt Lepreau, Wolsong and Quinshan. Workable contingency plans have been formulated and the details to achieve them are being worked on. 21 Oct 2016 (G. Naguib): OPG and vendors are working on a new strategy to cut HFDs with the chopper tool off the HFD assemblies in order to create ease of execution and contingency planning. The design efforts by Stern to complete this new strategy will begin November 2016.				

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current Probability	Current Financial	Current Schedule	Current Score	Post Probability	Post Financial	Post Schedule	Post Score
14207	Risk of Stuck Detector during HFD Program [Window 73] and VFD Program [Window 28]	There is a risk that, during horizontal in-core flux detector removals, a detector is lodged in the cutting chamber of the Stern ICFD Cutter Tool. Although the tool is built with contingency tooling for a number of "expected" stuck detector															
			Outage Window		**Window Description**												
			028		028 - Replace Vertical Flux Detector												
			073		073 - HFD Replacements												
14405	Risk of New flux detectors installed in incorrect location [window #28 and #73]	This risk is associated with the possibility of installing new flux detectors in the wrong location. Detectors are similar in fit and can be easily misidentified. This applies to both vertical and horizontal flux detector programs.		Active	John Stopar	George Naguib	14-Nov-16	Mitigate	15-Mar-17	2	1	2	4	1	1	2	2
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			7886	In Progress	BoP AA/ICFD Mockup and Wet Casket Bay/IFB Training Completion	AA rod removal/wet casket bay training and ICFD/IFB training is required to be implemented in two separate events 1) with a smaller management/supervisory team to validate the procedures, durations and equipment 2) Immediately prior to field work with trades staff/supervision to ensure familiarity with all applicable procedures/tooling. 3) Resource bridging strategy so that a subset of the AA trades are maintained for use in the ICFD window.	John Stopar	George Naguib	15-Mar-17	10 Aug 2016 (J.Stopar): Training for Adjuster and ICFD replacement includes practical evaluation of worker proficiency and knowledge. A high hazard rehearsal is also included at the end of the training program. Training will emphasize the fact that the maintenance activities are taking place in midst of sensitive equipment.							
			Outage Window		**Window Description**												
			028		028 - Replace Vertical Flux Detector												
			073		073 - HFD Replacements												
12219	Horizontal Flux Detector Guide Tube Replacement [Window 73]	The risk is that the horizontal flux detector (HFD) guide tubes will need to be replaced. A calandria tube to HFD gap measurement is currently being completed by IMS to determine if there is a need to replace the HFD guide tubes. HFDs are prone to sag as calandria tubes are, which may result in contact between calandria tubes and HFDs during normal operation (sag until contact) or during refurbishment by removal or installation of calandria tubes.	3	Active	John Stopar	George Naguib	14-Nov-16	Accept	14-Dec-16	1	3	3	3	1	3	3	3
			Outage Window		**Window Description**												
			073		073 - HFD Replacements												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14582	Assessed Hours Greater than Project Estimate Hours [no window]	This risk is associated with the current assessed hours being greater than the project's estimate hours, resulting in increased construction costs.		Active	John Stopar	George Naguib	14-Nov-16	Monitor	31-Jan-17	3	1	1	3	3	1	1	3
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
Project: Balance of Plant - 73514																	
13321	LPSW Alternative Cooling (Project # 73514) Interfaces with the BDBE and the BA Project components not ready [Window 57A, 57B]	The risk is that LPSW Alternative Cooling will not be available when required (MEC 124457) as a result of interfacing components (BDBE and the BA Projects) potentially not installed in a timely manner. The impact of this will be an inability to provide cooling water to the loads under MEC 124457, which may impact other project schedules.	3	Active	Scott Guthrie	Greg Mills	23-Jan-17	Monitor	17-Feb-17	2	2	3	6	2	2	3	6
			Outage Window		**Window Description**												
			057		057 - LPSW Outage Phase 2 & 3												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
15120	LPSW Alternative Cooling (Project # 73514) Risk of EC Revisions leading to increased Costs [Window 057]	Design was completed on LPSW TMODs EC (MEC 124457) in early 2015. Despite this there is the continuing risk of costs associated with EC Revision to the project. Several issues have recently come to light which threaten to contribute considerably to Engineering support costs despite the fact that design is complete. An error discovered in DSP submitted and accepted CALC (no SCR). Errors discovered in legacy routing of fixed pipe and hose along TMOD pipe route. This has triggered a supplemental COMS (this may represent a COMS failure, no SCR). Errors in routing discovered as a result of recent walk downs where material changes to the plant have interfered with the proposed route requiring route revision. Improvements in routing suggested by vendor based on construction personnel review. Alternative pipe supports, improved routing, etc. This also could be considered a potential COMS miss.		Active	Marcus Sztrimbely	Greg Mills	24-Jan-17	Mitigate	01-Sep-17	4	1	1	4	1	1	1	1
			Outage Window		**Window Description**												
			057		057 - LPSW Outage												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
Project: Balance of Plant - 73550																	
14401	AA & ICFD Replacement Staff Experience [window #21]	This risk is associated with the introduction of new tooling and processes to staff with little experience in performing the work. AA Rod Replacement has never been performed at Darlington and is new to the contractor. Horizontal ICFD is also a FIAW activity that is being performed by a vendor that has never performed the work before. In addition, discharge of flux detectors into the IFB is new to DNGS. The lack of experience is associated with the tooling/work process of replacing/discharging AA rods, assembly/installation of correct AA Rod Types and horizontal flux detector removal/install and discharge into the IFB.		Active	John Stopar	George Naguib	13-Feb-17	Mitigate	31-Oct-16	4	4	4	16	2	2	1	4
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**						
			7886	In Progress	BoP AA/ICFD Mockup and Wet Casket Bay/IFB Training Completion	AA rod removal/wet casket bay training and ICFD/IFB training is required to be implemented in two separate events 1) with a smaller management/supervisory team to validate the procedures, durations and equipment 2) Immediately prior to field work with trades staff/supervision to ensure familiarity with all applicable procedures/tooling. 3) Resource bridging strategy so that a subset of the AA trades are maintained for use in the ICFD window.		John Stopar	George Naguib	15-Mar-17	10 Aug 2016 (J.Stopar): Training for Adjuster and ICFD replacement includes practical evaluation of worker proficiency and knowledge. A high hazard rehearsal is also included at the end of the training program. Training will emphasize the fact that the maintenance activities are taking place in midst of sensitive equipment.						
			Outage Window		**Window Description**												
			021		021 - Replace Adjuster Rods												
15056	AA Rod Removal and Discharge Tooling [window 21]	Event: AA rod removal and discharge tooling may not be ready/available in time for window start Cause: Impact: Background: This risk is associated with the readiness/availability of AA rod removal and discharge tooling in time for window start.	4	Active	John Stopar	George Naguib	05-Dec-16	Monitor	01-Feb-17	4	2	2	8	4	2	2	8
			Outage Window		**Window Description**												
			021		021 - Replace Adjuster Rods												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
12418	Adjuster Rod Replacement Construction Costs [Window 21]	Due to the large delta between third party and EPC Vendor estimates for Construction costs, associated with Adjuster Rod removal, installation, and holding rack modification, there is a risk that the estimated construction costs at Gate 2H are increased in Phase 2 of the project.	3	Active	John Stopar	George Naguib	13-Feb-17	Monitor	15-Oct-16	3	2	1	6	3	2	1	6
			Outage Window		**Window Description**												
			021		021 - Replace Adjuster Rods												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13578	The Risk is that items to be procured by the Balance of Plant Project may have lead times greater than expected [Window 021]	Event: The items to be procured by the Balance of Plant Project may have lead times greater than expected Cause: Impact: This would impact the execution schedule. Background: In general, a valid mitigation strategy will be to expedite shipments through the procurement vendors.	3	Active	Scott Guthrie	George Naguib	13-Feb-17	Monitor	31-Dec-16	2	2	3	6	2	2	3	6
			Outage Window		**Window Description**												
			021		021 - Replace Adjuster Rods												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13902	Seismic Requirements for Flask Use on RMD [Window 21]	There is a risk that further engineering and work planning effort will be required to address the seismic requirements for use of the RM flask over the RMD. Due to the seismic requirements on the RMD, an assessment to confirm no seismic risk is imposed on reactor mechanisms and associated equipment, as a result of AA rod removals from the reactor core.		Active	John Stopar	George Naguib	14-Nov-16	Monitor	19-Dec-16	3	2	2	6	3	2	2	6
			Outage Window		**Window Description**												
			021		021 - Replace Adjuster Rods												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14402	RM Drive Mechanism Damage due to handling and AA Replacement work [window #21 and #28]	This risk is associated with the possible damage to RM Drive Mechanisms during handling (ie. removal and reinstall of AA Drive Mechanisms) as well as surrounding work during AA rod replacement and VFD replacement work.		Active	John Stopar	George Naguib	13-Feb-17	Mitigate	20-Dec-16	3	1	2	6	2	1	1	2
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**						
			7886	In Progress	BoP AA/ICFD Mockup and Wet Casket Bay/IFB Training Completion	AA rod removal/wet casket bay training and ICFD/IFB training is required to be implemented in two separate events 1) with a smaller management/supervisory team to validate the procedures, durations and equipment 2) Immediately prior to field work with trades staff/supervision to ensure familiarity with all applicable procedures/tooling. 3) Resource bridging strategy so that a subset of the AA trades are maintained for use in the ICFD window.		John Stopar	George Naguib	15-Mar-17	10 Aug 2016 (J.Stopar): Training for Adjuster and ICFD replacement includes practical evaluation of worker proficiency and knowledge. A high hazard rehearsal is also included at the end of the training program. Training will emphasize the fact that the maintenance activities are taking place in midst of sensitive equipment.						
			Outage Window		**Window Description**												
			021		021 - Replace Adjuster Rods												
			028		028 - Replace Vertical Flux Detector												

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14717	Vendor Project Staff Retention	[redacted]		Active	John Stopar	George Naguib	13-Feb-17	Monitor	30-Jan-17	3	1	2	6	3	1	2	6

Outage Window	Window Description
021	021 - Replace Adjuster Rods
028	028 - Replace Vertical Flux Detector
073	073 - HFD Replacements
128	128 - ECI Vault Work
129	129 - Temp Fission Chamber Install
155	155 - Adjuster Mechanism Re-Install

There are no Draft, Not Started, In Progress Actions associated with the risk.

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
15057	At Risk Procurement of Adjuster Rods [window 21]	Event: Adjuster rods may not be delivered in time for window 21 (March 2017) Cause: Due to fabrication issues, and concerns regarding the straightness spec of the adjuster rod outer tubes, and requirements for stress relief post straightening Impact: Background: Due to fabrication issues and concerns, the supply of adjuster rods for window 21 (March 2017) is currently at risk. There are concerns regarding to the straightness spec of the adjuster rod outer tubes and any requirements for stress relief post straightening. Due to these concerns, the manufacturing of outer tubes is on hold, and therefore placing the delivery of rods at risk.		Active	John Stopar	George Naguib	13-Feb-17	Monitor	01-Feb-17	3	2	2	6	3	2	2	6

Outage Window	Window Description
021	021 - Replace Adjuster Rods

There are no Draft, Not Started, In Progress Actions associated with the risk.

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14393	ALARA Risks Associated with AA Replacement Project [window 021]	Due to the nature of the AA Replacement work, there is a potential for contamination spread and a risk of unplanned exposure during the removal process.		Active	John Stopar	George Naguib	13-Feb-17	Mitigate	30-Jun-16	2	1	2	4	1	1	2	2

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
7886	In Progress	BoP AA/ICFD Mockup and Wet Casket Bay/IFB Training Completion	AA rod removal/wet casket bay training and ICFD/IFB training is required to be implemented in two separate events 1) with a smaller management/supervisory team to validate the procedures, durations and equipment 2) Immediately prior to field work with trades staff/supervision to ensure familiarity with all applicable procedures/tooling. 3) Resource bridging strategy so that a subset of the AA trades are maintained for use in the ICFD window.	John Stopar	George Naguib	15-Mar-17	10 Aug 2016 (J.Stopar): Training for Adjuster and ICFD replacement includes practical evaluation of worker proficiency and knowledge. A high hazard rehearsal is also included at the end of the training program. Training will emphasize the fact that the maintenance activities are taking place in midst of sensitive equipment.

Outage Window	Window Description
021	021 - Replace Adjuster Rods

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14399	Integration Risk between AA Replacement and other work groups [window 021]	There is a risk that other work groups will be affected by the AA Rod Replacement project execution (ie. flask maneuvering/transport, access control due to radiation, etc.).		Active	John Stopar	George Naguib	13-Feb-17	Monitor	30-Jun-16	2	1	2	4	2	1	2	4

Outage Window	Window Description
021	021 - Replace Adjuster Rods

There are no Draft, Not Started, In Progress Actions associated with the risk.

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14400	Adjuster Rod Toolset [window #21]	The existing Adjuster Rod replacement toolset at Darlington is not complete.		Active	John Stopar	George Naguib	10-Aug-16	Monitor	30-Sep-16	2	2	1	4	2	2	1	4

Outage Window	Window Description
021	021 - Replace Adjuster Rods

There are no Draft, Not Started, In Progress Actions associated with the risk.

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14208	Adjuster Absorber Rod Drop During Replacement [Window 21]	This risk is associated with the risk of dropping an adjuster absorber rod in one or both of the following scenarios: 1. Upon removal of spent AA Rods with the RM Flask. 2. Upon Installation of new AA rods into the reactor core. The impact of a dropped rod may result in severe damage to the AA rod itself as well as possible guide tube and locator damage.		Active	John Stopar	George Naguib	10-Aug-16	Mitigate	30-Sep-16	1	2	3	3	1	2	2	2

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments

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14208	Adjuster Absorber Rod Drop During Replacement [Window 21]	This risk is associated with the risk of dropping an adjuster absorber rod in one or both of the following scenarios: 1. Upon removal of spent AA Rods with the RM Flask. 2. Upon Installation of new AA rods into the reactor core. The impact of a dropped rod may result in severe damage to the AA rod itself as well as possible guide tube and locator damage.	7886	In Progress	BoP AA/ICFD Mockup and Wet Casket Bay/IFB Training Completion	AA rod removal/wet casket bay training and ICFD/IFB training is required to be implemented in two separate events 1) with a smaller management/supervisory team to validate the procedures, durations and equipment 2) Immediately prior to field work with trades staff/supervision to ensure familiarity with all applicable procedures/tooling. 3) Resource bridging strategy so that a subset of the AA trades are maintained for use in the ICFD window.	John Stopar	George Naguib	15-Mar-17	10 Aug 2016 (J.Stopar): Training for Adjuster and ICFD replacement includes practical evaluation of worker proficiency and knowledge. A high hazard rehearsal is also included at the end of the training program. Training will emphasize the fact that the maintenance activities are taking place in midst of sensitive equipment.							
			Outage Window	**Window Description**													
			021	021 - Replace Adjuster Rods													
14209	Less than Adequate AA Guide Tube Gap Inspection Results [Window 21]	This risk is associated with the risk that the AA vertical guide tube gap inspection on AA13 guide tube at the back end of the AA replacement program results in less than adequate measurements. Although the OPEX indicates that the risk is low, there would need to be extra work planning and execution work required to fix the gap measurements and study the extent of condition.		Active	John Stopar	George Naguib	10-Aug-16	Accept	30-May-17	1	3	3	3	1	3	3	3
			Outage Window	**Window Description**													
			021	021 - Replace Adjuster Rods													
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14403	RMD Mockup for AA Replacement [window #21]	Risk is that the RMD Mockup does not adequately reflect the field interferences from surrounding mechanisms, due to the complexity of interferences in the reactivity mechanism deck. This will impact on construction efforts in the field.		Active	John Stopar	George Naguib	23-Sep-16	Mitigate	31-Oct-16	3	1	1	3	2	1	1	2
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			8835	In Progress	Adjusters - Construct and Apply Go-No Go Gauge for Confirmation of Removal equipment Fit-up on the RM Deck	Risk mitigation will be achieved by constructing a go-no go gauge and using it on the Unit RM Deck at all 16 replacement sites in order to ensure that the removal tooling with fit in amongst the interferences. This exercise will occur late in 2016 after unit 2 is shut down.	John Stopar	George Naguib	15-Mar-17								
			Outage Window	**Window Description**													
			021	021 - Replace Adjuster Rods													

Project: Balance of Plant - 73572

15130	Risk of compromising the ASDC project due to rebar cutting in rooms R2-015 and R2-065	Due to the concrete slab thickness, drilling the holes for anchoring the ASDC pumps on the ceiling in room R2-015, may result in cutting more rebar than the value established as acceptance criteria by the design analysis. If this occurs, then other design options shall be explored, leading to significant cost ($1.5M) and schedule impact		Active	Katie Stewart	Doina Idita	03-Mar-17	Accept	30-Nov-17	4	2	5	20	4	2	5	20
			Outage Window	**Window Description**													
			124	124 - SDC Rm Work													
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
15129	Additional design changes due to supports requirements	Due to the increase of the KSB nozzle loads, some of the piping supports using the nelson studs (located on the containment liner) may not pass the supports stress analysis acceptance criteria. New Supports Imposing Combination Loads on Nelson Studs Beyond OPG Standards are required to be checked with the manufacturer. Manufacturer design/safety range/ margins to be used within stress analysis. If this risk occurs then project cost and schedule will be impacted.		Active	Katie Stewart	Doina Idita	03-Mar-17	Accept	26-Jan-17	4	1	4	16	4	1	4	16
			Outage Window	**Window Description**													
			124	124 - SDC Rm Work													
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
15126	Design cost increase du to the changes on the ASDC pressure and flow switches	There is a code requirement for remote RV indication for Class 2 pressure piping. The proposed solution was to provide a PS and FS upstream and downstream of the RV, respectively. There is a risk of design change if the vendors confirmation is not received for the required/specified materials to be used during manufacturing. If the PS/FS available on the market does not conform to the requirements of the Design Specifications, then a design change is required on two I&C DECs 128656 and 128658		Active	Katie Stewart	Doina Idita	26-Jan-17	Monitor	15-Mar-17	3	1	4	12	3	1	4	12
			Outage Window	**Window Description**													
			124	124 - SDC Rm Work													
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

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15127	Design cost increase due to balance of the vendor documentation	Vendor Documentation: All required vendor documentation to progress ECs have been advanced through design completion (with granted deviations by the DA at the DCAVR). However, the balance of documents that are expected from the vendor (i.e. manuals, test reports, etc.) pose a risk on the design. There are several KSB and Velan design documents currently outstanding. Most are at advanced stages of C&D but still carry some residual risk of changing. Due to the issues confronting the anchor DEC, there is a risk that KSB mounting plate may be affected. A design change maybe required if KSB plate has been changed.		Active	Katie Stewart	Doina Idita	26-Jan-17	Monitor	01-Sep-17	2	1	4	8	2	1	4	8
			Outage Window		**Window Description**												
			124		124 - SDC Rm Work												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
15134	Possible design cost increase due to the pipe whip analysis	There is a risk of design cost increase due to : -The review of the ITF or AVL documents may re-open certain closed items.A majority of the items were reviewed and closed out as part of submission of R0 of the DEC. However, different reviewers at this time may hold a different view.-Pipe whip for R-065 to support floor loading assessment for anchor DEC.Currently the scope for pipe whip analysis to support safety case is unclear. If a non-linear analysis is required, then several hundred hours of effort will be needed. -Final nozzle loads will not adversely impact the floor loading assessment or anchor calculations for pump installation (DEC 137042). To meet design completion schedule for DEC 137042 work progressed at risk without finalized piping loads (as the DEC 128660 was being revised). The nozzle loads are nearly final with nearly final vendor information. The revised nozzle loads will be incorporated in the 100% design submission.- Confirmatory walk-down for DEC 128660 may reveal information that may require further design iteration. With the design being finalized, a confirmatory walk-down is required to ensure there are no further issues in the field. As such, there remains a risk that some information will be revealed triggering changes to the design. The confirmatory walk-down may reveal some interferences with existing design, with a higher risk on support designs. While this may be a cost in the front-end, it will save significant issues during construction. The Aux SDC pumps has utilized 3D laser scans and team members have completed numerous walk-downs to obtain field info		Active	Katie Stewart	Doina Idita	26-Jan-17	Monitor	30-May-17	2	1	3	6	2	1	3	6
			Outage Window		**Window Description**												
			124		124 - SDC Rm Work												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
15202	ASDC - Design cost increase	There is a risk of ASDC design cost increase due to the following:- stakeholders concern with respect to the impact of heat transfer from the ASDC pump to the concrete from: (a) tack welds on the top-plate; and (b) the pump mounting plate temperature due to the medium. Note: This item has been included in the ITF and if a qualitative disposition is not acceptable, then funding will be required to complete a more detailed heat transfer calculation + concrete assessment.- There is an unresolved comment on the floor loading assessment report from OPG Civil design, which required additional plate vs. shell sensitivity analysis for the concentrated loads. Additional effort may be required to address this unresolved comment.- A deviation from L-964 spec is required to proceed with core drilling and potential rebar cutting for the floor slab in R-065. If the deviation memo is not accepted, then a significant re-design maybe required.- Required clearance for grouting between the through bolt and the concrete hole walls is too large. There maybe a need to cut two adjacent rebars while drilling holes for the through bolts. additional analysis may be required to nail down the acceptance criteria for rebars cutting.		Active	Katie Stewart	Doina Idita	27-Feb-17	Monitor	30-Nov-17	2	1	3	6	2	1	3	6
			Outage Window		**Window Description**												
			040		040 - Class 2 Electrical Rehab												
			104		104 - Vault Projects Before Feeder Removal												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14669	Revision of the Mechanical Design EC 128660 [window 124]	The final stress analysis of the Auxiliary Shutdown Cooling modification is going to be performed hand in hand with the revision 01 of the DEC 128660. The final stress analysis is mainly required for the final TSSA registration of the ASDC modification. There is a risk of performing a new revision (Rev.02) of the mechanical DEC128660 based on the results of the final stress analysis.		Active	Katie Stewart	Doina Idita	31-Jan-17	Monitor	15-Sep-17	2	1	2	4	2	1	2	4
			Outage Window		**Window Description**												
			124		124 - SDC Rm Work												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
Project: Balance of Plant - 73592																	
13369	73592 - Vault Work Interferences with JV Work [Window 8]	BoP project work will get delayed due to JV work being on critical path, this will lead to a contractor stand down resulting in additional costs and schedule delays. This will affect the vault work for the containment projects, e.g. Installation of the manifolds, roll-up doors at the airlocks and transfer chamber doors. Per FOAK feedback, actions associated with this risk will be allocated against the applicable BoP projects that are at risk such as NPC, EHS, ASDC & the cross cutting area of radiography/PAUT.		Active	Katie Stewart	Amanjot Singh	02-Feb-17	Monitor	30-Mar-17	3	2	3	9	3	1	3	9
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							

13369	73592 - Vault Work Interferences with JV Work [Window 8]	BoP project work will get delayed due to JV work being on critical path, this will lead to a contractor stand down resulting in additional costs and schedule delays. This will affect the vault work for the containment projects, e.g. Installation of the manifolds, roll-up doors at the airlocks and transfer chamber doors. Per FOAK feedback, actions associated with this risk will be allocated against the applicable BoP projects that are at risk such as NPC, EHS, ASDC & the cross cutting area of radiography/PAUT.	3436	In Progress	Alternate NDE Required: Radiography Cannot be Performed inside the Vault	Currently identified ~82 piping welds inside the vault (excluding feeders). the balance of plant and P&M scope is listed below. The action is to develop a path forward for an alternative to conventional radiography and implement these alternatives. Note: Action due date is tied to completion of first occurrence of alternate RT methods. Project # Project Name Applicable Window Start of Welding NDE Locations 73202 NR TS0100-2: ECT INSPECT BLEED COOLER 2-33320-HX2 (Cont'g ONLY) 105 Sept 2017 2 73648 NR DSR SI0050-1 EMERGENCY HEAT SINK MECH 2-33410-L124 105 May 2017 22 73380 DR SIO Shield Tank Over Press Protection (STOP) 105 1-Aug-18 5 73763 REPLACE 2-33330-PV1 VALVE BODY 105 7-Sep-17 2 38349 Spectacle Flange Replacements TBD August, 2017 10 38933 DN PHT LRV Modifications (Waterhammer) 31 June, 2017 35 73407 Check Valve Replacements (NV23, 24, 61, 36) 105	Scott Guthrie	Kristopher Probodiak	31-May-17	March 1, 2017 Small Controlled Area Radiography and Pulsed X-Ray are currently available options and alternatives to conventional radiography. Actions are in place to enable projects. Safety, Quality, Schedule, etc. are being addressed and reported on regularly at the project issues meeting. Funding has been made available to have IMS support the initiative and provide QA oversight, RP planning, etc. Refer to issue 294 for regular updates. first occurrence of SCAR is expected in May 2017 pending any project schedule changes. ***OLD Status Updates prior to Feb 2017***** all work groups/ projects to id their vault radiography requirements to Dennis. Boyd - requested to determine other if other "non-radiography" technologies avail. Jan 15th, 2015: Did discuss this with vendors (ES Fox and AMEC) and we have a path forward to determine radiography amounts (still unknown as piping modelling is underway), I'll get you detailed drawings when the modelling is done. 4Feb2015 note: all in vault projects to strive to not have to radiograph. As JV is working 6x10h: Sunday will be "radiography day". 28Apr2015 note: unkown currently how much radiography is required...this will be known better as design progresses. Due date pushed to EHS 40% design complete date for follow up. Vendor looking into other forms of NDE for pipe welds. 4-Sept-2015 Update: Will confirm amount of NDE through assessing/work planning phase. 3-Feb-2016: it was recently raised in the vault window meeting that radiography may not be allowed. This will affect multiple projects in the vault project window that require radiography. Other means of NDE is being investigated. 5-Apr-2016: This action is going to be canceled once a new action is generated and linked to a Program Risk, instead of Project Risk. The new action will be noted before this action is closed. Updates: Contacted IMS to investigate Phased Array option as an alternative. IMS to deliver proposal to BOP. 22 June 2016 (J.Stopar): This Proj

						20-Feb-18 4 73750 Valve PMs - 2-32110-NV37 TBD 17-Jul-18 2																
			5242	In Progress	BoP NPC Project - Vault Work Interferences with JV Work.	The risk response is to monitor and mitigate as possible. Regular meetings are set-up with the Work Control group and JV to determine vault interfaces (iSEP and Vault Coordination meetings) to determine optimal work windows for all groups and potential impacts that may arise. For the containment project, the installation of the manifold and the airlock/transfer chamber roll up door required vault access. 6 workers at $6000 per week for 2 weeks 6 workers at 16 hours a day for 2 weeks (10 days) = $96K	Ajay Upadhyaya	Katie Stewart	31-Jul-17	24 Nov 2016 up-date: On going meetings between project, OPG SWIC and JV are schedule, All potential interferences are reviewed and mitigating actions identified and assigned. This is an op going process. 26 Jan 2016 up-date: No interference is identified at this time.									
			Outage Window		**Window Description**																	
			008		008 - RFR Prereq prior to Containment Isolation																	
Project: Balance of Plant - 73613																						
14291	Stopple Plug: Risk of burn through during welding of split tee (PMOD) [Window 57]	During the workplan review for the stopple plug modification, it was identified that there is a risk of burn through of the 20" pipe during welding of split tee. This poses a potential for an unisolable leak from the Inter Unit Service Water Header (IUSWH). The maximum size of the leak would depend on the extent of any breach. Large leaks, while having a very low probability of occurrence, would have potentially severe consequences including flooding of U2 (north of Column Line 11 thus potential effects on U0 and U1) as well as the potential to impact on the operation of LPSW systems of Units 1, 3, and 4. Both of these events, should the break size be sufficiently large, would introduce a severe transient situation to the Plant and would likely require the use of a Group 2 Heat Sink in order to maintain Nuclear Safety. The risk of these events has been mitigated by the following considerations: - Welding, hot tapping, and stopple plugs have extensive OPEX behind them showing that with careful planning and adherence to industry best practice, failure scenarios are either extremely remote or unheard of.- Inspections of the piping for wall thickness and inner surface conditions will verify that conditions to perform the operations are satisfactory, UT scans have been performed already and show that the wall thickness within the welding requirements. UT scans and confirmation of thickness are to be performed as pre-req's to welding activities.	1	Active	Katie Stewart	Amanjot Singh	02-Feb-17	Monitor	03-Apr-17	1	2	3	3	1	2	3	3		
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**												
			7189	In Progress	Window 057 - Stopple Plug - Determine The Need For Additional Tasks For Safe Work Area / Extenting Safe Work Area	Off site schedule review Apr.19,2016	Amanjot Singh	Amanjot Singh	31-Mar-17	Per WO 3228917, the following task is related to safe work area: 11 - BCR ERECT PROTECTIVE BARRIERS PRIOR TO HOT TAP Further details are required to be input to align with WPL, eg. water spill/splash precautions such as spill kits, staging of catch containment and FME barriers. Tarps will be set up to protect nearby electrical equipment.									
			Outage Window		**Window Description**																	
			057		057 - LPSW Outage Phase 2 & 3																	
15144	Stopple Plug: TD Willaimson Equipment changed from original.	Event: SUPPORTS DESIGNED FOR ORIGINAL EQUIMENT MIGHT NEED TO BE CHANGED. Cause: Due to change in design from TD Williamson equipment Impact: cost and schedule impact Background: TD Williamson equipment on the basis of which RCM(Design agency) designed the supports has been changed. RCM insists design for the supports needs to be done again in order to accommodate the latest equipment. This will result in added financial cost and schedule impact incase the equipment arriving on site is different.	3	Active	Marcus Sztrimbely	Amanjot Singh	01-Mar-17	Avoid	10-Aug-17	1	1	3	3	1	1	1	1		
			Outage Window		**Window Description**																	
			000		000 – No Window Related																	
			There are no Draft, Not Started, In Progress Actions associated with the risk.																			
Project: Balance of Plant - 73618																						
14609	Risk of NICR or full Modification required for failed UST relay [window #004]	A new relay may be required which will require a NICR or a full modification. Identified at Deer Creek meetings as a result of a work request found in the system. Relay has been performing in a manner which suggests failure is imminent. Work order in question is WO 04869979-01 ("NR REPLACE 2-52120-T2-3-R3 DURING REFURB"). Note: WO 04869979 has now been cancelled, see WO 3259913. Note, this WO is not yet BOP scope. BOP Director will not accept this as project scope until material issue resolved.		Active	Koon Han	Greg Mills	05-Jan-17	Monitor	15-Dec-16	2	2	2	4	2	2	2	4		
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The following sub-actions are indicated:
1) AREVA and Refurbishment Engineering to review and advise on whether part is likely to be available. - COMPLETE, part is not commercially available, however a digital version of this item is available. Popular opinion is that this is beyond a NICR, and would be a full modification.
2) Refurbishment assessing to review and place hold as required. - COMPLETE, WO 3259913 (originally 4869979) ENA hold placed August 8.
3) Refurbishment Design to review, prioritize and produce design product required. - CANCEL, no traction
4) Contact work control and resolve that scope either gets assigned to the EPC vendor, or is removed from refurb. COMPLETE: John Culligan is prioritizing requests into the screening committee.
5) Arrange for AREVA troubleshooting with support of the system engineer. This will require bringing the troubleshooting tasks into scope, MCD, CCF, etc. TCD: CANCEL, project change estimate was presented to BOP director mid-Feb 2017. Rejected as not BOP scope.
6) Request MCD for troubleshooting from AREVA. COMPLETE: MCD received (not accepted by BOP director. $ 25 k)
7) As vendor execution has been ruled out by BOP Director, pursue Maintenance support for troubleshooting: COMPLETE, Brad Schofield has agreed to perform troubleshooting, scheduled for March 6, 2017 (WO 3259913-02)
8) Review results with System Engineer: Yet TO START, TCD: March 30, 2017
9) Initiate required actions to support U2 return to service based on item 8) above. YET TO START, TCD: April 17, 2017

Outage Window	Window Description
004	004 - MOT/UST/IPB Rehab

Project: Balance of Plant - 73628

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
15181	73628 Emergency Lighting-Risk of New EP Creation	Event: Electrical cable may not fit in the existing EP's, requiring additional tooling and labour for EP drilling to create a new EP for the cable. Cause: The size of Teck cable that is be run through EP 41218 and the amount of space left in the EP to fit another cable Impact: Additional costs for tooling/labour, Schedule delays to obtain appropriate approvals and execute work Background: Teck cable is to be run through EP 41218, however, the penetration is fairly full and may not be able to accommodate the size of the cable. ITF Item 43 was created to poke a hole through the EP to determine whether the cable can fit. There is risk that the cable may not fit through the EP or that other cables may be hit when removing the sealant to accommodate the new cable. EP 41217 may also be used but it is also fairly full. If the cable can not fit in the existing EP, there is a risk that drilling will need to occur through the concrete wall to create a new EP for the cable. If drilling through the concrete wall is to occur, this can impose a cost and schedule impact to the project and will also trigger the update of multiple engineering drawings to document station configuration.	3	Active	Marcus Sztrimbely	Breanne Stramenga	01-Mar-17	Monitor	12-Jun-17	3	1	3	9	3	1	3	9
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13352	[Window 515] Risk of detector accessibility	The Risk is that detectors in the field are not accessible for replacement. Should this be the case, relocation is the only option for the modification. This will be addressed via a FIC, and required more time and effort than anticipated, as the FHA/FSSA must always be adhered to. Any relocations must be reviewed, validated, and approved by the Design Services Provider as the design basis must be protected.	3	Active	Oweis Chohan	Jacob Davis	21-Nov-16	Monitor	30-Apr-17	3	2	1	6	3	2	1	6
			Outage Window		**Window Description**												
			515		515 - U2 SCID 7083 Fire Alarm Upgrades												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
15137	73628 Emergency Lighting-Potential Work Interferences with Fuel Handling Work	Event: The Emergency Lighting Modification may face delays during the construction window/installation Cause: Due to day to day Fuel Handling activities and other station/refurb work that is given priority. FH is the primary work group in the FH maintenance shop. Impact: Schedule delays. Background: The planned SOI is currently in April 2017,however, the SOI may move depending on the window in which FH will not interfere with project work. As well, there is risk that delays may be encountered during installation as construction crews may need to stand down to allow FH to proceed with their work. Night shift work may result to avoid work group interferences.	3	Active	Marcus Sztrimbely	Breanne Stramenga	01-Mar-17	Monitor	20-Apr-17	2	1	3	6	2	1	3	6
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14509	[Window 515, 516] Resources for Fire Alarm and Fault Isolator installation and Commissioning	There is a significant threat to the installation and commissioning of the fire alarms and fault isolators project. The issue is that the work plan is calling for (2) full time control techs to support the work throughout the project.		Active	Brad Schofield	Jacob Davis	21-Nov-16	Monitor	03-Apr-17	2	1	2	4	2	1	2	4
			Outage Window		**Window Description**												
			515		515 - U2 SCID 7083 Fire Alarm Upgrades												
			516		516 - U2 SCID 7085 Fire Fault Isolators/U2 SCID 7084 SST Containment/U0 SCID 7081 Change Room Mods												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
15138	73628 Emergency Lighting-Foil Insulation Interference	Event: Cable fasteners procured for this project may not accommodate the material under the foil insulation, and require Additional DBOM items to be ordered Cause: Due to unknown material (not indicated on plant configuration drawings), NR Design cannot determine type of cable anchorage required (ie. for steel or concrete) Impact: cost impact Background: Foil insulation located on the ceiling of S-141 will need to be removed as an interference in order to run cables along the ceiling. Since the plant configuration drawings do not indicate the type of material under the foil insulation, NR Design can not determine the type of cable anchorage required (i.e. for steel or concrete). Construction delays may occur if the cable fasteners procured for this project can not accommodate the material underneath the foil insulation. As well, if sufficient cable slack is discovered under the foil insulation the design may need to be modified in order to reduce the number of junction boxes required.	3	Active	Marcus Sztrimbely	Breanne Stramenga	01-Mar-17	Monitor	01-May-17	2	1	2	4	2	1	2	4
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
Project: Balance of Plant - 73639																	
13260	PHT & Aux - Heat Exchangers Require Replacement [window 048]	The risk is that the D2O Collection Tank and Vent Condenser heat exchanger tubes will have degraded to a point which requires heat exchanger tube bundle replacement. This is part of the PHT & Aux rehabilitation project.	1	Active	Scott Guthrie	Hassan Baharvandy	07-Mar-17	Accept	30-Jul-17	2	1	2	4	2	1	1	2
			Outage Window		**Window Description**												
			048		048 - HTS Aux Drain,Purge,Outside Vault												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
Project: Balance of Plant - 73648																	
13314	EHS Vault Work Interferences with JV Work [Window 68, 104, 105]	Event: Emergency Heat Sink contractors may have to stand down during planned work windows to allow for JV critical path work to be completed Cause: Impact: Cost and schedule delays Background: The risk is that the Emergency Heat Sink project will face schedule delays during planned work windows due to interferences with the R&FR/JV work. The EHS project will get delayed due to JV work being on critical path for a variety of reasons (eg: high radiation beams in vault, work interferences in similar areas of the vault, etc.) which will lead to a contractor stand down resulting in additional costs and schedule delays.	1	Active	Katie Stewart	Hassan Baharvandy	07-Mar-17	Monitor	15-May-17	3	1	3	9	3	1	3	9
			Outage Window		**Window Description**												
			068		068 - Emergency Heat Sink												
			104		104 - Post Feeder Vault Projects												
			105		105 - Vault Projects After Feeder Removal												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
Project: Balance of Plant - 73696																	
13644	Fission Chamber Guide Tube Redesign Risk [Window 129] (This Risk is REALIZED)	The Risk is that due to clearance issues caused by RF&R components or hot conditioning, there will be a requirement to redesign the fission chamber guide tubes.	1	Active	John Stopar	George Naguib	14-Nov-16	Monitor	16-Jan-17	3	2	2	6	3	2	2	6
			Outage Window		**Window Description**												
			129		129 - Temp Fission Chamber Install												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14717	Vendor Project Staff Retention	[redacted]		Active	John Stopar	George Naguib	13-Feb-17	Monitor	30-Jan-17	3	1	2	6	3	1	2	6
			Outage Window		**Window Description**												
			021		021 - Replace Adjuster Rods												
			028		028 - Replace Vertical Flux Detector												
			073		073 - HFD Replacements												
			128		128 - ECI Vault Work												
			129		129 - Temp Fission Chamber Install												
			155		155 - Adjuster Mechanism Re-Install												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
12311	Fission Chamber Guide Tube Installation Risk [Window 129]	The risk is that possible misalignment between the view port, thimble and calandria nozzle will hinder installation of the temporary fission chamber guide tube.	2	Active	John Stopar	George Naguib	14-Nov-16	Mitigate	15-Aug-17	2	2	2	4	1	1	1	1
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			8833	In Progress	Install Fission Chamber Guide Tube Well Before Intended Use	The fission chamber guide tube may experience mechanical interference or fit-up issues when being installed into the Viewport. The initial installation must occur well before the intended use of this component in order to allow recovery time. The guide tube complete with fission chambers must be functional prior to fuel load.	John Stopar	George Naguib	30-Sep-18								
			Outage Window		**Window Description**												
			129		129 - Temp Fission Chamber Install												

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14406	Risk that Detector does not meet Specification [window #129]	There is a risk associated with the performance of the selected fission detectors such that they will not provide the functionality required by the specification.		Active	John Stopar	George Naguib	14-Nov-16	Monitor	30-Jun-17	2	1	2	4	2	1	2	4
			Outage Window		**Window Description**												
			129		129 - Temp Fission Chamber Install												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13642	Schedule Delays for Fission Chambers [Window 129]	Due to the nature of the Fission Chamber work, there is some probability that issues during startup, reinsertion, and repositioning may affect startup. The result of this work would be increased time for labour hours above and beyond the estimated value	1	Active	John Stopar	George Naguib	14-Nov-16	Monitor	07-Aug-17	1	1	2	2	1	1	2	2
			Outage Window		**Window Description**												
			129		129 - Temp Fission Chamber Install												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
Project: Balance of Plant - 73750																	
14992	Skilled Trades Availability from Union Hall	Event: Skilled trades may not be available from Union Hall during peak time. Cause: Shortage of skilled labor and parallel work going on. Effect: Cost, schedule and quality of work	3	Active	Anisha Bhasin	Anisha Bhasin	21-Nov-16	Monitor	20-Jan-17	3	1	3	9	3	1	3	9
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14413	DNRU2 Valve Project 73750 Phase 2 cost escalation (Windows 122, 124, 029, 057)	Event: Current estimate for the execution phase of the valve rehab project may increase substantially Cause: due to full assessing complete and current revision of the schedule differs greatly from the time contract initialization. Impact: Cost impact	3	Active	Marcus Sztrimbely	Anisha Bhasin	31-Jan-17	Mitigate	26-Oct-19	4	2	2	8	2	2	1	4
			Outage Window		**Window Description**												
			029		029 - HTS Vac Dry												
			057		057 - LPSW Outage Phase 2 & 3												
			122		122 - Moderator Valve Rehab												
			124		124 - SDC Rm Work												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14574	Project 73750 - Window execution dates misaligned with Valve Delivery dates [No window related]	Event: Delivery of parts may be after the start of the window and may interfere with the critical path. Cause: All the POs to the sub-suppliers have not been placed yet and Window execution dates misaligned with the current Valve Delivery dates. Impact: schedule delays to critical path	3	Active	Marcus Sztrimbely	Anisha Bhasin	31-Jan-17	Monitor	30-Apr-17	2	2	4	8	2	2	4	8
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14370	Project 73750 Valve Rehabilitation - Risk of system modifications due to increased weight of replacement valves (Window 122)	Event: System mods may be required in order to accommodate the significantly higher weight of the new valves Cause: The installed valves are obsolete and not currently available like-for-like (new valves have significantly higher weights than the original valves) Impact: Cost and schedule impact background: The Valve Rehabilitation Project covers 80 valves - a subset are subject to replacement with new. A number of replacement valves are not available like for like with the original, and are being addressed with NICRs. During preparation of the NICRs as part of the procurement process, it became known that some replacement valves have significantly higher weights than the original valves.	3	Active	Scott Guthrie	Anisha Bhasin	31-Jan-17	Monitor	28-Feb-17	2	2	3	6	2	2	3	6
			Outage Window		**Window Description**												
			057		057 - LPSW Outage												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

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Risk Report by Project with Associated Actions

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15195	Project 73750 - Actuators would not perform adequately when re-installed	Event - The actuators may not function adequately when re-installed, and require overhaul or replacement Cause - The actuators have not been overhauled since they were first installed and have only gone through MOVATs as PM work. Impact - delays to schedule and costs to expedite parts for overhaul or replacement. Background - The actuator overhauls have not been scoped as part of DNRU2 and there is a risk that the actuator will not function when re-installed. A detailed analysis by components engineering required a minimum of 12 actuators to be overhauled and the rest to be inspected for lube PM. However, the work requests to bring the actuator overhauls have been cancelled by SRE.	4	Active	Marcus Sztrimbely	Anisha Bhasin	24-Feb-17	Mitigate	31-Mar-17	2	3	3	6	2	3	3	6
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
12295	Project 73750 - Insufficient Temporary Facilities To Support Valve Rehab Scope resulting in delays and cost increase [Window 29,57,122,124]	Event - Valves may need to be removed offsite (i.e.decontam / ship contaminated valves off site). This may affect the following windows: 29, 48, 54, 57, 103, 104, 122, 124, 131 Cause - Unforseen needs associated with valve rehab facilities cause Temporary facilities on site to be inadequate. Impact - Additional facilities required causing schedule and cost impact. Background: Much of the valve work will need to be performed "on-site" (due to contamination and logisitics of welded in valves)	3	Active	Marcus Sztrimbely	Anisha Bhasin	31-Jan-17	Monitor	30-Nov-17	2	1	2	4	2	1	2	4
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			029		029 - HTS Vac Dry												
			048		048 - HTS Aux Drain, DFead Legs and Purge,Outside Vault												
			054		054 - Instrument Air Maintenance												
			057		057 - LPSW Outage Phase 2 & 3												
			078		078 - Remove Mod Dry Equipment												
			103		103 - Establish Upper Calandria Purge Flow & E/W Valve Maintenance												
			104		104 - Vault Projects Before Feeder Removal												
			122		122 - Moderator Valve Rehab												
			124		124 - SDC Rm Work												
			131		131 - REMOVAL Segment PMs & Miscellaneous Work												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
12305	Project 73750 - Risk of Increased Cost Due to Valve / Actuator Discovery Work or as a Result of Obsolete Valves [Window 29, 122, 124, 131]	Event - Actuators may not be adequate for new valves and may need to be replaced. During this work, there is the potential for 'discovery' issues to arise that will need to be addressed in order to return the valve to proper working order (either the valve or the actuator). May also result in NICRs being required. This may affect windows: 29, 48, 54, 57, 103, 104, 122, 124, 131 Cause - Inaccurate drawings leading to valve to actuator fit up problems. Valves will be replaced / repaired / overhauled as per the current approved scope. Impact - Depending on the severity of the issue there could be cost or schedule impacts.	3	Active	Marcus Sztrimbely	Anisha Bhasin	31-Jan-17	Monitor	31-Jul-17	1	2	2	2	1	2	2	2
			Outage Window		**Window Description**												
			029		029 - HTS Vac Dry												
			048		048 - HTS Aux Drain, DFead Legs and Purge,Outside Vault												
			054		054 - Instrument Air Maintenance												
			057		057 - LPSW Outage												
			103		103 - Establish Upper Calandria Purge Flow & E/W Valve Maintenance												
			104		104 - Vault Projects Before Feeder Removal												
			122		122 - Moderator Valve Rehab												
			124		124 - SDC Rm Work												
			131		131 - REMOVAL Segment PMs & Miscellaneous Work												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13778	Project 73750 - Additonal Tenting for Contamination Control - Valve Rehabiliation [Window 29, 48, 54, 57]	Event - Implementation of tenting for contamination control may require a modification. Activities that may cause loose/airborne contamination include use of an arter grinder for valve overhaul. This may affect windows: 29, 48, 54, 57, 103, 104, 122, 124, 131 Cause - Procedures drive the requirement for a temporary modification. Impact - Cost impact due to additional resources needed for TMOD.	1	Active	Scott Guthrie	Anisha Bhasin	31-Jan-17	Monitor	31-Jul-17	1	1	2	2	1	2	1	2
			Outage Window		**Window Description**												
			029		029 - HTS Vac Dry												
			048		048 - HTS Aux Drain,Purge,Outside Vault												
			054		054 - Instrument Air Maintenance												
			057		057 - LPSW Outage Phase 2 & 3												
			103		103 - Establish Upper Calandria Purge Flow & E/W Valve Maintenance												

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13778	Project 73750 - Additonal Tenting for Contamination Control - Valve Rehabiliation [Window 29, 48, 54, 57]	Event - Implementation of tenting for contamination control may require a modification. Activities that may cause loose/airborne contamination include use of an arter grinder for valve overhaul. This may affect windows: 29, 48, 54, 57, 103, 104, 122, 124, 131 Cause - Procedures drive the requirement for a temporary modification. Impact - Cost impact due to additional resources needed for TMOD.	104		104 - Vault Projects Before Feeder Removal												
			122		122 - Moderator Valve Rehab												
			124		124 - SDC Rm Work												
			131		131 - REMOVAL Segment PMs & Miscellaneous Work												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
Project: Balance of Plant - 73761																	
13307	Project 73761 - Preventive Maintenance "Other" Schedule Risk [Window 29, 60, 133, 90]	Event - Changes in the level 3 schedule are required due to schedule integration. When the RFP was sent out for the preventive maintenance work, assumptions were made as to when the work would be performed. Due to the numerous systems involved in the preventive maintenance work the scheduling of this work will need to work around and with many other projects. The estimates given were based on the information given in the Scope of Work which may not be accurate once the schedule is integrated. This may negatively affect the cost to do the work. Cause - Schedule integration. Impact - Schedule and cost impacts.	1	Active	Gary Grahn	Greg Mills	16-Dec-16	Accept	31-Jan-17	2	2	2	4	2	1	1	2
			Outage Window		**Window Description**												
			029		029 - HTS Vac Dry												
			060		060 - HT Pump Motor Installation												
			090		090 - HTS Operational Testing												
			133		133 - RTS Segment PMs & Miscellaneous Work												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13355	Preventive Maintenance -"Other" Parts Risk	Event - Parts required which are no longer available. This may require design changes to be done. Also delays in obtaining parts may push the scheduled tasks requiring a lengthening of the work window or re-establishing the required plant conditions to perform the maintenance. Cause - Obsolete parts Impact - OPG is performing engineering function for this work, may require additional resources.	2	Active	Gary Grahn	Greg Mills	22-Nov-16	Monitor	31-Jan-17	4	1	1	4	4	1	1	4
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
Project: Balance of Plant - 73762																	
14825	Conventional Electrical (Project # 73618) SF6 scope risk	During the kick off with Hydro One on the SF6 scope of work, it was noted by Hydro One that they have been consulted by Siemens (OEM of the SF6 equipment). The result of the consultation of the Siemens technical representative has resulted in significant work to the Hydraulic seals of the SF6 breakers, The seal have reach the end of their life and are being replaced during the same time as the Unit 2 Refurbishment. The scope involves 16 breakers in total for Hydro One. The key risk here is that on the OPG side of the demarcation point there are (4) Breakers that would require the Hydraulic Seals replaced as well. This would be a 4 unit risk as this equipment is cresting on 30 years of service with out any maintenance.	3	Active	Marcus Sztrimbely	Greg Mills	23-Dec-16	Transfer	31-Mar-17	2	2	2	4	1	1	1	1
			Outage Window		**Window Description**												
			132		132 - INSPECT & INSTALL Segment PMs & Misc Work												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
15108	Project 73762 - Risk of Emergent Maintenance work while Refurbishment owns transformers for 2.5 years [Window 130, 131, 132, 137]	It has already become apparent that for the period of time that the Refurbishment will own each unit, any emerging transformer maintenance work will have to be added to the scope of the AREVA maintenance contract. As such, costs for this work will likely increase throughout the life of the contract as miscellaneous maintenance issues arise. At the time of writing, the U2 UST is experiencing an oil leak from the tap changer, and there is a relay which needs to have troubleshooting work done in order to determine whether the relay has failed or not. Rather than to say the risk has been realized, it needs to be understood that this is just the beginning (first 4 months) of the refurbishment period. There is another 2 years in which to maintain these large transformers.	3	Active	Marcus Sztrimbely	Greg Mills	13-Jan-17	Monitor	01-Sep-19	2	2	2	4	2	2	2	4
			Outage Window		**Window Description**												
			004		004 - MOT/UST/IPB Rehab												
			130		130 - LEAD IN Segment PMs & Miscellaneous Work												
			131		131 - REMOVAL Segment PMs & Miscellaneous Work												
			132		132 - INSPECT & INSTALL Segment PMs & Misc Work												
			137		137 - Final Commissioning (VVRS Ph-I, AL&TCD Logic Mods, BU Logic Mod Ph-II)												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14638	PM Electrical (Project # 73762) Risk of emergent NICRs [Window 004, 041]	As a result of assessments of PM and OA work orders that are part of project 73762, there is a risk of NICRs required to support work where components are obsolete and therefore no longer available commercially. In these cases NICRs will be required to support alternate models that are now the only alternative offered by OEMs. Assessment of this work is complete, however procurement is still underway. Until all items are under order by PO, there is a chance that items will be unavailable. This risk needs to remain open until then.	3	Active	Scott Guthrie	Greg Mills	06-Mar-17	Monitor	28-Apr-17	1	2	1	2	1	2	1	2
			Outage Window		**Window Description**												
			004		004 - MOT/UST/IPB Rehab												
			041		041 - Class 3 Electrical Maintenance												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
Project: Balance of Plant - 73773																	
15042	delays of the ASDC pump-motor assemblies and possible impact on Refurb Critical Path	ASDC pumps mounting base plate holes pattern is required to be provided to KSB (Germany) by Dec 28, 2016. If the holes pattern is not submitted to KSB by 28 Dec 2016, the next date they may be able to be submitted is Oct 2017. The pump-motor-assemblies delivery date will be delayed with one year, placing ASDC field execution outside of the installation window 124 (DN Refurbishment outage)		Active	Katie Stewart	Doina Idita	03-Mar-17	Mitigate	30-Nov-17	5	1	5	25	5	1	5	25
			Outage Window		**Window Description**												
			130		130 - LEAD IN Segment PMs & Miscellaneous Work												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14368	Potential delay of delivery ASDC pump-motor assembly(mounting hole details) [Window 130, 124]	KSB design of the mounting base plate of the ASDC pump-motor assembly has been changed due to the post welding thermal treatment requirements. Currently the mounting base plate is forged into the pump casing, and being part of the pressure boundary component. The anchors holes shall be machined in to the pump mounting base plate at KSB site. No changes to the holes could be done at ES FOX/OPG site. The prints of the both pumps P4 & P5 anchors as installed in field should be provided to KSB by Dec 30, 2016, with no impact on the delivery date of the pump-motor assemblies. 1. There is a risk of having approx. one month delivery delay if the holes location change from the original design(from Oct 4 to Nov 4, 2017)1. There is a risk of having delivery delays of the pump-motor assemblies if required prints of the installed anchors will not be provided to KSB by Dec 30, 2016.2. There is a risk of having one or more failures of the pull test performed on the installed pumps′ anchors. If the risk occurs then the following will be impacted:- the mechanical EC128660 shall be revised (changing the pump-motor supporting design by having rods perforating the 1.2 meters slab. There will be interferences with SDC HX1 replacement). Cost and schedule impacted - delays in delivery of the pump motor assemblies- missing the installation window (SDC rooms work - within U2 refurbishment outage)- U2 Refurbishment outage critical path may be impacted	4	Active	Katie Stewart	Doina Idita	31-Jan-17	Mitigate	30-Nov-17	4	2	4	16	3	2	4	12
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							

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ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14368	Potential delay of delivery ASDC pump-motor assembly(mounting hole details) [Window 130, 124]	KSB design of the mounting base plate of the ASDC pump-motor assembly has been changed due to the post welding thermal treatment requirements. Currently the mounting base plate is forged into the pump casing, and being part of the pressure boundary component. The anchors holes shall be machined in to the pump mounting base plate at KSB site. No changes to the holes could be done at ES FOX/OPG site. The prints of the both pumps P4 & P5 anchors as installed in field should be provided to KSB by Dec 30, 2016, with no impact on the delivery date of the pump-motor assemblies. 1. There is a risk of having approx. one month delivery delay if the holes location change from the original design(from Oct 4 to Nov 4, 2017)1. There is a risk of having delivery delays of the pump-motor assemblies if required prints of the installed anchors will not be provided to KSB by Dec 30, 2016.2. There is a risk of having one or more failures of the pull test performed on the installed pumps′ anchors. If the risk occurs then the following will be impacted:- the mechanical EC128660 shall be revised (changing the pump-motor supporting design by having rods perforating the 1.2 meters slab. There will be interferences with SDC HX1 replacement). Cost and schedule impacted - delays in delivery of the pump motor assemblies- missing the installation window (SDC rooms work - within U2 refurbishment outage)- U2 Refurbishment outage critical path may be impacted	6830	In Progress	ASDC project - Civil Design to identify rebar contraints for installation of ceiling anchors	In order to mitigate rebar interference with ASDC pump anchor installation design is requested to evaluate allowable number of rebar that could be cut during anchor installation.	Katie Stewart	Doina Idita	20-Apr-17								

Date has been extended to Feb 28, 2017. Design is reviewing what is req'd to perform this assessment, an initial assessment will be req'd prior to drilling anchor holes in ceiling. Based on more detailed rebar scans and actual field conditions further assessment will be req'd during the actual field installation of the ceiling anchors which was delayed due to the issues on the materials for P4&P5 interferences relocation Date extended to May 30, Design is reviewing what is req'd to perform this assessment, an initial assessment will be req'd prior to drilling anchor holes in ceiling. Based on more detailed rebar scans and actual field conditions further assessment will be req'd during the actual field installation of the ceiling anchors.
Action extended to June 30/16. Fox Director of Design (M. Ismail) to follow-up with new Refurb Design Authority to confirm extent of margin available wrt rebar. Note - rebar scanning to be completed by June 10/16. Update July 5/16: Rebar assessment will be performed by Amec once more detailed scans are completed TCD July 18, 2016
Aug: 30, 2016: Action extended to September 30. work in progress between ES Fox and NR Design Authority to confirm the extent of margin available with respect to rebar. AMEC review of the second ceiling scanning results has been delayed due some clarifications required in order to allow them to perform the rebar assessment by Sep 15, 2016.
Oct 06, 2016: EC137042 has been Initiated to address the interference of the Rebar with the anchors/bolts supporting the ASDC pumps. TCD for DEC completion Nov 09,2016
Jan 31, 2017EC 137042 is not yet finalized. The third design option is in progress for ASDC pump anchorage (design option has been identified and agreed upon on Jan 30, 2017). Action plan and TCD will be communicated shortly by AMEC.

Outage Window	Window Description
124	124 - SDC Rm Work
130	130 - LEAD IN Segment PMs & Miscellaneous Work

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13633	ASDCH - Late Materials as a result of late issuance of PO to Manufacturers [Window 130, 124]	There is a risk that due to the late issuance of manfuacturing POs and EC revisions, materials will need to be expedited in order to arrive on time for execution. This will require funding above and beyond the estimated cost of materials.	2	Active	Scott Guthrie	Doina Idita	31-Jan-17	Mitigate	01-May-17	3	2	3	9	2	2	3	6

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13633	ASDCH - Late Materials as a result of late issuance of PO to Manufacturers [Window 130, 124]	There is a risk that due to the late issuance of manfuacturing POs and EC revisions, materials will need to be expedited in order to arrive on time for execution. This will require funding above and beyond the estimated cost of materials.	6606	In Progress	Action ESFOX to issue POs for ASDCH components/equipment to obtain vendor information	Engage installation vendor to issue the POs for the ASDCH components/equipment in the very next futrure (ASAP), get the required vendors'information, and finalyze the Design Commissioning Specification, installation and commissioning work plans	Katie Stewart	Doina Idita	15-Mar-17								

Date extended to May 20 to account for new Engineering baseline schedule received for Design revisions. Update 05.13.16: 2nd Extension to June 10 required, ES Fox confirmed that all vendor docs required to proceed with design revisions will be submitted by June 10.
June 13/16 Update - Date extended to June 30 as PE continues to be away (since mid April) writing R&FR workplans and PM is on OCC until June 20.
July 5 update - date moved to continue monitoring. We now have vendor drawings TCDs incorporated into engineering schedule, continue to monitor progress
Aug 5 update - date moved due to the clarifications requested by equipment vendors with respect to the different Design Specification items. All these discussions are part of the vendors' bids evaluation.
Nov 21, 2016: date moved due to the Design Specifications and DECs revision. DBOMs have been modified by adding new components.
Jan 31, 2017As communicated to ES FOX via funding release memo for phase 2B execution, POs for all materials required for ASDC installation shall be issued by April 4, 2017.

Outage Window	Window Description
124	124 - SDC Rm Work
130	130 - LEAD IN Segment PMs & Miscellaneous Work

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13944	ASDCH - Lack of equipment vendors' information causing rework [Window 130, 124]	Due to the lack of manufacturers'/vendors' details/information on numerous components/equipment there is a risk of re-work on design EC packages which implies cost increase for their revision.	3	Active	Katie Stewart	Doina Idita	01-Mar-17	Mitigate	31-Aug-17	3	2	3	9	2	2	1	4

Outage Window	Window Description
124	124 - SDC Rm Work

There are no Draft, Not Started, In Progress Actions associated with the risk.

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14322	ASDC pump-motor site testing [Window 90]	The risk is that the ASDC pump-motor assemblies will fail on site acceptance testing after the factory acceptance testing in Germany. .		Active	Katie Stewart	Doina Idita	31-Jan-17	Monitor	30-Jun-19	2	2	4	8	2	2	4	8

Outage Window	Window Description
090	090 - HTS Operational Testing

There are no Draft, Not Started, In Progress Actions associated with the risk.

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13637	ASDCH - Final TSSA registration of Stress Analysis will cause rework to design [Window 124]	ASDC TSSA Registration carried through design completion is provisional, as the stress analysis performed made several assumptions to defer incorporation of Level D Waterhammer, LRV Loads, SDC HXs replacement, EHS modification. There is a risk of: 1. rework of the ASDC final stress analysis to include the above as required for the final registration of the modification. This final stress analysis shall include the stress signals of the other modifications (LRV, SDC HXs replacements, EHS, LDWH and NB3200 analysis). Impact is additional cost to design. 2. potential change in pipe schedule to Class 1, additional supports or reconfiguration of supports. Impact is additional cost to design as well as procurement	1	Active	Katie Stewart	Doina Idita	31-Jan-17	Monitor	10-Jul-17	2	2	3	6	2	2	3	6

Outage Window	Window Description
124	124 - SDC Rm Work

There are no Draft, Not Started, In Progress Actions associated with the risk.

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13939	ASDCH - Multilin 239 relay installed on the 600V circuit breaker (supplying the ASDCH pump-motors) to fail the vibration test [Window 41]	As per current design the ASDC pump-motors are supplied from BU13 and BU14 Class III 600V power supply. Because the motor protective relay Multilin 139 (used on both OPG sites Pickering and Darlington NGS) is declared obsolete item, the current design includes the usage of Multilin 239 (MM239) protective relay installed on the 600V circuit breaker unit. There is a risk that the Multilin 239 relay installed on the 600V circuit breaker (supplying the ASDCH pump-motors) to fail the endurance test (testing the functional behavior of the MM239 during 100 cycles open-close of the circuit breaker). This assembly is a "first of a kind" design for DNGS. If the risk occurs, than the associated Electrical design EC's for pump-motor protection shall be changed by placing the Multilin 239 relay in another location.	3	Active	Katie Stewart	Doina Idita	31-Jan-17	Monitor	01-Jun-17	2	1	3	6	2	1	3	6
			Outage Window		**Window Description**												
			041		041 - Class 3 Electrical Maintenance												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13994	ASDCH Large volume of project documentation (TPARs/OMs/etc) may be required [Window 90]	As the ASDCH modification is complex, a significant number of new and OPG existing documents must be updated/created (there were identified 120 documents). There is a risk of EPC contract cost increase if ES Fox underestimated the number of the OPG procedures/documentation (non-change papers associated with EC project) which must be marked-up/created due to the implementation of the ASDCH modification.	2	Active	Katie Stewart	Doina Idita	31-Jan-17	Monitor	30-Jun-17	2	1	3	6	2	1	3	6
			Outage Window		**Window Description**												
			090		090 - HTS Operational Testing												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14997	New ASDC power supply circuit breakers may not be a good fit for existing CB cells	Schneider Electrical, the manufacturer of the circuit breakers supplying the ASDC pump-motors, expressed their concern of providing an equipment which could not be a good fit for the existent breaker cells. The risk is valid. Schneider request to perform a walk down and take cells measurements was not granted due to the lack of an outage of the Class III BU13 or BU14 power supply.		Active	Katie Stewart	Doina Idita	31-Jan-17	Monitor	31-Aug-17	2	1	3	6	2	1	3	6
			Outage Window		**Window Description**												
			041		041 - Class 3 Electrical Maintenance												
			124		124 - SDC Rm Work												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13607	ASDCH - Execution/installation window schedule delays due to work interferenced with JV work [Window 130,124]	The risk is that the Auxiliary Shutdown Cooling project will face schedule delays during the planned work windows due to the interferences with R&FR/JV work. The ASDC project will get delayed due to the JV work being on critical path for a variety of reasons (i.e. 1. removal of the cable trays required for pulling the power supply cables to pump-motors will be performed immediately after installation of the bulkhead, and their re-installation is plan to be done just before the PHT refill or later on, 2. getting access for the ASDC equipment and materials to SDC rooms when R&FR work is at full speed, 3. work interferences in the same area of the vault) which will lead to a contractor stand down resulting in additional cost and schedule delays.	1	Active	Katie Stewart	Doina Idita	31-Jan-17	Monitor	01-Jul-18	2	1	2	4	2	1	2	4
			Outage Window		**Window Description**												
			124		124 - SDC Rm Work												
			130		130 - LEAD IN Segment PMs & Miscellaneous Work												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14001	ASDCH pump-motor CSA certification at risk to be rejected [Window 124]	KSB Germany works mostly following European standards and codes. There are the following risks to be considered:- KSB request for CSA certification of the ASDCH pump-motor to be rejected. If this risk occurs, then a major design re-work will be required.- of cost increase of the KSB pump-motor for ASDCH due to the CSA certification requirements. KSB needs to engage a third party to prepare a report proving the equivalency between the european (used for manufacturing of the pump-motor assemblies) and north american standards.		Active	Katie Stewart	Doina Idita	13-Oct-16	Monitor	30-Aug-17	2	1	2	4	2	1	2	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			6603	In Progress	KSB to engage TUV (Germany equivalent CSA) to prepare a report proving the bridge/equivalency between the european and north american codes/standards	KSB to engage TUV (Germany equivalent CSA) to prepare a report proving the bridge/equivalency between the european and north american codes/standards Update: KSB did not need to engage TUV they are currently working directly with UL who has identified applicable CSA stds that will achieve equivalency through ULL, many of these will be met through MITP. Risk is considered low but will be monitored through to UL listing. This action will not be completed until ULL is received TCD: August 2017	Katie Stewart	Doina Idita	30-Aug-17							
			Outage Window		**Window Description**												
			124		124 - SDC Rm Work												

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14320	U2 Refurb Critical Path extension due to the validation of the ASDC heat removal capability [Window 90]	There is a risk of critical path extension if the validation of the ASDC heat removal capability has to be performed during the ASDC commissioning and linked to the AFS of the modification:		Active	Katie Stewart	Doina Idita	13-Oct-16	Monitor	30-Mar-17	2	2	2	4	2	2	2	4
			Outage Window		**Window Description**												
			090		090 - HTS Operational Testing												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14325	Condition of any LPSW tie-in pipe work [Window 124]	Due to implementation of the ASDC modification, LPSW piping providing cooling to ACU1 shall be slightly and permanently changed in Room R2-015. There is a risk that the welding of the new tie-ins will not be possible to be performed due to the condition of the existing LPSW pipes (MIC).		Active	Katie Stewart	Doina Idita	13-Oct-16	Monitor	31-Mar-17	2	1	2	4	2	1	2	4
			Outage Window		**Window Description**												
			124		124 - SDC Rm Work												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14339	Risk of design changes/FICs due to rebar scanning results [Window 12, 124]	The risk is that the rebar scanning results for ASDC pump-motor installation and piping supports may trigger design change or FIC. This risk is elevated for NC1 piping, due to low tolerance for FICs. This risk also applies to hitting rebar during installation, despite results of scanning.		Active	Katie Stewart	Doina Idita	21-Nov-16	Monitor	30-Mar-18	2	2	2	4	2	2	2	4
			Outage Window		**Window Description**												
			012		012 - Defuel Reactor												
			124		124 - SDC Rm Work												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14321	Failure of the ASDC commissioning criteria/AFS [Window 90]	There is a risk: - that the ASDC commissioning on unit start up will not be successful and will not pass RTS criteria/AFS (due to failure of SAT, not meeting the commissioning acceptance criteria - electrical, mechanical, vibration failures) -Critical path may be affected		Active	Katie Stewart	Doina Idita	13-Oct-16	Monitor	30-Jul-19	1	2	3	3	1	2	3	3
			Outage Window		**Window Description**												
			090		090 - HTS Operational Testing												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13632	ASDCH - DBOM revisions due to obsolete materials [Window 130,124]	Should materials be obsoleted during the time between creation of the DBOMs and field installation, there is a possibility of rework on design. The effect to this would be schedule delays to installation and cost increases to revise the design via a FIC or EC rev (whichever will be appropriate).	1	Active	Katie Stewart	Doina Idita	13-Oct-16	Monitor	14-Apr-17	2	1	1	2	2	1	1	2
			Outage Window		**Window Description**												
			124		124 - SDC Rm Work												
			130		130 - LEAD IN Segment PMs & Miscellaneous Work												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
15199	ASDC Installation cost increase due to extensive engineering support required	Installation of the ASDC modification will be performed by ES FOX.. The required engineering support for installation of the modification is provided by AMEC under a separate contract between the two vendors. [redacted]		Active	Katie Stewart	Doina Idita	27-Feb-17	Monitor	30-Jun-18	2	1	1	2	2	1	1	2
			Outage Window		**Window Description**												
			040		040 - Class 2 Electrical Rehab												
			104		104 - Vault Projects Before Feeder Removal												
			105		105 - Vault Projects After Feeder Removal												
			124		124 - SDC Rm Work												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

Project: Balance of Plant - 73782

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
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ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
11864	Unique Components Rehabilitation (Project # 73782) Increased Scope of Cables/EPs Replacement [window 104][window 105]	Life cycle costs and scope for EQ Cable and EP replacement was based on partial U2 and completed U1 inspection findings. Future inspections on following units may result in scope increase or reduction. Scope increase will have schedule and cost impact. This risk updated and cited as part of Gate 3.	3	Active	Marcus Sztrimbely	Greg Mills	07-Mar-17	Monitor	30-Nov-16	2	2	1	4	2	2	1	4

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
6389	In Progress	Review Cable and EP inspection results for U3	Facilitate/expedite Engineering Review of Cable and EP inspection results for U3. This involves reviewing the NIR and EP inspections from the U3 outage.	Ajay Upadhyaya	Greg Mills	31-Mar-17	U3 inspection reviews were concluded before the end of 2015 and it is now May 2016. This review is behind and issue needs to be escalated with management. Date bumped out to June 30. Discussed lack of progress with Neil Yhap. Pushed date to July 29 Meeting held July 19 with Mike Hodges, Greg Mills, Neil Yhap, Gopal Aluri, John Lee. Timeline for review established completing by the end of August. Due date for this action pushed out to September 2, 2016. September 2 update: Engineering busy on higher priority work. Pushed date 1 month. September 28 update: still no traction on engineering reviews. November 22 update: Have received report for U4 on memory stick to be provided to engineering (this was done due to email size restrictions). U3 report review still in progress with John Lee. Moved date to Dec 15. December 12 update: Conference call with engineering held to discuss path forward. U3 draft report contains a much larger number of findings than prior reports. Clarification has been requested. Bumped due date to January 16, 2017. Unless removed, this could add a considerably larger number of cable replacements to U3 scope. Jan 16 update: No opportunity to address since mid-December. Will follow-up. Date moved to Feb 15. Feb 16 update: Updated report on the way back from Kinectrics via thumb drive (size issues). Will be provided to Engineering for their review. These are the U3 results I believe.

Outage Window	Window Description
104	104 - Post Feeder Vault Projects
105	105 - Vault Projects After Feeder Removal

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
Project: Defuelling - 73155																	
14685	Closure Plug seating Issues at Reduced PHT Pressure Envelope	Event: Closure plugs may potentially have seating/sealing issues at reduced PHT Pressure (6 MPA) proposed for defuelling Cause: D1641 exposed the risk of increased probability of closure leakage at lowered pressures used for outage fuelling (~6.5MPa vs. ~7.5MPa used previously) Impact: The leakage of closure plugs could push out the window for defueling longer than 113 days and result in costs incurred for replacement D2O.		Active	Sorin Marinescu	Antonio Carito	17-Feb-17	Mitigate	12-Jan-17	3	4	5	15	3	3	4	12
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**						
			9629	In Progress	Contingency - Closure Plug Shimming	Based on conceptual discussions with GEH-C, adding shims to closure plug assemblies could be used to counter-act aging and creep in the Nickel face. Contingency is to develop an engineering solution (NICR), develop procedures and demonstrate the concept for future use. Shims may be purchased for future use - decision to be made following commissioning.		Sorin Marinescu	Matthew Moore	24-Mar-17	Jan 16 - Unit 2 testing was not conducted. Instead, an off-line testing program will be performed, with technical analysis for increasing scope of use for shims.						
			9630	In Progress	Contingency - Seal Disc repair by electroplating	Based on recent Fuel Handling maintenance OPEX at Pickering and Darlington, brush electroplating has been used to successfully repair some components. This action is to explore the possibility to use this process to refurbish aged seal discs by applying new Nickel plating. Steps are for FH Maintenance to have a prototype disc fabricated (COMPLETE), then deliver this to GEH-C (COMPLETE), to conduct testing and inspection. Results may be used to qualify the process for potential future usage (subsequent Units)..		Sorin Marinescu	Matthew Moore	24-Mar-17	13-Dec: Disc was delivered to GEH-C for testing. Results expected in February, with path forward determined afterwards.						
			Outage Window		**Window Description**												
			012		012 - Defuel Reactor												
Project: Defuelling - 73159																	
13395	Price Uncertainty in Additional Software/Opdata Scope	EVENT: Additional Opdata work is required to update the Fuel Handling Software system to incorporate the new inverters and Universal Carriers. CAUSE: Introduction of Universal Carriers requires updates to the Opdata system. Opdata changes were re-categorized as Category III Software changes increasing the required V & V rigor and introducing the need for an EC. The system has also received many partial patches over the years increasing the complexity of the system and creating potential for unexpected results in Commissioning. IMPACT: Additional work required by Vendor staff to fulfill OPG Validation and Verification requirements through commissioning would increase the cost of the project.	3	Active	Sorin Marinescu	Antonio Carito	17-Feb-17	Monitor	28-Feb-17	4	2	2	8	4	2	2	8
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 08-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
Project: Facilities and Infrastructure Projects (Campus Plan) -																	
13587	Refurb laundry shipments plan	The concern is right now Darlington has laundry shipments taken to unit 0 loading bay going through Stores loading docks. If we continue to ship Refurb Laundry that same way it will have major congestion. There is no room now without additional Refurb shipments. Also how do we manage priority laundry shipments between Refurb and Station stock?		Active	Val Bevacqua	Tom Carvin	19-May-16	Mitigate	26-Feb-16	1	1	1	1	1	1	1	1
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Not Started, In Progress Actions associated with the risk.														
Project: Facilities and Infrastructure Projects (Campus Plan) - 31555																	
12334	16-31555 D2O Storage Project: Construction Delays Due to Material Ordering Delays	Event: Late placement of purchase orders or long lead times of materials/equipment Cause: Lack of procurement resources Impact: There is a risk that long lead materials (LLM)/Bulk materials will not be ordered/delivered in time to support the construction schedule.	3	Active	Anthony Colella	Constantin Banica	08-Mar-17	Mitigate	28-Feb-17	4	4	2	16	4	4	2	16
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			6336	In Progress	Bulk Material Ordered by JV	JV to provide delivery dates which support need dates of recovery schedule. A weekly meeting is held with a dedicated materials management group, with issues being escalated per documented escalation protocol. Weekly meetings are now being held with materials management group. According to latest bulk material procurement report, the JV still has about 200 items to place onto a purchase order.	Anthony Colella	Constantin Banica	31-May-17	-A lot of major equipment has been fabricated and FATs are being performed. -Long lead items are already ordered.						
			Outage Window		**Window Description**												
			000		000 – No Window Related												
14987	16-31555 D20 Storage Project: Commissioning schedule delay due to late submission of design manuals	Delays in issuance of new design manuals by the JV has the potential of affecting dates for issuance of commissioning workplans by OPG. In turn this has the potential to delay execution of commissioning activities.	3	Active	Anthony Colella	Constantin Banica	08-Mar-17	Mitigate	31-May-17	4	3	3	12	3	2	2	6
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			9188	In Progress	Weekly progress meetings to review DM and WP status	Participate in weekly progress meetings to review work status; take corrective actions as required	Anthony Colella	Constantin Banica	30-Jun-17	OPG participates in weekly progress meetings with JV staff involved in design and commissioning activities. [redacted] Good progress has been made on DCS production. [redacted]						
			Outage Window		**Window Description**												
			000		000 – No Window Related												
14996	16-31555 D20 Storage Project: Schedule delay due to required redesign of fire protection/detection system	Initial design of the WA included sprinklers throughout the building. Design inadequacies resulted in challenges to procure and install a sprinkler system. A decision was made by OPG in September 2016 to have a non-sprinklered building. Regulatory approval for alternate compliance introduces a risk to schedule.	3	Active	Anthony Colella	Ron Piggott	08-Mar-17	Mitigate	28-Feb-17	3	1	2	6	1	1	1	1
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			9197	In Progress	Obtain CNSC approval for fire protection/detection	Obtain CNSC approval for alternate compliance after re-categorizing to non-sprinklered building design.	Constantin Banica	Ron Piggott	30-May-17	Third party was engaged to confirm compliance with the applicable codes. Letter was submitted (Sept 09) to CNSC requesting approval of alternate compliance for the non-sprinklered design. CNSC has provided comments and OPG will submit Fire Hazard Assessment and CCR in Feb 2017. A separate third party review of the FHA/CCR is in progress and will be submitted to CNSC.						
			Outage Window		**Window Description**												
			000		000 – No Window Related												

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current Probability	Current Financial	Current Schedule	Current Score	Post Probability	Post Financial	Post Schedule	Post Score
Project: Fuel Handling - 73162																	
14631	Discovery of increased schedule windows during detailed execution logic optimization and station stakeholder review for Powertrack impacting project costs [Windows 39,52]	Event: Preparation of detailed Powertrack installation logic includes assumptions that were used for gate 3 estimate Cause: Assumptions from detailed planning phase associated with the installation methodology and scheduling windows for Intermediate Rollers and Cable Replacement to be validated through logic optimization and station stakeholder reviews Impact: Cost and schedule issues found in assumptions increase above estimated amounts		Active	Sorin Marinescu	Peter Frisina	24-Feb-17	Mitigate	28-Sep-18	3	2	5	15	3	2	3	9

Outage Window	Window Description
039	039 - Power Track 1 & 2 Replacement Window 1
052	052 - Power Track 3 & 4 Replacement

There are no Draft, Not Started, In Progress Actions associated with the risk.

11980	Execution Delays Due to Scheduling Logic [Window 39, 52]	Event: Power Track execution is deferred from the designated work window Cause: Power Track is not critical path work but requires the Trolley to be taken out of service, Work Control may defer Power Track work in order to complete other work or maintain fueling. Delays could also result from field co-ordination issues. Impact: Any work window deferral will impact both cost and schedule.	2	Active	Sorin Marinescu	Greg Maggs	17-Feb-17	Mitigate	15-Sep-17	4	2	3	12	3	2	3	9

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
5724	In Progress	Develop a Detailed Implementation, execution, and schedule for Powertrack	Develop a detailed implementation/execution strategy, working with the contractor and involving the required station stakeholders to ensure alignment. Based on this, develop the installation schedule, including execution windows and fuelling receovery windows.	Sorin Marinescu	Greg Maggs	14-Jul-17	Station requesting review of potential switch from T3/4 to T1/2 being Refurbished first causing delays. Validation of installation logic and schedule planned for July/August 2016: 29Jun2016 update Aug. 31/16: Logic optimization in progress to minimize installation windows and dose. Work planning to be updated to reflect this during Q3/4 2016.
5725	In Progress	Installaion Delay strategy for Powertrack	Implement execution strategy and scheduledeveloped by ES MSA vendor. Risk of installation delays cannot be fully mitigated despite implementation plan. Contingency to be utilized, if required, to address.	Sorin Marinescu	Greg Maggs	14-Jul-17	

Outage Window	Window Description
039	039 - Power Track 1 & 2 Replacement Window 1
052	052 - Power Track 3 & 4 Replacement

11977	Discovery Work on Power Track Execution [Windows 39, 52]	Event: Discovery Issue during Power Track Execution Cause: Field discovery issues such as configuration management or equipment degradation. Impact: Execution delay to resolve configuration or equipment conditions	2	Active	Sorin Marinescu	Greg Maggs	17-Feb-17	Mitigate	15-Sep-17	3	2	3	9	1	2	2	2

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
5726	In Progress	Detailed Work Planning to Address Potential Discovery Work Issues	Project to address potential discovery work issues by involving both contractor and station stakeholders to review and assess potential discovery risks and issues, during detailed work planning.	Sorin Marinescu	Greg Maggs	14-Jul-17	May 30/16: detailed work plans and instructions have been developed by the vendor (ES Fox). Further review and validation to be completed by project and station stakeholders during Q2/3 2016. Sept. 27/16: Action extended based on extension of completion date for detailed work planning.

Outage Window	Window Description
039	039 - Power Track 1 & 2 Replacement Window 1
052	052 - Power Track 3 & 4 Replacement

12414	Discoveries during detailed Work Planning for Power Track impacting project costs [Window 39, 52]	Event: Additional requirements for installation are discovered during Detailed work Planning phase example: requirements for end drum replacement (Power Track frame removal required). Cause: Assumptions from contracting phase associated with the installation methodology and scheduling windows could be incorrect causing major changes to be necessary as the detailed work planning is completed. Impact: Cost and schedule increase from the work planning process.	2	Active	Sorin Marinescu	Greg Maggs	24-Feb-17	Mitigate	28-Sep-18	3	3	3	9	1	2	3	3

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
5723	In Progress	Validation Strategy and Schedule with Stakeholders	Phase 1 contract has been issued for detailed work planning. Project is to work with ES Fox and station stakeholders to validate the installation methodology and detailed scheduling windows as part of detailed work planning process. Then address any cost and/or schedule impacts resulting from work planning via proejct contingency.	Sorin Marinescu	Greg Maggs	14-Jul-17	Detailed Work Planning phase will continue until CWP's complete including ITP's (June 30th). Validation of installation logic and schedule planned for July/August 2016: 29Jun2016 update Aug. 31/16: Logic optimization in progress to minimize installation windows and dose. Work planning to be updated to reflect this during Q3/4 2016.

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current Probability	Current Financial	Current Schedule	Current Score	Post Probability	Post Financial	Post Schedule	Post Score
12414	Discoveries during detailed Work Planning for Power Track impacting project costs [Window 39, 52]	Event: Additional requirements for installation are discovered during Detailed work Planning phase example: requirements for end drum replacement (Power Track frame removal required). Cause: Assumptions from contracting phase associated with the															
			Outage Window		**Window Description**												
			039		039 - Power Track 1 & 2 Replacement Window 1												
			052		052 - Power Track 3 & 4 Replacement												
13376	Two Trolleys are unable to maintain Reactor zone levels adequately causing an operational impact [Window 39, 52]	Event: Zone levels in on the operating units drop close to levels tha require derating. Cause: Two Trolleys are unable to maintain Reactor zone levels due to reliability issues. Impact: Station requires longer recovery periods between execution windows, or windows need to be adjusted resulting in cost and schedule impact.		Active	Sorin Marinescu	Greg Maggs	17-Feb-17	Mitigate	31-May-17	3	2	3	9	2	2	2	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			5722	In Progress	Powertrack Implementation Strategy	Project to work with station to incorporate strategy for addressing unit derating, in Powertrack implementation strategy.	Sorin Marinescu	Greg Maggs	31-May-17								
			Outage Window		**Window Description**												
			039		039 - Power Track 1 & 2 Replacement Window 1												
			052		052 - Power Track 3 & 4 Replacement												
14482	Potential Issues Arise Due to Handoffs Between Station and Vendor At The End of Work Windows [Work Window 52 39]	EVENT: Hand offs between Vendor and Station staff are delayed due to Vendor's inability to operate Fuel Handling equipment while properly integrating with Control Room staff to complete required post maintenance testing prior to hand off. CAUSE: Complexity of Fuel Handling system combined with the large number of short windows (2 to 4 days) scheduled could cause minor issues and miscommunications to push the end of work windows. IMPACT: Increase to cost and schedule as any delay in the completion of work windows pushes the start of the next work window and potentially endangers the reactivity levels of the three operating units.		Active	Sorin Marinescu	Greg Maggs	17-Feb-17	Mitigate	15-Sep-17	3	2	3	9	2	1	2	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			7752	In Progress	Develop Fuel Handling Handoff Strategy	Develop a handoff strategy to be used for end of window transition between vendor staff and OPG Fuel Handling staff with input from an relevant stakeholders.	Sorin Marinescu	Andrew Long	15-Mar-17	Sept 19th: Memo draft written, pending approval.							
			Outage Window		**Window Description**												
			039		039 - Power Track 1 & 2 Replacement Window 1												
			052		052 - Power Track 3 & 4 Replacement												
11976	Trolley Refurbishment scope execution impacts Powertrack [Windows 39, 52]	Event: Station staff schedules Trolley refurb work (also performed in the FFAA's) to the work windows designated for Power Track refurbishment adding additional staff to an already tight work environment. Cause: As per the Blue Ribbon initiative Trolley refurb work beign grouped with Power track Refurb. Impact: Both cost and schedule would be impacted if this were to occur as there could be co-ordination/delay issues.	2	Active	Sorin Marinescu	Greg Maggs	17-Feb-17	Mitigate	31-Oct-17	2	2	4	8	1	2	3	3
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			5727	In Progress	Address Interface Requirements between Refurb and DNGS	Address interface requirements between Refurb and DNGS as part of execution/implementation strategy, regarding trolley refurb (station scope). Then implement any required actions identified in execution/implementation strategy.	Sorin Marinescu	Greg Maggs	28-Feb-17	Interface requirements to be defined following validation of installation logic and schedule, which are planned for July/August 2016: 29Jun2016 update Work Planning to be finalized Dec15 16							
			5728	In Progress	Interface Issues with Trolley Refurb (Station Scope) During Ex	Project to monitor execution and implement contingency if required to address issues during execution.	Sorin Marinescu	Greg Maggs	31-Oct-17								
			Outage Window		**Window Description**												
			039		039 - Power Track 1 & 2 Replacement Window 1												
			052		052 - Power Track 3 & 4 Replacement												
14512	Terminal Blocks Scope Added to Powertrack Refurbishment Project [Windows 39,52]	EVENT: Terminal Block replacement is discovered as necessary during Powertrack Refurbishment Execution.CAUSE: Terminal blocks have developed some issue. During execution, terminal blocks will have to be replaced. Currently work is part of station (blue ribbon) scope. IMPACT: The additional work required could impact the cost and schedule of the project by stretching and or delaying work windows.		Active	Sorin Marinescu	Greg Maggs	24-Feb-17	Mitigate	30-Jun-17	4	1	2	8	3	1	2	6
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			7963	In Progress	Project to perform a pre-installation assessment for terminal block replacement requirements	Project will perform a pre-installation assessment to determine whether the terminal block replacement is required. If it is deemed necessary 30% of total terminal blocks required for both Trolleys will be procured prior to T12 installation, if additional spares are required during installation they will be procured and a sufficient number will be procured for Trolley 34 execution.	Sorin Marinescu	Catalin Butoi	29-Mar-17								
			Outage Window		**Window Description**												
			039		039 - Power Track 1 & 2 Replacement Window 1												
			052		052 - Power Track 3 & 4 Replacement												

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
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ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14632	Potential for utilization of Radiation Shieldlng during Fueling Duct work for Powertrack Execution [Work Window 52 39]	Event: RP discussion with project team regarding shielding for Powertrack work at Deer Creek Impact: Cost and schedule increase above estimated amounts Cause: Additional procurement and execution cost due to potential use of shielding during Fueling Duct work for Powertrack execution. This resulted from development of the detailed ALARA plan and review/feedback from ALARA department.		Active	Sorin Marinescu	Thomas Wong	17-Feb-17	Mitigate	31-May-17	4	2	2	8	3	2	2	6

Outage Window	Window Description
039	039 - Power Track 1 & 2 Replacement Window 1
052	052 - Power Track 3 & 4 Replacement

There are no Draft, Not Started, In Progress Actions associated with the risk.

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13381	Re-Assigment of Powertrack Staff to Other ES MSA Projects During Planned Standby Periods [Windows 39, 52]	Event: The Powertrack execution schedule incorporates planned standby periods as part of the execution schedule. This is based on the requirement to return the trolleys to service following each phase of the Powertrack Refurbishment execution, due to operating unit fuelling requirements. Cause: Each Powertrack trolley pair refurbishment is made up of 15 installation windows ranging from 4 to 28 days, with an overall schedule duration of approximately 6 months. In between each installation window, re-assignment of trades staff will need to be addressed. Some of the staff will be assigned to work on preparation for the next installation window or may be re-assigned to other ES MSA projects. Trades staff that are not doing prep work or re-assigned to other ES MSA projects will need to be paid planned standby time. Impact: Planned standby time pay that the project will be responsible for.	2	Active	Sorin Marinescu	Greg Maggs	17-Feb-17	Accept	31-Mar-17	3	2	1	6	3	2	1	6

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
5719	In Progress	Develop and Implement a Re-Assignment Strategy	Develop a project specific re-assignment strategy, working with the contractor.	Sorin Marinescu	Greg Maggs	31-May-17	
5720	In Progress	Co-ordinate Re-Assignment Strategy	Co-ordinate trades re-assignment strategy with other Refurb projects and Work Control.	Sorin Marinescu	Greg Maggs	31-Oct-17	

Outage Window	Window Description
039	039 - Power Track 1 & 2 Replacement Window 1
052	052 - Power Track 3 & 4 Replacement

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13609	Powertrack Engineering Support During Execution [Window 39, 52]	Event: Engineering support is required during execution, examples: To modify Power Track frame, scaffolding, or other possible necessary modifications discovered during execution. Cause: Power Track contract is Procurement and Construction, as the project is "Like for Like". Therefore any Engineering support required would likely be provided by OPG engineering and not covered under current contract baseline. Impact: If this risk is realized OPG engineering support will be required, impacting cost and schedule.	2	Active	Sorin Marinescu	Peter Frisina	17-Feb-17	Mitigate	15-Sep-17	3	2	1	6	2	2	1	4

Outage Window	Window Description
039	039 - Power Track 1 & 2 Replacement Window 1
052	052 - Power Track 3 & 4 Replacement

There are no Draft, Not Started, In Progress Actions associated with the risk.

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13383	Powertrack field execution requires additional trades staff to be hired and trained due to ALARA requirements for dose impacting project Schedule and Cost [Window 39, 52]	Event: Contractor staff recieve dose that limits their ability to perform RAD work requiring additional trade staff to complete execution work. Cause: Duration of Power Track refurbishment results in staff reaching dose limits Impact: Hiring of additional staff to maintain sufficient staff levels will be an additional cost on the project.	2	Active	Sorin Marinescu	Greg Maggs	17-Feb-17	Mitigate	28-Jul-17	2	2	1	4	1	2	1	2

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

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ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13383	Powertrack field execution requires additional trades staff to be hired and trained due to ALARA requirements for dose impacting project Schedule and Cost [Window 39, 52]	Event: Contractor staff recieve dose that limits their ability to perform RAD work requiring additional trade staff to complete execution work. Cause: Duration of Power Track refurbishment results in staff reaching dose limits Impact: Hiring of additional staff to maintain sufficient staff levels will be an additional cost on the project.	5717	In Progress	Develop ALARA plan with RP and Contractor	Develop ALARA plan with RP and contractor, taking into consideration the required resources and impact on project.	Sorin Marinescu	Greg Maggs	28-Feb-17	Jan. 24/17: ALARA plan currently on hold pending input from OPG RP on proposed shielding options. ALARA plan to be completed in February 2017 and presented to ALARA committee. May 30/16: ALARA plan has been prepared by ES Fox. Further review and validation will be completed as part of the presentation to the Refurb ALARA team, planned in June/July 2016. Execution Logic review is ongoing, the ALARA plan will be updated after the logic is finalized. Aug. 31/16: ALARA plan was presented to ALARA committee, and rework of the plan was requested due to dose being higher than expected. Project team is working with ALARA and ES Fox to revise execution logic and potentially incorporate shielding in the CSA. Nov. 28/16: ALARA plan was updated and presented to the ALARA committee in October 2016. It was agreed to in concept, but required further details such as the shielding design. RP Refurb agreed to extend the action until Jan. 2016, to allow ES Fox to develop the shielding and make further updates to the ALARA plan.								
			5718	In Progress	Ensure Actions from ALARA Plan are Implemented	Project to ensure actions from ALARA plan are properly implemented including implementation of additional staff as required.	Sorin Marinescu	Greg Maggs	30-Jun-17								
			Outage Window		**Window Description**												
			039		039 - Power Track 1 & 2 Replacement Window 1												
			052		052 - Power Track 3 & 4 Replacement												
13435	Identification of Tooling Requiring Modifications to Station [Window 39, 52]	Event: Engineering support is required during work planning to verify design of an anchor point, addition of shieve, or other modification to station identified prior to execution to perform Power Track replacement. Cause: Power Track contract is only Procurement and Construction, as the project is "Like for Like". But modifications may be required to safely install tooling needed to perform replacement. Impact: Unplanned costs due to Engineering support would be required.	2	Active	Sorin Marinescu	Greg Maggs	17-Feb-17	Mitigate	31-May-17	2	1	2	4	1	1	1	1
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			5713	In Progress	Implement any Required Modifications for Tooling	If required, implement a plan to address any modifications required for tooling, that were identified during the work planning phase.	Sorin Marinescu	Greg Maggs	31-May-17								
			Outage Window		**Window Description**												
			039		039 - Power Track 1 & 2 Replacement Window 1												
			052		052 - Power Track 3 & 4 Replacement												
13433	Breathing Air modification does not fully mitigate requirements during Execution [Window 39, 52]	Event: Both Contractor team and Fuel Handling Maintenance and/or station staff working in Fuelling duct at the same time puts a significant load on the breathing air system. Cause: Trolley reliability failure occurs simultaneously with Power Track execution work causing both teams to be forced to work in th Fueling Duct simultaneously. Impact: Cost and schedule may be impacted if Breathing Air cannot support both activities simultaneously thereby increasing the amount of standby time the proejct must pay for Contractor staff.	2	Active	Sorin Marinescu	Greg Maggs	17-Feb-17	Monitor	31-May-17	1	2	2	2	1	2	2	2
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			5714	In Progress	SDLU Group to address the requirements for Breathing Air m	Breathing Air mods to be planned and implemented to address Fuel Handling requirements during Powertrack execution.	Sorin Marinescu	Greg Maggs	31-May-17								
			Outage Window		**Window Description**												
			039		039 - Power Track 1 & 2 Replacement Window 1												
			052		052 - Power Track 3 & 4 Replacement												

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14486	Utilizing Winch to Pull Chain and Cable out of the FFAA/CSA [Work Windows 52, 39]	EVENT: Use of Winch to pull Powertrack Chains and Cables out of the FFAA and/CSA damage the cables creating a delay in the completion of the work. CAUSE: Cables are in varying states of wear due to age and original design issue of cable knotting over time. IMPACT: There would be an increase to cost and schedule as the window would likely not be completed on time pushing back the following windows and potentially impacting the reactivity levels of the operating units.		Active	Sorin Marinescu	Greg Maggs	17-Feb-17	Monitor	15-Sep-17	1	1	2	2	1	1	2	2

Outage Window	Window Description
039	039 - Power Track 1 & 2 Replacement Window 1
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There are no Draft, Not Started, In Progress Actions associated with the risk.

ONTARIO POWER GENERATION

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
Project: Pre-requisite Projects -																	
11811	Project/Construction relatedFatality/Serious Injury during Readiness (Campus Plan) Phase of project	Risk is that such injuries may affect the project schedule, cause delays, result in financial impact and potential difficulty controlling the outcome (legal).		Active	Dragan Popovic		08-Mar-17	Mitigate	31-Jan-14	2	2	2	4	1	2	2	2
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
Project: Pre-requisite Projects - 31555																	
14287	16-31555 - Building Structural Steel Delivery Dates	Event: Changes to the 100el slab thickness Cause: Design changes to an accepted EC Impact: Late fabrication and delivery of structural steel	4	Active	Anthony Colella	Anthony Colella	08-Feb-17	Mitigate	28-Feb-17	5	2	5	25	2	2	4	8
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			6504	In Progress	16-31555 - Assess impact of structural steel delivery	Management team is actively involved in reviewing erection schedule with the JV, fabricator and erector. Review delivery dates and expedite to meet construction schedule. Discuss second shift and weekend/overtime work to advance delivery dates.	Anthony Colella	Anthony Colella	28-Feb-17	This risk still continues to delay the project. Sequence 7-10 structural steel has been installed and bolt-up is in progress. Sequence 12 is now in progress (Nov. 9th, 2016).								
			Outage Window		**Window Description**												
			000		000 – No Window Related												
12455	16-31555 D2O Storage Project: Quality Issues Resulting from Expedited Construction	Event: Late start of new EPC Vendor and continued construction delays. Cause: Insufficient QA resources to support CWP/ITP development and material verification. Impact: Quality issues due to expedited construction schedule with many activities progressing in parallel.	4	Active	Anthony Colella	Zane Lougheed	08-Feb-17	Mitigate	28-Feb-17	4	3	5	20	3	3	5	15
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			6338	In Progress	Update POP with current field activities	Review and update project oversight plan with new status of field work and increased oversight responsibilities including in field, fab shop in Cambridge as well as any major subcontractors of the JV	Anthony Colella	Zane Lougheed	28-Feb-17	The POP was last updated on September 10 2015, weekly meetings are scheduled to manage open items. FE/IMS oversight going to Cambridge weekly to review fabrication completing QA/QC oversight Participating in bulk material procurement, actively engaged in team to assist with placement of purchase orders and review of need dates and expediting as needed. Field oversight of pipe spools and construction work in the basement. Review of the 2-week look aheads daily.							
			6701	In Progress	16-31555 - JV to provide cost of recovery	JV to provide a cost of implementation of the revised recovery schedule that was provided to OPG on June 12, 2016, as well as based on discussions in Jan/Feb 2017.	Anthony Colella		30-Mar-17	Original due date was with schedule provided. The cost of recovery was not submitted and a date of early march was given by JV. [redacted] 4AUG2016: Basis of Estimate expected from the JV by August 12th, 2016. 8MAR2017: A new estimate is expected from the JV by March30th, 2017.								
			Outage Window		**Window Description**												
			000		000 – No Window Related												
13532	16-31555 D2O Storage Project: Transition between engineering vendors	There is a risk that the transition between the two engineering vendors may result in additional costs and schedule due to the state of the Revision 0 design packages. In addition, field support from the new vendor on the previous vendors design may result in additional design changes due to different designers interpretation of codes/standards. This field support could cause construction delays. Also any latent design errors will have to be revised by the new engineering vendor.	3	Active	Anthony Colella	Aninda Dutta Ray	08-Mar-17	Accept	28-Feb-17	4	2	5	20	4	2	5	20
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			7743	In Progress	16-31555 - Number of open ITF items	Review ITF by EC with existing OSS team to start to close out open ITF issues.	Anthony Colella	Henry Lo	28-Feb-17	MTL and DTL (both OPG and JV) meet weekly to close out ITF items that have due dates coming soon.							

ONTARIO POWER GENERATION

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13532	16-31555 D2O Storage Project: Transition between engineering vend	There is a risk that the transition between the two engineering vendors may result in additional costs and schedule due to the state of the Revision 0 design packages. In addition, field suppo	**Outage Window**		**Window Description**												
			000		000 – No Window Related												
14177	16-31555 - 11 New Design EC's Completion Date	Event: Late start of new EPC Vendor Cause: Amount of design work to complete including equipment vendor information. Impact: Late procurement/installation/commissioning activities The 11 new DEC's for JV to complete have a completion date (per the latest recovery schedule) of late 2016, threatening the installation and commissioning milestones. Diesel generator EC and multiple software ECs are outstanding and will need constant revisions. Ongoing revisions will cause more delays.	4	Active	Anthony Colella	Paolo Auciello	08-Mar-17	Mitigate	28-Feb-17	4	2	5	20	3	2	5	15
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14175	16-31555 - CWP Production Rate	JV currently has staffing issues which is affecting the production of CWP preparation and QA resources.	4	Active	Anthony Colella	Zane Lougheed	08-Mar-17	Monitor	28-Feb-17	4	2	4	16	2	2	4	8
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14283	16-31555 - D2O storage project - Impact of Construction Delays on Commissioning Activities	Event: The AFS date is at risk due to changes in commissioning strategy and logic and unviability of commissioning resources. Cause: Delays in installation activities and change in focus from receiving PHT water to receiving moderator water. Impact: Unable to store U2 refurbishment Moderator Water in HWMB-WA	3	Active	Anthony Colella	Ron Piggott	08-Feb-17	Mitigate	28-Feb-17	2	2	4	8	2	2	4	8
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			9940	In Progress	Update Commissioning Schedule	Complete a commissioning schedule review and realignment based on available resources and available systems in the WA (EG Power supplies)	Ron Piggott		28-Apr-17								
			Outage Window		**Window Description**												
			000		000 – No Window Related												
12277	16-31555 D2O Storage Project: Risk of Damage to Storage Tank	There is a risk that one or more of the heavy water storage tanks will be damaged prior to being placed in service.	2	Active	Anthony Colella	Anthony Colella	08-Mar-17	Accept	30-Apr-17	1	1	5	5	1	1	5	5
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
12377	16-31555 D2O Storage Project: Construction Delays Due to Piping Complexity	There is a risk that the piping design will be difficult to implement in the field due to complexity and congestion issues; this may result in construction delays that impact cost and schedule.	3	Active	Anthony Colella	Zane Lougheed	08-Mar-17	Monitor	20-Jan-17	1	1	3	3	1	1	3	3
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
12108	16-31555 D2O Storage Project: Soil Voiding and/or Sinkhole Issues Due to Dewatering	There is a risk that dewatering activities required to facilite excavation could cause voiding or sinkholes in the vicinity of the building footprint.	3	Active	Anthony Colella	Jeff Ezard	08-Mar-17	Accept	20-Jan-17	1	2	1	2	1	2	1	2
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
15113	16-31555 D20 Storage Project: Changes resulting from shielding analysis	Updated shielding analysis started late (January 2017) and may result in need for further design changes to include shielding material.	3	Active	Anthony Colella	Constantin Banica	08-Mar-17	Mitigate	30-Apr-17	2	1	1	2	1	1	1	1
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
Project: Pre-requisite Projects - 73360																	

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 08-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
12290	EPG3 - Critical Spare Parts Unavailable for AFS	There is a risk that critical spares may not be available for the scheduled AFS due to the late identification of the spare parts list. The unavailabilty of spare parts would threaten the AFS being completed and a risk to meeting the Refurbishment breaker open commitment.	3	Active	John Ieraci		08-Mar-17	Mitigate	28-Feb-17	4	3	4	16	4	3	3	12

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
3309	In Progress	Obtain Cost & Delivery Schedule For all Project Spare Parts	Project team to obtain costs and schedule of procuring spares by the Vendor and issue PO rev.	John Ieraci		28-Feb-17	Parts lists created and list signed off for Turbine-Generator/Crane and Protection Panel and most sub-systems. Vendor has submitted costs for these spares on these system. Costs and delivery dates to be finalized. OPG to order spares. Contracts in place.

Outage Window	Window Description
000	000 – No Window Related

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13954	EPG3: Risk to Software Qualification to Category 2	The equipmnent was supplied without adequate documentation to support Cat 2 software qualification. The EPC Vendor has engaged SWI to qualify the EPG3 software/firmware to Cat 2. Some of the required information to complete qualification is either not available or proprietary. This issue could impact anticipated AFS, if not resolved in a timely manner. Extra effort required by ESFL/HSL/SWI could impact cost and schedule.	3	Active	John Ieraci		08-Mar-17	Mitigate	28-Feb-17	3	2	4	12	3	2	3	9

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
6940	In Progress	Ensure Certain Software Functional Tests are included in the appropriate EPG3 Commissioning Work Plans	The following software functional checks were not tested during the EPG3 FAT test: 1. Lube Oil Header Pressure Low; 2. Generator Protection Fault - (CAT 1); 3. Back Up Lube Oil Pump Fail; As a result, these functional tests must be included in the appropriate EPG3 commissioning work plan and done on site. This is necessary to support software Cat 2 qualification of the associated components.	John Ieraci		28-Feb-17	Commissioning Work Plans I/P and will incorporate the requirements. Final verifications in progress.

Outage Window	Window Description
000	000 – No Window Related

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14411	EPG3: Vendor Estimate at Completion	[redacted]	3	Active	John Ieraci		08-Mar-17	Monitor	28-Feb-17	4	3	2	12	3	2	2	6

Outage Window	Window Description
000	000 – No Window Related

There are no Draft, Not Started, In Progress Actions associated with the risk.

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13950	EPG3: CSA N291 Concrete/Rebar Materials Testing Results Not Acceptable	Late identification that CSA N291 requires concrete batch materials and rebar to be tested per specific requirements. A material testing lab is now engaged, however results are pending. There is a risk that the results will not be acceptable, yet the concrete and rebar has already been placed. This potentially means rework, with the associated impact to Project cost and schedule.	2	Active	John Ieraci		08-Mar-17	Accept	28-Feb-17	1	1	4	4	1	1	4	4

Outage Window	Window Description
000	000 – No Window Related

There are no Draft, Not Started, In Progress Actions associated with the risk.

Project: Pre-requisite Projects - 73365

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14371	73365 CFVS - There is a risk that the Project EAC will exceed the current Project approved budget	It is forecasted that the Project EAC will exceed the current Project approved budget. The Vendor is continually submitting overtime requests and CTPs and PCAs that are outside of the currently approved budget. This risk will result in additional cost to the project exceeding the approved budget. Approval at Gate 4 or through a CCN will be required to increase project funding.	3	Active	Ralph Stube	Samantha Thurston	08-Mar-17	Mitigate	30-Dec-16	5	3	4	20	5	3	4	20

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 08-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14371	73365 CFVS - There is a risk that the Project EAC will exceed the current Project approved budget	It is forecasted that the Project EAC will exceed the current Project approved budget. The Vendor is continually submitting overtime requests and CTPs and PCAs that are outside of the currently approved budget. This risk will result in additional cost to the project exceeding the approved budget. Approval at Gate 4 or through a CCN will be required to increase project funding.	3090	In Progress	CFVS - Increased ES MSA contrator cost estimate	Review vendor costs during weekly quad chart review meeting. Request detailed CTP and PCA information from the vendor. Present PCAs and CTPs to PMOC for review and approval. Request additional funding through a CCF	Samantha Thurston	Samantha Thurston	23-Dec-16									
			Outage Window		**Window Description**												
			000		000 – No Window Related												
14372	73365 CFVS - Risk that the schedule is not realistic to achieve the AFS milestone due to errors in the schedule	The current P6 schedule has multiple issues of concern including incorrect logic, incorrect activity ties, and incorrect durations. During three week lookahead reviews the contractor is constantly reporting that they are fixing logic errors and updating durations to maintain the AFS milestone date. There is a risk that the schedule is not realistic to achieve the AFS milestone due to errors in the schedule.	3	Active	Ralph Stube	Samantha Thurston	08-Mar-17	Mitigate	23-Dec-16	5	2	4	20	5	3	4	20
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
12471	73365 CFVS - Lack of schedule float for weather delays	The weather during the spring months can be rainy and windy. If the winds are too high then craning activities cannot be performed. There is a risk that there is insufficient float in the schedule to account for poor weather conditions. If there is insufficient float then activities put on hold due to rain and/or high wind will cause a delay to schedule and increased costs for trades on standby and craning equipment rental.	3	Active	Ralph Stube	Samantha Thurston	08-Mar-17	Monitor	28-Apr-17	4	2	4	16	3	1	4	12
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13265	73365 CFVS venting stack monitoring requirement potential need to purchase new stack monitor	Reactor Safety review of CFVS MDR requirements traceability matrix identified potential need for project to purchase a new stack monitoring portable device. Project action to date was only to obtain isolatable sample points to tie-in a portable device provided by others. Risk is that a new monitor will need to be designed and purchased and installed, or test connected and commissioned prior to AFS. Project is ~ 6 months from final AFS	2	Active	Ralph Stube	Samantha Thurston	08-Mar-17	Monitor	30-Jun-16	2	1	5	10	1	1	5	5
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 08-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13265	73365 CFVS venting stack monitoring requirement potential need to purchase new stack monitor	Reactor Safety review of CFVS MDR requirements traceability matrix identified potential need for project to purchase a new stack monitoring portable device. Project action to date was only to obtain isolatable sample points to tie-in a portable device provided by others. Risk is that a new monitor will need to be designed and purchased and installed, or test connected and commissioned prior to AFS. Project is ~ 6 months from final AFS	4899	In Progress	73365 CFVS resolve need for CFVS Project to provide stack monitoring device	Communicate with stakeholders to identify issue and get support for resolving the requirement. 1. Review RTM requirement with design oversight, nuclear safety and emergency planning organizations and 2. Identify issue to steering committee, project and refurbishment engineering line organizations Identify options to meet potential requirement 1. identify potential existing devices and how they could be mobilized and integrated into CFVS procedures 2. identify requirements for device specification and existing equipemtn similar to device to determine potentail cost and schedule Prepare plan to implement if resolution is that a new device will be required	Bill Devlin	Colin Barfoot	08-Apr-16								
			Outage Window		**Window Description**												
			000		000 – No Window Related												
14674	Containment Filtered Venting System(CFVS) Project 73365 - Conduit Interference on VB exterior wall	There is a 4" conduit running up the side of the southeast exterior wall of the vacuum building. This is the planned location for the supports for the CFVS exhaust stack. This interference was missed by Design during the detail design phase. The conduit contains strain gauges for pressure testing the vacuum building during construction as well as during select vacuum building outages. If this conduit cannot be relocated then the exhaust stack will need to be relocated which will require redesign and re-fabrication of supports. If the conduit is not removed as soon as possible it will cause a delay to the exhaust stack support installation. The exhaust stack supports are not available for installation and have a planned delivery date of July 20th which is likely to push because material fabrication is behind schedule.	4	Active	Samantha Thurston	Samantha Thurston	08-Mar-17	Mitigate	28-Apr-17	2	1	3	6	1	1	2	2
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			8413	In Progress	Containment Filtered Venting System(CFVS) Project 73365 - VB exterior wall conduit interference	Collaborative effort between vendor, OPG Projects and OPG Station staff to provide a viable path forward for relocation of the VB exterior wall conduit to avoid installation delays to the exhaust stack supports. Walkdown have been completed. HSL engineering is working on design for new conduit supports. OPG CMO is working on locating drawings of the conduit and equipment as well as assisting with required authorization for removal of the conduit. Fox electrical providing input and support for removal of the conduit.	Samantha Thurston	Samantha Thurston	28-Apr-17	August update: walkdowns have been performed. HSL engineering has designed new supports for the conduit relocation. Conduit will be removed and reinstalled as an AFS open action. ES Fox has requested OPG DTL concurrence on removal plan. Sept/Oct Update: Conduit will be rotated south and fixed to the VB using temporary supports. Permanent supports have been ordered and will arrive on site in early November for installation. Nov update: Conduit has been rotated and permanent supports have been ordered. Permanent supports will be installed when the stack installation is complete. March update: Permanent supports have been installed. A terminal strip needs to be reinstalled.				
			Outage Window		**Window Description**												
			000		000 – No Window Related												
12058	73365 CFVS - Containment Filtered Venting System: (CFVS)Access to the work areas	The risk is that access to the work areas may be denied due to delays in obtaining the necessary access permit or changes in the station meaning access to the PRVM is not possible The risk is that the containment tie-in installation may be extended 1 day beyond the scheduled window. The consequence is aligned resources will incurr standby/ delay cost, and if delay is longer than 1 day it could move the scope to another work week (delay of 8 weeks non critical path with a higher cost) .	2	Active	Ralph Stube	Samantha Thurston	08-Mar-17	Mitigate	14-Oct-16	1	2	2	2	1	1	1	1
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			3185	In Progress	CFVS - Access to PRVM to complete placing CFVS in service activites	Mitigating actions: 1. Develop appropriate CAD models and perform RELAP analysis. 2. conduct installation reviews with the construction group and vendor to examine potential issues. 3. Develop construction alternatives as required. For final placing system in service, plan execution of 1 look per week to minimize impact of delays in no fuel windows needed to obtain PRVM access needed for isolation to do work.	Colin Barfoot	Colin Barfoot	09-Dec-16	Review meeting has been scheduled with Operations and Projects to align on the commissioning execution and required permitry and AFSing.							
			Outage Window		**Window Description**												
			000		000 – No Window Related												

Project: Pre-requisite Projects - 73380

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 08-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14424	STOP Project work area interference with other outage work scope for D1711 and RF U2	Event: in D1641 Installed shielding wall and scaffolding to support STOP installation found to be in the way of other outage work Cause: Lack of outage coordination on time and space usage Impact: Interference with other critical work if not sequenced around STOP space requirements potential delays to work and rework if interferences need to be removed to support critical path.	3	Active	Dragan Popovic	Colin Barfoot	08-Mar-17	Mitigate	07-Jul-17	4	2	3	12	2	2	2	4
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**						
			7014	In Progress	Prepare time and space matrix for used space for transient shielding and scaffolding builds	For the STOP and ESC piping reconfiguration modifications take detailed photographs of the installed scaffolding, tenting and ventilation, shield walls and other transient material that is needed at specific time and places to support ESC STOP modification installation. distribute information to Outage ECTL and refurbishment		Dragan Popovic	Colin Barfoot	09-Jan-18							
			Outage Window		**Window Description**												
			104		104 - Post Feeder Vault Projects												
			134		134 - U1 Outage 2017 (D1711)												
12345	73380 - STOP- installation interferences with existing station equipment which require equipment relocation, removal or redesign of piping or supports	Event: During STOP installation of seismically qualified vent line or class 2 piping and supports or maintenance platform there will be differences in the location of interferences that were not identified during the design phase. Update to risk is need to relocate unit hydrogen igniter potentially in all units (Unit 4 electrical panel was relocated) Cause: Due to equipment location being different between units and access not close enough to determine interferences during STOP design walk downs. Risk Impact: Since the lines are seismicaly analysed it will require a redesign and analysis, with added design costs and potential outage schedule delay	2	Active	Bill Devlin	Colin Barfoot	08-Mar-17	Mitigate	28-Oct-16	3	1	3	9	3	1	2	6
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**						
			3184	In Progress	STOP - Installation interferences	Mitigating actions: 1. Detailed inspections will be performed as close as possible to the vault ceiling as soon as vault access is available. 2. tasks have been added in outage P6.		Colin Barfoot	Colin Barfoot	28-Oct-18	mitigated for unit 3, in progress for unit 4 installation of STOP modifications.						
			Outage Window		**Window Description**												
			104		104 - Post Feeder Vault Projects												
			134		134 - U1 Outage 2017 (D1711)												
14254	73380 ESC STOP Vault access restrictions delay STOP execution	Event: Vault Access via vault coordinator control limits the number of personnel allowed to be in the vault due to breathing air and emergency egress reasons. Cause: Vault access is provided to work groups based on outage determined priority. Impact: During each outage ESC STOP execution was delayed for several days in aggregate due to priority based access restrictions. Risk is that access delays will add to project and outage critical path.	3	Active	Dragan Popovic	Colin Barfoot	08-Mar-17	Accept	30-Jun-16	3	2	3	9	3	2	2	6
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			104		104 - Post Feeder Vault Projects												
			134		134 - U1 Outage 2017 (D1711)												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14866	ESC STOP Need to replace ESC containment boundary isolators 34110-V1,V15,V16 on U1 and U2 to install pressure pulse mitigation modifications	Event: In D1641 Containment Boundary Isolation valves passed preventing their use as isolation for the ESC pressure mitigation modifications to relocate the pump discharge valves and install new nozzle check valves. This required draining of the ESC piping in the vault for the pump suction isolator V1 and installation of ice plugs in the vault to support replacement of V15, V16. Cause: Isolators are used to support infrequent maintenance on the ESC system outside the vault and seats degrade from normal operation. Isolators can only be tested once the unit is shutdown and moderator cooled so condition of Unit 1 and 2 isolators is not known. Impact: Outage critical path logic best case prepared for D1632 for contingency replacement of these valves identified 125 hours to replace V15 and or V16 plus 50 hours to replace V1 in series before planned modifications work can start in D1641 the evolution took 296 hours and was the outage critical path for days. Impact on schedule if risk comes to play results in increased project cost extending the duration of dedicated crews for execution.	2	Active	Dragan Popovic	Colin Barfoot	08-Mar-17	Accept	30-Sep-18	3	3	2	9	3	3	2	9
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**						
			9166	Draft	Prepare for contingency execution of unit 1 and 2 34110V1, V15, V16 replacement if found passing	1. Ensure execution work plans and work order tasks orders include valve isolation test and direct contingency valve replacement 2. Ensure WCTL schedules isolation test as soon as practical and identifies refurbishment window for contingency valve replacements. 3. Ensure OPEX from delays in ice plugging and isolation are identified per the SCR's below		Dragan Popovic	Colin Barfoot	01-May-18							
			Outage Window		**Window Description**												
			105		105 - Vault Projects After Feeder Removal												
14111	73380 - new design scope to address ESC pressure pulses needed for unit 3, 1, 2	Event: Pressure Pulse identified in Unit3 ESC piping system by STOP SIR team will be addressed by Pump discharge piping modifications with a new type nozzle check valve installation. Cause: Risks are associated with short timeline to complete design, work planning , assessing, procurement and execution and with first time use of this type and size of valve at OPG. Impact: design schedule does not support outage readiness milestones, recovery plan will be needed for all remaining units. Additional oversight and direct management with HIT team	3	Active	Dragan Popovic	Colin Barfoot	08-Mar-17	Mitigate	30-Jun-17	3	2	2	6	2	2	2	4
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**						
			6225	In Progress	Implement ESC Pressure Pulse elimination modifications	Support execution of STOP for pressure pulse elimination modifications in D1641 outage		Ralph Stube	Colin Barfoot	01-Oct-18							
			Outage Window		**Window Description**												
			104		104 - Post Feeder Vault Projects												

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 08-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
411	73380 - new design scope	Event: Pressure Pulse identified in Unit3 ESC piping system by	134		134 - U1 Outage 2017 (D1711)												
14928	Schedule Acceleration Execution Cost Risk	Event: During D1632 ESC STOP execution had to be accelerated increasing shifts from planned and started 10h to 12 hours with worked through second lunches with support from RP and all interfacing work groups. Cause: D1632 Execution critical path project PHT pump replacement pulled ahead several days making ESC STOP execution critical Path. Impact: Project costing and planned resourcing are based on planned D1711 execution windows and Unit 2 execution window (duration yet to be confirmed) optimized to minimize cost while meeting the required execution timelines. If project cannot accelerate critical path will be impacted.	3	Active	Dragan Popovic	Colin Barfoot	08-Mar-17	Mitigate	30-Jun-17	3	2	2	6	2	1	2	4
			Outage Window		**Window Description**												
			105		105 - Vault Projects After Feeder Removal												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14233	73380 - ESC Pressure Pulse Testing - effectiveness of piping an NV change to be commissionioned in each unit	Event: Pressure pulses in ESC system above the design set point of the STOP RD, potential to be different in each unit. Cause: Original design of piping and check valves as measured on Unit 3 ESC Impact: Lack of testing could result in ineffective design solution in that it does not adequately resolve the pressure pulse issue resulting in failure of the STOP rupture disc, or STOP would not be installed or will be isolated, leading to ineffective STOP installation. Risk for requiring EC revision to support testing results different than expected or with lower probability not being able to execution modification due to proximity to setback.		Active	Colin Barfoot		08-Mar-17	Mitigate	31-Aug-17	2	2	2	4	2	1	2	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			6397	In Progress	ESC Discharge check valve pressure pulse testing required t	Design for the ESC Pump start time delay requires testing done on each unit.	Dragan Popovic	Colin Barfoot	10-Jul-17								
			Outage Window		**Window Description**												
			104		104 - Post Feeder Vault Projects												
			134		134 - U1 Outage 2017 (D1711)												

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
Project: Retube and Feeder Replacement -																	
13326	[QUARTERLY MONITORING] Excusable Delays [000 - No Window Related]	Execution Phase: Due to conditions beyond the control of JV and OPG RFR, 5.2 (a) Excusable Delays Section of EPC Agreement explains the condition and the contract terms of excusable delays, which have impacts on Execution phase Schedule. This risk concentrates on delays of more than 3 days. Ensure adherence to contract terms to ensure any costs are allowable per contract.	1	Active	Roy Brown	Cameron Macleod	03-Mar-17	Monitor	01-Jan-26	3	1	5	15	3	1	5	15

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
8383	In Progress	Actions in response to Risk 13326 - Excusable Delays	Update 16Aug2016: This action is created to subdivide specific actions as per team meetings within the Construction Team. The following are the areas to explore: - Radiation conditions (tritium, alpha, debris, high activation product concentration, high radioactive debris/particles) higher than expectations causing delays in cleanup (> 3days); Currently, weekly meetings are held with OPG RP/HP and JV HP and Project team to discuss various interface items. See attached RFR-RP Interface items database. This is a live database of current and incoming challenges to address the above mentioned radiation conditions. - Fueling machine stops unexpectedly (> 3days) below the bulkhead of the Unit being refurbished with Labour Force in the vault working on critical path;- Unplanned Fuel Handling activities affecting duct access (> 3days) applicable to critical path refurbishment work in the duct;- Required upgrades/repairs/maintenance to OPG existing facilities (> 3days);- Unexpected operating plant transients with impacts > 3days on critical path; - Delay in completion of work required to be completed by OPG (or its vendors) (> 3days); - Reactor not defueled on time as scheduled by OPG (> 3days); - Delay in Breaker Open milestone (> 3days); - Loss of station power (OPG supply) to run JV equipment / tools (> 3days)- D2O spills (> 3days)- Activities in operating units (including testing and Safety Related System Test of adjacent operating units) causing interruptions in refurbishment work (> 3days)- Vault Equipment Airlock Malfunction causing interruptions in transitions and material movement (> 3days)- CNSC work stoppage (> 3days)- MOL work stoppage not due to JV's negligent work (> 3days) PCD according to 5.2 (a) Excusable Delays (> 3 days)	Ken Brown	Jeffrey Palmateer	30-Sep-26	

Outage Window	Window Description
000	000 – No Window Related

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
11111	Lack of Change Control and management resulting in unapproved design changes	Execution Phase Risk. Event: There is a risk that lack of Change Control occurs on RFR Tooling leading to unapproved design changes to tooling. Cause: Lack of clarity on Tooling Change Control process/roles/responsibilities during execution phase leading to insufficient authorities approving changes. There is also a challenge to ensure that approved changes are properly implemented in the field on all applicable tools. Impact: Unexpected damage to the reactor or failure to perform tooling function may occur in the Execution Phase causing rework or delays.	3	Active	Michael Hersch	David Kurpjuweit	27-Feb-17	Mitigate	28-Mar-17	4	1	3	12	2	1	2	4

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments

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Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

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11111	Lack of Change Control and management resulting in unapproved design changes	Execution Phase Risk. Event: There is a risk that lack of Change Control occurs on RFR Tooling leading to unapproved design changes to tooling. Cause: Lack of clarity on Tooling Change Control process/roles/responsibilities during execution phase leading to insufficient authorities approving changes. There is also a challenge to ensure that approved changes are properly implemented in the field on all applicable tools. Impact: Unexpected damage to the reactor or failure to perform tooling function may occur in the Execution Phase causing rework or delays.	6298	In Progress	RFR Tooling - Configuration Management Plan	Configuration management of tooling is escalating risk based on multiple CAR/NCR/SCR during standby plan, final design acceptance, and FAT tests of production tools during Q4 2015-Q1 2016. Risk #00011111 strategy changed from Monitor to Mitigate. This action is to develop a targeted oversight and mitigation plan for Q1 2016 to execution start Q4 2016 to ensure that JV is managing configuration management in accordance to their ECR process and rolling changes out to field staff. This action is complete when the overisght/mitigation plan for risk 00011111 is ready and in progress.	Michael Hersch	David Kurpjuweit	17-Mar-17									Geary M (27 Feb 2017): New TCD for extent of condition is March 17 2017 Geary M (31 Jan 2017): This action will be closed upon results from extent of condition from JV. Geary M (16 Jan 2017): Due date revised due to delay in review of disposition from JV Oversight activity 493 planned and will be kicked off with the JV within the next 2 weeks. August 18th 2016 - Oversight activity 493 kicked off with JV. JV to start providing required material the week of August 22nd. Sept 21 update - Execution of oversight plan in progress. Findings to be presented to JV for Oct 1/2016 November 2 update - findings presented to JV and discussed. Dispositions under review. November 17 update - C&D sheet on findings returned to JV. Waiting for JV follow up on open items and TCD December 14th update - several items on the C&D sheet are closed, however currently waiting JV response on items still open.

Outage Window	Window Description
071	071 - Trial CT Install
112	112 - PT Sever
113	113 - Sever Bellows
114	114 - End Fitting Removal
115	115 - Pressure Tube Removal
116	116 - CTI Removal
117	117 - CT Removal
118	118 - CT Install Series
119	119 - Fuel Channel Install Series
184	184 - RFR-Waste Volume Reduction
910	910 - RFR Series Tooling

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13338	Not Enough commissioning / training Time for Volume Reduction System in Retube Waste Processing Building (RWPB)	Execution Phase: Event: Due to RWPB construction being late (potential), the risk of not having enough commissioning / training time for Volume Reduction System . Cause: RWPB construction schedule slippage. Impact: Potential for negative impacts on Execution Phase schedule	2	Active	Michael Hersch	Sean Carpenay	27-Feb-17	Mitigate	31-Oct-17	3	1	4	12	2	1	3	6

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score	
13338	Not Enough commissioning / training Time for Volume Reduction System in Retube Waste Processing Building (RWPB)	Execution Phase: Event: Due to RWPB construction being late (potential), the risk of not having enough commissioning / training time for Volume Reduction System . Cause: RWPB construction schedule slippage. Impact: Potential for negative impacts on Execution Phase schedule	8248	In Progress	WTS CWP updated with Mobilization Plan Findings	Waste Tooling System CWP will include all the lessons learned (as field mark-ups) from the Mobilization Plan testing. The CWP will be revised to include series commissioning for the Waste Tooling System.	Michael Hersch	Sean Carpenay	31-Mar-17	Due date pushed to mid-march. S. Carpenay (31 Jan 2017): Due date extended for one month as CWPs for construction purposes have been prioritized and the Operation CWP will be put on HOLD until then. S. Carpenay (16 Jan 2017): Waiting on CWP 0050 to be delivered to OPG for review. CARPENAS 20160920 - The CWPs 010, 038, 039, 040, 041 and 050 will have lessons learned from Mobilization Plan incorporated by the following dates: CWP 010 - TCD Oct 21, 2016 CWP 038 - TCD Oct 24, 2016 CWP 039 - TCD Nov 24, 2016 CWP 040 - TCD Nov 18, 2016 CWP 041 - TCD Nov 23, 2016 CWP 050 - TCD Mar 17, 2016 SCARPENAY- CWPs 0050 and CWP 0010 are currently under review and mobilization plan testing is being incorporated into the CWPs. Once the review is completed and comments incorporated this action will be closed.								
			Outage Window		**Window Description**													
			184		184 - RFR-Waste Volume Reduction													
			522		522 - Retube Waste Processing Building RWPB													
13860	[QUARTERLY MONITORING] Owner Specified Material (OSM) pricing from Unit-to-Unit Procurement [U1, U3, U4] [000 - No Window Related]	[EXECUTION PHASE] EVENT: There is a risk of cost escalation of the OSM pricing. CAUSE: Due to Unit-to-Unit Procurement, vendor price increases, or other external market conditions. IMPACT: Change to budget allocation.	1	Active	Chad Da Maren	David Fennell	23-Feb-17	Mitigate	30-Dec-16	4	3	1	12	3	3	1	9	
			Outage Window		**Window Description**													
			000		000 – No Window Related													
			There are no Draft, Not Started, In Progress Actions associated with the risk.															

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Risk Report by Project with Associated Actions

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13917	Insufficient Tool Quantities or Spares for RFR Execution - all causes	Execution Risk. This risk combines four risks related to Tool Qty and Spares: 13917 Insufficient Tool Qtys (this risk)13566 Frequent Tool Failures13332 Insufficient Tool Maintenance13570 Tool Damage during Transition and Shipping Event: RFR Tool breaks during execution and cannot be readily replaced due to no backup spare Tool available per Part Supply List (PSL). Details of estimated Tool Series failure modes are described in Class 2 estimate risks associated with each series. The individual tool series risks are owned by the Joint Venture (JV). This risk is the residual risk to OPG. This risk also includes the case where tools cannot be readily repaired. Spares parts have been identified by tools designers (sub vendors). Tool failures associated with sufficient spares, quality of maintenance and repair of the tools, as well as shipping and handling to/from/within site are owned by the JV. This risk is the residual risk to OPG. Cause: This risk combines four (4) types of failure modes leading to insufficient tools/spares leading to critical path schedule delay. The tool failure mode was not identified in risks during design and class 2 execution estimate (discovery work or possible tool warranty claim). This is the residual risk from the design and testing. ie PSL insufficient qtys. (orig scope of risk 13917). Tool failures with known failure modes occured more frequently then expected leading to insufficient spare tools or spare parts for repairs. (Risk 13566). Ineffective Practices in Maintaining the Tools. (Risk 13566). Damages to tools during transitions and shipping to site. (Risk 13570). Impact: Schedule delay, potentially long lead items if Tools cannot be repaired and all tools on PSL used.	2	Active	Michael Hersch	Martin Geary	27-Feb-17	Mitigate	15-Sep-19	3	3	4	12	3	3	3	9

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
5427	In Progress	Evaluate whether additional spare components and training tools are required.	Review spares list with JV Tooling and identify gaps. TCD Q2 2016. Started Q1, 2016. In parallel Review tool maintenance activities with the JV Tool Management Organization (TMO) and identify gaps. TCD Q2 2016. If gaps are identified, evaluate whether additional spare components and training tools are required.	Michael Hersch	Michael Hersch	31-Mar-17	Geary M (27 Feb 2017) - Please note that from PCD 21, JV has indicated there are no changes required to tool quantities. There are still some open items on the C&D sheets for tooling spare parts (waste tool assemblies, RTP air line connectors, clean room tocco unit). Kevin Hill (27Jan2017) - PCD 21 closure now progressing, Lessons Learned document is required to close the final milestone. This deliverable will outline all JV ACERs generated from the program, including increases to the PSL where required. OPG to review and comment to be performed following submission. Herschm (Jan 16, 2017) - Overall completion of review of JV spare parts list is delayed to February due to a detailed review of WTS spare components vs spare assemblies per OPG oversight team comments. JV TCD was early January, but TCD has been pushed to late January. Kevin Hill (23Dec2016) - PCD 21 (Rehearsal/Mobilization Plan) also describes a project supply list (PSL) update as per observations/lessons learned from the program. This deliverable has not been provided to date, and is being tracked as per RMO action 00005428. Collaborative review between RFR tooling group and RFR facilities will be initiated once a commitment date is confirmed by the vendor. Tooling group to provide status on spare quantities review(s). GearyM (22Nov2016): C&D is in progress. Accepted part of it. GearyM (20/OCT/16): All packages except RCC & WTS - Dispositions for Install and Review Tools provided by JV 2nd week of Oct 2016 and under OPG review. JV provided RCC spares list in Oct 2016. OPG review and comment in progress. GearyM: Due date extended as C&D process is ongoing. Hill K - August 2016 -All PCD 25 milestones have now been endorsed and signed -Spare parts are under review as per RMO Action#00006524 -DEC mock up mobilization plan is in progress, where contingency work orders are being developed and tested, Trades personnel are getting hands on exposure and training with the toolset -WTS mobiliz

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13917	Insufficient Tool Quantities or Spares for RFR Execution - all causes	Execution Risk. This risk combines four risks related to Tool Qty and Spares: 13917 Insufficient Tool Qtys (this risk)13566 Frequent Tool Failures13332 Insufficient Tool Maintenance13570 Tool Damage during Transition and Shipping Event: RFR Tool breaks during execution and cannot be readily replaced due to no backup spare Tool available per Part Supply List (PSL). Details of estimated Tool Series failure modes are described in Class 2 estimate risks associated with each series. The individual tool series risks are owned by the Joint Venture (JV). This risk is the residual risk to OPG. This risk also includes the case where tools cannot be readily repaired. Spares parts have been identified by tools designers (sub vendors). Tool failures associated with sufficient spares, quality of maintenance and repair of the tools, as well as shipping and handling to/from/within site are owned by the JV. This risk is the residual risk to OPG. Cause: This risk combines four (4) types of failure modes leading to insufficient tools/spares leading to critical path schedule delay. The tool failure mode was not identified in risks during design and class 2 execution estimate (discovery work or possible tool warranty claim). This is the residual risk from the design and testing. ie PSL insufficient qtys. (orig scope of risk 13917). Tool failures with known failure modes occured more frequently then expected leading to insufficient spare tools or spare parts for repairs. (Risk 13566). Ineffective Practices in Maintaining the Tools. (Risk 13566). Damages to tools during transitions and shipping to site. (Risk 13570). Impact: Schedule delay, potentially long lead items if Tools cannot be repaired and all tools on PSL used.	5428	In Progress	Provide Comments on Mobilization Plan Series	Through the use of C&D sheets, provide comments on Mobilization Plan Individual Series to the JV. OPG team to ensure comments are incorporated into final work instructions and procedures.	Jeffrey Palmateer	Kevin Hill	31-Mar-17									Geary M (27 Feb 2017) - Please note comments have been submitted for all series in Mob plan and ACERs generated. This action to be confirmed closed by completion of PCD 21. Kevin Hill (10Feb2017) - Linked to risk. Kevin Hill (27Jan2017) - PCD 21 closure now progressing, Lessons Learned document is required to close the final milestone. This deliverable will outline all JV ACERs generated from the program, including increases to the PSL where required. OPG to review and comment to be performed following submission. Due date updated to align with final milestone submission TCD, Lessons Learned document submission. Kevin Hill (23Dec2016) - Only remaining rehearsal scope of PCD 21 is hold due to tooling qualification delays - Feeder nozzle prep. tooling. Review of PCD and scoping document underway identifying deliverable gaps in preparation for PCD formal close out. Meeting to be scheduled with OPG project management to review evidencing of deliverables and/or program gaps. November 30, 2016 Update - K. Hill Mobilization plan is ongoing as per published schedule - due date for this action moved forward as oversight will continue until the completion of PCD 21. Updated file attached outlining all rehearsal observations to date. Mobilization oversight have attended all series rehearsal closeout meetings and ensured ACERs are being captured where follow up/mitigating actions are tracked by the vendors program. Series lead oversight team are to ensure timely closeout of ACERs as per the series readiness programs/procedures. END OF UPDATE Last update - Work is ongoing. Observations/Actions coming out of the Rehearsal Plan are being recorded in a consolidated Observation Log Excel Sheet that is updated continually and maintained on SharePoint, as Rehearsals occur. Also, all actions that JV should be taking to address issues observed in Rehearsals are being recorded and sent to the JV on a weekly basis. END OF UPDATE

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13917	Insufficient Tool Quantities or Spares for RFR Execution - all causes	Execution Risk. This risk combines four risks related to Tool Qty and Spares: 13917 Insufficient Tool Qtys (this risk)13566 Frequent Tool Failures13332 Insufficient Tool Maintenance13570 Tool Damage during Transition and Shipping Event: RFR Tool breaks during execution and cannot be readily replaced due to no backup spare Tool available per Part Supply List (PSL). Details of estimated Tool Series failure modes are described in Class 2 estimate risks associated with each series. The individual tool series risks are owned by the Joint Venture (JV). This risk is the residual risk to OPG. This risk also includes the case where tools cannot be readily repaired. Spares parts have been identified by tools designers (sub vendors). Tool failures associated with sufficient spares, quality of maintenance and repair of the tools, as well as shipping and handling to/from/within site are owned by the JV. This risk is the residual risk to OPG. Cause: This risk combines four (4) types of failure modes leading to insufficient tools/spares leading to critical path schedule delay. The tool failure mode was not identified in risks during design and class 2 execution estimate (discovery work or possible tool warranty claim). This is the residual risk from the design and testing. ie PSL insufficient qtys. (orig scope of risk 13917). Tool failures with known failure modes occured more frequently then expected leading to insufficient spare tools or spare parts for repairs. (Risk 13566). Ineffective Practices in Maintaining the Tools. (Risk 13566). Damages to tools during transitions and shipping to site. (Risk 13570). Impact: Schedule delay, potentially long lead items if Tools cannot be repaired and all tools on PSL used.	9346	In Progress	Work with JV to commit to a TCD for PSL revision	Project Supply List (PSL) requires a revision after the milestone Tooling Manufacturing Completed Delivery. Examples include New Fuel Load, Dowel bellows inspection, PCD 37, Corrections to qty's for Candu Installation tools, Dummy Bundle Tooling Removal, RTP Column Handler. Revisions based on Mob Plan/Rehearsal. If NO changes to PSL for Mob Plan, then a letter to Sr. Director is required.	Michael Hersch	Martin Geary	31-Mar-17									M Geary (27 Feb 2017): Due to resourcing at JV, updated PSL report delayed until end of March. M. Geary (31 Jan 2017): Due date extended. Please note, JV has indicated that mob plan has not driven changes to the PSL. OPG has received updated PSL memos and PSL list. OPG has provided comments and is waiting for dispositions and final revision to PSL report. M Geary - 2017/1/16: Draft revised tool project supply list (memos and excel list) received, but formal document revision not yet provided. M Geary - 2016/12/14: Draft revised report to be provided by end of next week. M Geary - 2016/12/05: As per last Tooling PM meeting, JV due to provide TCD for revised report by December 15th. TCD still undetermined. Priority tooling work for JV is the RFS for the tools. M Geary - 11/17/16: completion of RFS memos and signoff are currently a higher priority. Revision of the PSL will be pushed back as a result. Moved due date to accommodate priorities

Outage Window	Window Description
112	112 - PT Sever
113	113 - Sever Bellows
114	114 - End Fitting Removal
115	115 - Pressure Tube Removal
116	116 - CTI Removal
117	117 - CT Removal
118	118 - CT Install Series
119	119 - Fuel Channel Install Series
184	184 - RFR-Waste Volume Reduction

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14164	There is a risk that Liner Spacers and Liner Latch Assemblies will not be available in time for Fuel Channel installation	[Execution Phase] Event: There is a risk that Fuel Channel Liner Spacers and Liner Latch Assemblies manufacturing will be delayed beyond the need by date for execution Cause: The delay is due to time lost through the purchasing and document review/acceptance phase of work (cannot be recovered), and for a longer than expected manufacturing process as proposed by the vendor. Impact: Liner spacer and latch assemblies are required on site prior to the fuel channel installation series which is scheduled for August 2018. [JV Risk 8.133]	3	Active	Chad Da Maren	Geoff Colling	23-Feb-17	Mitigate	02-Feb-17	4	1	3	12	3	1	3	9

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
8440	In Progress	Mitigating actions to be performed for liner assembly manufacturing	OPG (RFR OSM Group) will perform oversight of the liner assembly manufacturing by being involved in meetings between the Joint Venture and the Laker Energy, being present at Laker's facility during witness and hold points identified in the ITP, and by performing project management routine oversight at Laker to track schedule and production of the liner assemblies.	Chad Da Maren	Geoff Colling	24-Mar-17	18Oct2016 JV received recovery plan on 17Oct2016, they will provide it to OPG for review within a week.

Outage Window	Window Description
119	119 - Fuel Channel Install Series

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13330	RTP first-of-a-kind Installation in Darlington Vault	Execution Phase Risk. Event/Cause/Impact: As results of Retube Tool Platform (RTP) being the first-of-a-kind platform installed in the Darlington vault with various constraints, the risk of more downtime of the installation than planned may occur in Unit 2 with negative impacts on Execution Phase schedule.	1	Active	Jeffrey Palmateer	Samad Kasaai	03-Mar-17	Mitigate	01-Jan-26	3	1	3	9	3	1	3	9
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**						
			9336	Not Started	Develop OA for Risk 13330	Develop OA for Risk 13330		Samad Kasaai		28-Oct-16							
			Outage Window	**Window Description**													
			082	082 - RTP Removals, Bridge Replacement													
			101	101 - Remove FM Bridge and Install RTPs													
13610	[QUARTERLY MONITORING] Execution Delays due to quality or fit-up to Reactor Area Bridge Component Replacement [Window 82]	Event: RAB components do not fit during installation. Cause: Work has not been done on some of the Reactor Area Bridge components since the initial installation and minor shifts in the component alignment could result in fit-up failures. Impact: Components that do not fit must be replaced etiher with original parts that have been refurbished or with new parts that would have to be rush ordered both of which would impact the cost and schedule of the project by delaying critical path installation.	2	Active	Roy Brown	Michael Hersch	28-Feb-17	Mitigate	31-May-18	3	1	3	9	2	1	3	6
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**						
			5342	In Progress	RAB Planning to include pre-installation and installation activities to mitigate delays	Project to work with installation vendor to ensure planning process and CWP's include pre-installation and installation activities to mitigate the risk of installation delays. Example: dimensonal checks on bearings, mechanical components		Sorin Marinescu	Greg Maggs	28-Feb-17	In progress with CWP reviews: 29Jun2016 27Sep2016: Action extended. Final CWP's have not been received.							
			5710	In Progress	Mitigation of Potential Rework Issues	To mitigate rework issues and cost, Project and Supply Chan to work with vendors to ensure necessary quality checks are included in the fabrication process and that CWP's incorporate necessary pre-installation and quality checks.		Sorin Marinescu	Greg Maggs	31-May-18								
			Outage Window	**Window Description**													
			082	082 - RTP Removals, Bridge Replacement													
15014	Delays/Rework due to inadequate Training	[redacted] Impact: Delays and rework during U2 outage		Active	Kevin Hill	Kevin Hill	03-Mar-17	Monitor	01-May-17	3	2	3	9	2	2	2	4
			Outage Window	**Window Description**													
			017	017 - Install ATP and End Fitting Caps - FM Carriage													
			023	023 - Install Bulkheads													
			025	025 - Install Bulkhead Shielding													
			027	027 - Bulk Interferences Removals													
			029	029 - HTS Vac Dry													
			042	042 - Feeder Removal													
			045	045 - Nozzle Inspection & Weld Preparation													
			071	071 - Trial CT Install													
			072	072 - Bellows Inspections													
			074	074 - Calandria Inspection													
			076	076 - Upper Feeder Installation													
			082	082 - RTP Removals, Bridge Replacement													
			083	083 - Lower Feeder Installation													
			088	088 - Bulkhead Removal													
			098	098 - CTI Release													
			101	101 - Remove FM Bridge and Install RTPs													
			111	111 - Feeder Cabinet Removal													
			112	112 - PT Sever													
			113	113 - Sever Bellows													
			114	114 - End Fitting Removal													
			115	115 - Pressure Tube Removal													

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15014	Delays/Rework due to inadequate Training	[redacted] Impact: Delays and rework during U2 outage	116	116 - CTI Removal													
			117	117 - CT Removal													
			118	118 - CT Install Series													
			119	119 - Fuel Channel Install Series													
			180	180 - Upper Feeder Prep													
			182	182 - RFR-Lower Feeder Preparation													
			184	184 - RFR-Waste Volume Reduction													
			185	185 - RFR-Clean Room CT and FC Preps													
			186	186 - RFR-Feeder Cabinet Install Phase 2-4													
			188	188 - RFR-Feeder Cabinet Install Phase 6-7													
			536	536 - Refurb Control Centre (RCC)													
			539	539 - Temporary Power Distribution System (TPDS)													
			910	910 - RFR Series Tooling													
			920	920 - RFR Series Training													
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
15135	CWP lifecycle maintenance not adhered to due to lack of ownership	If the CWP's are not kept up to date and accurate, they could become critical path and push schedule (time taken to bring them up to date)		Active	Joseph Lefebvre	Joel Phair	24-Feb-17	Monitor	24-Feb-17	3	1	3	9	2	1	1	2
			Outage Window	**Window Description**													
			000	000 – No Window Related													
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
12322	End Fitting Waste Processing - First Of A Kind (FOAK) risk	Execution Phase Risk: EVENT: Based on EF processing times incorporated into class 2 estimate, waste processing is on critical path during EF removal series (window 165). As a result of the first of a kind nature of the End Fitting waste processing with no existing operating experience, the risk is that the Waste Processing extends the critical path, with negative impacts on the schedule. This OPG risk is the residual of JV risk 26.23 - Unexpected WTS Failures. CAUSE and IMPACT: This section has been revised as EF processing is on critical path. Equipment Reliability - there is more downtime of the tooling system than planned. Due to the radiation hazards, equipment failures may be difficult to troubleshoot and concerns regarding safety may lead to significant delays during execution. Design Requirements call for close to 100% equipment availability, which may be difficult to demontrate in test program.	3	Active	Michael Hersch	Sean Carpenay	27-Feb-17	Monitor	01-Feb-17	2	2	4	8	2	2	4	8
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			9218	In Progress	EF non-sever parallel path	Pursue design and build of full length end fitting waste container and supporting peripheral items (tooling, transportation package, lifting beam).	Sean Carpenay	Tara Dhekney	13-Oct-17	Rahim Lakhani (31JAN2017): Rahim to speak to Tara D. in regards to creating a risk instead of this action. The RFR team is working with NWDE to design and procure new full length end fitting waste containers (EFWC). The mod package, MDR and scope of work for the design scope of the EFWC are approved. An RFP was submitted to proponents on 02NOV2016 and closed on 22NOV2016. No bids were received. The JV, who is accountable for procurement of the waste containers advised that their fabricators are interested in the design scope as well. OPG is looking to pursue engaging the JV for the full design and build scope of the EFWC. A formal letter to direct this scope addition is being prepared by OPG and Financial approvals are being sought: TCD for both is December 16th. Language surrounding JV liability clauses to be captured in the formal letter will be discussed in parallel with financial approvals. The JV provided a verbal estimate to OPG on Nov 28, 2016 for EFWC interface tooling and CWP updates. A kimono session is planned for the week of December 12th to go over the detailed estimate. Numerous meetings have been held at management levels and working levels to ensure prompt stakeholder responsiveness.				

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12322	End Fitting Waste Processing - First Of A Kind (FOAK) risk	Execution Phase Risk: EVENT: Based on EF processing times incorporated into class 2 estimate, waste processing is on critical path during EF removal series (window 165). As a result of the first of a kind nature of the End Fitting waste processing															
			Outage Window	**Window Description**													
			114	114 - End Fitting Removal													
			184	184 - RFR-Waste Volume Reduction													
13333	[QUARTERLY MONITORING] Stop Work Order due to Safety Events	Execution Phase: Event:: OPG stopping the work order(s) may occur Cause: Due to safety events or near-misses (specifically not related to JV's negligent work) Impact: Negative impacts on Execution Phase schedule.	1	Active	Jeffrey Palmateer	Jarrett Gagnon	03-Mar-17	Mitigate	01-Jan-26	4	1	2	8	4	1	2	8
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			5408	In Progress	Reinforce high safety culture	Reinforce high safety culture in the project team to eliminate safety events or near-misses to avoid impacts of Stop Work Orders.	Jeffrey Palmateer		01-Jan-26	2015/07/13: No mitigation cost as this shall be part of normal training. To ensure that there is a strong safety culture within the JV Project Team there are numerous interactions to ensure there is strong communications, interactions such as; There is a scheduled weekly mock-up walk down with a quorum of the both RFR Construction Mangers (JV & OPG) with the Training Area Supervisor and the Safety Representatives Weekly OPG/JV day meeting where safety events or issues are dicussed and tracked SCR's are entered for significant events or occurances; list can be provided if required							
			Outage Window	**Window Description**													
			000	000 – No Window Related													
14680	Vault Periscope scanner head becomes further degraded	[Execution Phase] Event: During the RFR Bulk Interferences windows, the Vault Periscope scanning head is to be removed, stored and re-installed. The Vault Periscope is currently known to have a damaged seal and not have full range of movement. The Vault Periscope Scanning head may become further degraded during removal and reinstallation process. Cause: The OEM for this equipment is now no longer able to support replacement of the part in question. Performance Engineering - Fuel Handling, is currently in discussions with OEM for refurbishment of the scanning head and performing minor repairs if required. Impact: If the Vault periscope Scanning head is further degraded, a system required by Fuel Handling may be less functional than before.	2	Active	Jeffrey Palmateer	Tony Wong	15-Feb-17	Mitigate	07-Apr-19	4	2	1	8	1	2	1	2
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			9057	In Progress	Oversee station fuel handling establishment of scanner head refurbishment contract	Oversee station fuel handling establishment of scanner head refurbishment contract.	Jeffrey Palmateer	Tony Wong	12-May-17	22NOV2016: Station in discussion with Raytheon to perform testing of scanner head on DNGS site. JV in discussions with Station regarding FH setup of rubber area where scanner head will be stored after it is removed and prior to reinstallation. See attached email 17NOV2016. 16JAN2017: [redacted] FH is looking into alternate viewing technologies which will be installed in a subsequent (not U2 refurb) outage. Station FH has requested that if required, JV still to help facilitate hand-off of components to FH for testing/refurbishment. See attached email 10JAN2017. 31JAN2017: Update action due date as Periscope removal is now scheduled to start May 4, 2017.							
			Outage Window	**Window Description**													
			027	027 - Bulk Interferences Removals													
			173	173 - RFR- Bulk Interference Removal													

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
15116	Analysis shows Calandria Vessel Fatigue Usage due to Increased Feeder/FC Loads	Event: Higher loads (from original analysis) have created a fatigue usage on the vessel not previously registered by OPG. The original analysis documented that the Calandria Shield Tank Assembly (CSTA) was exempted from detailed fatigue analysis based on the methods of NC-3219.2 per ASME Sec. III 1977, including summer 1977 addendum. OPG would require the ANSYS model to either: demonstrate in greater detail that the CSTA remains exempt from detailed fatigue analysis, or address reactor transients throughout the extended life of the CSTA. Cause: The stress analysis performed during refurbishment has shown increased loads throughout the Feeder and Fuel Channel Assemblies. These higher loads are being transferred into the CSTA. The increased mechanical load stresses have been shown to meet code allowable stresses and at current, would enable design registration of the CSTA with the TSSA in support of refurbishment. Impact: If the design is not registered with the TSSA as-is (showing fatigue usage), the RFR project may continue to fabricate, ship and install calandria tubes (CT) as a CRN has been obtained from the TSSA for the updated CT drawing and TS. However, a finalized design report must be submitted to the TSSA prior to re-start of the unit. Prior to re-start is conservative as the existing submitted report is still a valid design basis for the retubed configuration but a point in time post-re-start exists when FCs have crept axially to a particular length that the current report is not a sufficient basis and requires updated to account for the higher loads at that time. Final CRNs have been obtained for all portions of the Feeder Piping assembly. Therefore, this issue has no impact on manufacturing or installation of feeder related items. A final CRN has been obtained for the Calandria Tube material TS update. Therefore, this issue has no impact on manufacturing or installation of calandria tubes. However, this final CRN must now be revised/updated	2	Active	Chad Da Maren	Andre Sidiropoulos	23-Feb-17	Mitigate	31-May-17	4	2	1	8	3	1	1	3

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
9983	Draft	Obtain Executive Concurence to Register Calandria Vessel Registration Update As-Is	Higher stresses on the End Shields have created a fatigue usage on the vessel not previously registered by OPG. The original analysis documented that the vessel assembly was exempted from detailed fatigue analysis based on the methods of NC-3219.2 per ASME Sec. III 1977, including summer 1977 addendum. If the design is registered with the TSSA as-is (showing fatigue usage), OPG program owner's for LCMP & PIP will need to re-review the design package and determine impacts on their programs. OPG Sr. Management concurrence is sought prior to proceeding with registration.	Chad Da Maren	Andre Sidiropoulos	17-Feb-17	
9984	Draft	Obtain Stress Analysis model/inputs for Calandria Vessel Analysis	Engage supply chain/contracts management in investigating if OPG has the rights to the model/inputs based on commercial agreement in place with Joint Venture for specific scope of work. If OPG has rights to the model/inputs, request them from Joint Venture.	Chad Da Maren	Andre Sidiropoulos	17-Feb-17	

Outage Window	Window Description
080	080 - Fill Calandria

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
12254	Installation Delays due to Assessment Issues [Window 64, 70]	Event: JV CWP's do not address the field configurations, ITP's and materials. Cause: RFR quality of assessment is less than adequate. Impact: Poor quality assessment could lead to installation issues which would have an impact on both cost and schedule.	1	Active	Roy Brown	Samad Kasaai	03-Mar-17	Mitigate	30-Nov-16	2	2	3	6	2	1	2	4

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
12254	Installation Delays due to Assessment Issues [Window 64, 70]	Event: JV CWP's do not address the field configurations, ITP's and materials. Cause: RFR quality of assessment is less than adequate. Impact: Poor quality assessment could lead to installation issues which would have an impact on both cost and schedule.	2694	In Progress	Actions to avoid cost and schedule impact due to unidentified structural members in front of vault coils	Investigation into potential interferences prior to commencement of field work.	Marc Paiment	Tony Wong	28-Feb-17								

Feb 4, 2015: will be included in installation planning by JV.
Sept. 18/15: Project is co-ordinating a vault walkdown for JV staff to verify installation methodology and any potential interefence issues. A walkdown was attempted earlier in 2015, but JV staff were not given access to the specific locations required. A further walkdown is planned during Q3.
Feb 2016: Project provided feedback to JV in 2015 that Vault Cooler frames can be temporarily removed to allow coil removal and replacement. JV would need to prepare a weld package to document the frame removal and re-installation. OPG has requested that this be addressed as part of the CWP preparation.
May 30/16: JV has prepared CWP's based on removing/installing coils without any significant removal of interferences from the external area of the coils. This will utilize rigging/scaffolding to maneurvre the coils with the ACU enclosure to facilitate the removal/installation process. Further review will be completed as the CWP's are finalized.
Sept. 27/16: Project has not received the finalized CWP's. Action extended.
Nov. 22/16: CWPs to be finalized Dec 15, 2017, with TCD for DF2 sign-off in Jan 2017. Action extended. JV foreman has also committed to walkdown of area at next window of opportunity now that their is Vault Access during the defuel window.
Jan 6, 2017: Action extended as CWP finalization date for West Side ACUs is now Jan 30, 2017. East Side ACU CWPs to be finalized upon completion of work in West Side to capture any relevant OPEX.
31JAN2017: Action extended as CWP finalization date for West Side ACUs is now Feb 28, 2017. East Side ACU CWPs to be finalized upon completion of work in West Side to capture any relevant OPEX.

5735	In Progress	Mitigation of Assessment Risk for Vault Cooler CWPs	OPG to work collaboratively with contractor in preparation and review of CWPs and schedule to ensure installation does not delay project completion. Support to include obtaining all available technical information (drawings, manufacturers manuals, etc.), obtaining input from station and Refurb SME's, and facilitating any required walkdowns.	Sorin Marinescu	Greg Maggs	28-Feb-17		

May 30/16: Project has provided significant amount of OPEX and drawings/photos to the vendor (Aecon). CWP's have been updated to incorporate this information, and further reviews/validations are in progress for completion of the R0 CWP's.
Sept. 27/16: Action extended. Project has not received updated CWP's.

Outage Window	Window Description
003	003 - Secondary Side SG Layup
064	064 - West Side: Vault ACU Replacements
070	070 - East Side: Vault ACU Replacements

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13329	Claims from Retube and Feeder Replacement (RFR) Vendor Not already Covered in the Contract [000 - No Window Related]	Execution Phase: As a result of OPG not meeting its obligations, there are risks of the RFR vendor making claims for additional costs, cost claim from schedule delay not covered in the Contract, in the Execution Phase. Note: there is a similar risk for Definition Phase (risk #12214).	1	Active	Roy Brown	Cameron Macleod	27-Feb-17	Monitor	01-Jan-26	2	3	1	6	2	3	1	6
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13394	Vault Cooler Scope Change [Window 64, 70]	Event: Station mandates that the split coil design is used for the Vault Cooler refurbishment Cause: Revised split coil design hasbeen partially implemented in the station. Decision may be made to change over to the new design. Impact: There would be an impact on both cost and schedule if the split ocil design were mandated as it would have to be processed as a project scope change.	2	Active	Roy Brown	Peter Frisina	03-Mar-17	Monitor	31-Jul-18	3	2	1	6	3	2	1	6
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			5236	In Progress	Incorporation of Split Coil Design Into Vault Cooler Installation	1) Project to monitor status of station initiative to implement the split coil design. 2) Project to initiate a project change directive if split coil design is implemented by station and brought into Refurb scope. Split coil would be used in selected locations dependent on removal/installation interferences.3) Project to submit PCD to JV for cost and schedule impact, contingency to be utilized.	Sorin Marinescu	Greg Maggs	30-Jun-18							
			Outage Window		**Window Description**												
			064		064 - West Side: Vault ACU Replacements												
			070		070 - East Side: Vault ACU Replacements												
14016	Toolset Modification due to Station Status Documents for Units 1, 3 & 4	[Execution] Event: There is a risk that Station Status Documents (SSD) for units 1,3,4 will reveal anomalies that challenge tooling design or MOD packages. Cause: The station status documents were generated for Unit 2. Upon review of the station status documents, there were anomalies identified that challenged the tooling design which had to be accounted for. The SSD documents for Units 1,3 and 4 are not complete. Impact: Modifications to the toolset or MOD packages may be required. The cost of completion of the station status documents for Units 1,3,4 are considered in the class II estimate. However, the cost of any modifications to the tooling or MODs is unknown.	3	Active	Michael Hersch		23-Feb-17	Monitor	01-Jan-19	3	2	2	6	3	2	2	6
			Outage Window		**Window Description**												
			112		112 - PT Sever												
			113		113 - Sever Bellows												
			114		114 - End Fitting Removal												
			115		115 - Pressure Tube Removal												
			116		116 - CTI Removal												
			117		117 - CT Removal												
			118		118 - CT Install Series												
			119		119 - Fuel Channel Install Series												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14136	RFR Schedule assumptions for reduced RPPE	EVENT: There is a risk that the transition from wearing Plastic Suits inside the vault for RFR work to no plastic suits after bulkhead installation, commissioning and testing is complete will not be planned and communicated to all workers in a timely manner. CAUSE: The RFR project schedule currently recognizes a large portion of work that requires the use of plastic suits. The transition from plastic suits to reduced requirements on RPPE (such as plastic suits) is a process that will require sustained radiological sampling to demonstrate the requirements and risk for plastic suits is no longer necessary. Currently, there is no planned approach and strategy for the relaxation of RPPE post bulkhead commissioning. IMPACT: The schedule and the assumptions made from the project need to be aware and reflect these requirements to ensure a smooth transition with minimal delays is achievable.	2	Active	Johnathon Hash	Ian Edwards	15-Feb-17	Mitigate	01-Jul-17	2	2	3	6	2	2	2	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14136	RFR Schedule assumptions for reduced RPPE	EVENT: There is a risk that the transition from wearing Plastic Suits inside the vault for RFR work to no plastic suits after bulkhead installation, commissioning and testing is complete will not be planned and communicated to all workers in a timely manner. CAUSE: The RFR project schedule currently recognizes a large portion of work that requires the use of plastic suits. The transition from plastic suits to reduced requirements on RPPE (such as plastic suits) is a process that will require sustained radiological sampling to demonstrate the requirements and risk for plastic suits is no longer necessary. Currently, there is no planned approach and strategy for the relaxation of RPPE post bulkhead commissioning. IMPACT: The schedule and the assumptions made from the project need to be aware and reflect these requirements to ensure a smooth transition with minimal delays is achievable.	6924	In Progress	Create and Document Sampling Requirements to Support the Reduction of Required RPPE inside Vault	The action here is for RP to document the sampling requirements and the subsequent results which would enable a planned transition to reduced RPPE. The secondary piece is documenting the sustaining survey requirements to remain in reduced RPPE or to continue to track RPPE reduction pathways. RP owns the documentation and the surveys required to reduce and maintain (to characterize and monitor for change of conditions). The documented path can be achieved by end of August. RP is still working on the sampling / routine survey plans among other critical items which will influence this process. Ultimately, decisions will be based on N-PROC-RA-0025 "Selection of Radiation Personal Protective Equipment"	Johnathon Hash	Ian Edwards	30-Jun-17									(10 Aug; JJ) Development plans for a strategy to enable a planned transition to reduced RPPE requirements for work inside the vault is in progress. (Sep 13; JJ) Initiated discussions with HPD (Joe Zic) to share with them a proposal from Supply Chain (Julian Read) that Supply Chain can approach several potential vendors that manufacture PAPRs to obtain interest in providing OPG with PAPRs that meet RP's Technical Specifications for a PAPR. The vendors can perform the required tests to meet the specs. HPD had no problem with the proposal, however, HPD indicated that they will still need to test and qualify each PAPR to determine if it meets spec before approving it for OPG use. Next steps: (1) Provide tech spec to Supply Chain. (2) for the 2 PAPRs that have been test and approved for OPG use, explore what the use lifecycle management program will look like for these PAPRs. Based on OPEX from the Bruce, the PAPRs were fairly high maintenance and high care items. FYI...PAPRs are being considered by OPG RP as an alternative to Plastic Suit for work requiring a plastic suit (ex: alpha level 3 areas, high airborne contamination areas). As for sampling requirements, NR-RP will deploy appropriate and specific semi-portable instrumentation (ex: iCAMs) to measure area concentration levels of airborne contamination in specific locations to ensure both workers in the local area and outside the local area are well protected from all RP hazards. These monitoring instruments will be mandatory for certain work and will be stipulated in the Radiation Protection Execution Guides (RPEGs) for each window series. In addition to airborne monitoring, smears of equipment surfaces will be performed and analyzed upon system opening to ensure that workers RPPE are selected in accordance with the best available hazards analysis values. The current RP Program will be adhered to for work planning and execution, with specific focus on proven exposure/contamination control methodologies.

Outage Window	Window Description
013	013 - PHT Bulk Drain
023	023 - Install Bulkheads
024	024 - Containment Pre Test, Achieve Dew Point & Containment Test
027	027 - Bulk Interferences Removals
029	029 - HTS Vac Dry

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14517	Difficulty Accepting Findings of Calandria Vessel Inspection	Event: There is a risk that findings of the Calandria Vessel inspection may be difficult to accept without being able to rely on a reference sample of acceptable indications. Cause: While acceptance criteria are defined, it will not be possible to take moulds (replicas) of potential indications. Therefore, it may be difficult to judge acceptability based on visual images only. Impact: This could result in the accountable inspection acceptance authority requesting additional inspection be performed, impacting project critical path.	1	Active	David Kurpjuweit	Andre Sidiropoulos	27-Feb-17	Mitigate	25-May-17	2	1	3	6	1	1	3	3

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
9072	Draft	Calandria vessel inspection results	Obtain calandria vessel inspection results from other retube campaigns to be used for training and a baseline for inspections.	Ken Brown		01-Mar-17	
9073	Draft	Calandria Vessel inspection procedure	Review calandria vessel inspection procedures with the contractor and identify ambiguous areas for further development.	David Kurpjuweit		01-Mar-17	

Outage Window	Window Description
074	074 - Calandria Inspection

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14850	Annulus Spacer Retrieval resulting in Contamination of Retube Platform	[Execution Phase] Event: An inordinate amount of time to be spent in decontaminating the Retube Tooling platform prior to re-commencement of the EF flask series. In addition, PCD-14 requires that original activated shield plugs be swapped for new shield plugs in parallel with establishment of the vault crane maintenance window 015. Cause: If the PHT Vacuum dry process elevates the loose contamination levels of internal PHT components that will be handled during this portion of the annulus spacer retrieval. In addition, the annulus spacer retrieval tool has been based upon the current design of the tool used during regular SFCR campaigns – the last (and only) annulus spacer retrieval tool was modified based upon CIGAR data that was obtained just previous to the execution of reactor face work. New CIGAR data will NOT be available for the 6 channels that are going to be the subject of the annulus spacer retrieval during Unit 2 Refurb – all available OPEX has been applied to the design of the ASRT cartridges being used for Refurb BUT there still exists the risk that extrapolated data by which the design has been based upon, may be in error leading to ASRT cartridge failure in channel. Impact: Delays on the critical path schedule which can be mitigated by progressive decontamination steps an increased radiation protection surveillance during annulus spacer execution. If OPG F/H cannot complete the swap for new shield plugs in parallel, then there could be a push to the Refurb critical path duration in the order of 6 to 12 hours.		Active	Michael Hersch	Martin Geary	27-Feb-17	Monitor	31-Aug-17	3	1	2	6	1	1	1	1

Outage Window	Window Description
114	114 - End Fitting Removal

There are no Draft, Not Started, In Progress Actions associated with the risk.

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
15193	Production items/materials scrapped due to failure of Pre-Production Qualification	Event: There is a risk that production item(s) and/or material (s) may be scrapped if a supplier fails to pass pre-production qualification (PPQ). Cause: In limited cases, suppliers have been granted approval to begin production manufacturing prior to the close-out of PPQ. This approval has been granted by the JV following OPG's Acceptance of a Design Deviation Requests (DDRs) from the applicable requirement within OSM technical specification(s). The basis of these case-by-case Acceptances has been that production may commence as long as production manufacturing does not proceed past an accepted/approved PPQ step. The intention of permitting the start of production is to mitigate the higher risk of suppliers failing to deliver production items/materials in time to support the RFR execution schedule. This risk is intended to document the residual risk of allowing production to commence prior to PPQ close-out. Impact: In the event that a supplier fails PPQ but has already commenced production under an Accepted DDR, the supplier remains accountable contractually for the cost implications of scrapped production item(s)/material(s). The schedule risk tied to suppliers failing PPQ, regardless of whether or not production has commenced, is generically assessed below.	1	Active	Chad Da Maren		23-Feb-17	Monitor	01-May-19	1	1	5	5	1	1	5	5
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
11150	[QUARTERLY MONITORING] Risk of Vendor Default/Business Continuity [000 - No Window Related]	Execution Phase: Event: the vendor is unable to meet the contractual obligation Cause: Vendor default. Impact: It may have negative impacts on cost and schedule to rorganize the teams to continue RFR project.	3	Active	Roy Brown	Cameron Macleod	27-Feb-17	Monitor	01-Jan-26	1	2	4	4	1	2	4	4
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13325	[QUARTERLY MONITORING] Concealed Conditions [000 - No Window Related]	Execution Phase: Due to uncontrolled and unknown conditions inside the vault, especially, those inside the reactor, 4.8 Concealed Conditions Section of the EPC Agreement explains the condition and the contract terms of concealed condition, which can have cost and schedule impacts on Execution Phase. The examples of Concealed Conditions include, but not limited to:- CTSB Inspection Results;- Feeder nozzle found unsatisfactory;- Calandria tube contacting horizontal flux detector when they are moved;- As-built configurations vary from design and drawings, while laser scan and walk down etc. did not identify the variations and the JV had done everything possible;- Permanent bulkhead unexpected repairs identified during NDE;- Unexpected deficiencies of existing EPs in shutdown cooling rooms, after due diligence of JV exercised;- As-found "original construction" feeder flaws uncovered, after JV verification completes but could not identify those feeder flaws earlier;- Unexpected changes to containment boundary from OPG/other vendors may cause interruption to containment isolation pressure test;- Calandria Vessel discovery work requiring new tool and new method to remove the discovery materials;- PT factures longitudinally, resulting in jagged end on the PT	1	Active	Roy Brown	Jeffrey Palmateer	03-Mar-17	Accept	01-Jan-26	1	3	4	4	1	3	4	4
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13397	Execution delays due to quality or fit-up of vault cooler components results in impact to cost and schedule [Window 64, 70]	Event: Vault Cooler components found to have quality issues making it necessary to perform re-work during installation. Cause: Quality or fit-up issues with Vault Cooler components. Impact: Both cost and schedule would be impacted if re-work had to be performed on the Vault Coolers.		Active	Roy Brown	Peter Frisina	03-Mar-17	Mitigate	31-May-17	2	1	2	4	1	1	2	2
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			5736	In Progress	Mitigation of Material Procurement Risk, Vault Coolers	Project to work collaboratively with Supply Chain to implement an oversight plan for material procurement to ensure that OPG quality Assurance requirements are met.	Sorin Marinescu	Greg Maggs	31-May-17								
			Outage Window		**Window Description**												
			064		064 - West Side: Vault ACU Replacements												
			070		070 - East Side: Vault ACU Replacements												

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13399	Vault Cooler Cat ID exceptions due to changes in material/design results in cost impact to material procurement [No Windows Related]	Event: Significant Cat ID tech specs, or drawings exceptions are found for vault cooler components. Cause: Changes in the material or design by the bendor since the original Cat ID was created Impact: Increased cost due to material/design changes	2	Active	Roy Brown	Peter Frisina	03-Mar-17	Mitigate	17-Aug-17	2	2	2	4	1	2	2	2

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
5237	In Progress	Strategy to Address Potential Cat ID Exceptions, Vault Coolers	Current vendor quotes do not include significant exceptions. Exceptions identified at time of procurement would need to be evaluated by Plant Design. Project would need to incorporate any additional costs via contingency.	Sorin Marinescu	Greg Maggs	28-Jul-17	A significant number of exceptions were encountered during the RFQ process for the Vault Cooler motors. The PO issuance is pending, the project needs to review the pricing and reconcile against approved funding for these components (from Gate 3/RQE). Aug. 31/16: Vault cooler motor PO was issued, there is no significant impact to Gate 3/RQE costs currently. There could be an issue if motor production fall behind schedule and expediting fees required. To be monitored during Q3/4 2016. 25Oct2016: PO's have been issued for both Vault Cooler motors and ACU coils. Action to be tracked through the procurement phase to address any cost impacts. 28NOV2016: Authorization to start fabrication on motors still pending. Costs impacts to be determined pending resolution of engineering/QA comments.

Outage Window	Window Description
000	000 – No Window Related

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13422	RE-work and re-installation caused by Quality Issues with RAB Ball screws impacting both project Cost and Schedule [Window 82]	Event: Quality issues with RAB Ball screws are discovered during installation and/or commissioning. Cause: Fabrication quality or fit-up issues with Ball Screws. Impact: Both cost and schedule would be impacted as re-work and re-installation would be required.	2	Active	Roy Brown	Samad Kasaai	03-Mar-17	Mitigate	31-May-18	2	1	2	4	1	1	2	2

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
5176	In Progress	Ball Screws QA to Ensure Quality	The project to implement any additional required oversight identified to minimize installation risks for the ball screw assemblies. This will include ensuring that OPG Supply Chain Quality Assurance is in place during fabrication to ensure all dimensional and quality requirements are met. This is based on past OPEX from Candu refurbishments that had issues with replacement ball screws. Also, following removal of the existing ball screws, maintain them in storage as a back-up option.	Sorin Marinescu	Greg Maggs	31-May-18	
5716	In Progress	Review of Quality Assurance Requirements with focus on RAB Ball Screws	The project will work with Supply Chain to review the Quality Assurance requirements, with a particular focus on RAB Ball Screws.	Sorin Marinescu	Greg Maggs	28-Feb-17	MITP preparation for the Ball Screws is in progress. Project will work with Supply Chain to ensure QA and oversight requirements are met.
9617	Not Started	Existing Ball Screw Storage	Confirm with JV that ?the existing ball-screw is being carefully removed and properly stored	Samad Kasaai		28-Dec-16	

Outage Window	Window Description
082	082 - RTP Removals, Bridge Replacement

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13442	Delays during PHT Vac Dry Process	Execution Phase Risk. Event: PHT Bulk Vacuum Drying window may experience delays in reaching successful completion of PHT vac dry defined by parameters: dew point at PHT suction of -10C, and less than 50Kg for 24hrs of collection in PHT vac dry skid, and 120 Mg of collection. Cause : There are 3 postulated causes: Tooling (PHT Vac dry skid) failures leading to delays - this risk has been successfully mitigated, see closure notes in comments. (Tooling) Challenges to heat PHT envelope for vac dry to assist evaporation and flow (Heating). Challenges to maintain moisture seal of PHT envelope for vac dry (Leaks). In addition, the following logistical concerns are raised through program risk 919 EC not signed, WPL not complete. REFURB Level 1 logic not correctly aligned(conflict between OPG and Vendor ties in schedule). Impact: Potential for delays to critical path since PHT vac dry is near critical path.	2	Active	Jeffrey Palmateer	Samad Kasaai	03-Mar-17	Monitor	28-Apr-17	1	1	4	4	1	1	4	4
			Outage Window		**Window Description**												
			029		029 - HTS Vac Dry												
			910		910 - RFR Series Tooling												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13555	Extra Bellows Need Replacement - all units	[Execution Phase] Event: Not enough spare bellows for Unit 2 Cause: During bellows inspection it is possible to find legacy damage to bellows or during construction bellows may be damaged Impact: If bellow damages require replacement above the number of spares planned, there will be a critical path delay and project costs incurred.	1	Active	Chad Da Maren	Cole Stark	23-Feb-17	Mitigate	01-Sep-17	1	1	4	4	1	1	2	2
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			8256	In Progress	Convert Original Spare Bellows to RFR Design	Once drawing update is complete: generate PO, review incoming bid, award work and oversee conversion efforts.	Cole Stark		01-Jul-17	7Mar2017- Procurement seeking 3 bids for work. 6Oct2016 Drawing will be updated by Oct 12. Scope of work development to follow. 18Oct2016 Drawing will be updated and Issued by CANDU by Oct 21, Scope of work development to follow. 1Nov2016 Drawing was updated and issued by CANDU and accepted by OPG, draft scope of work prepared and under review. 15Nov2016 Due date changed to end of January due to other priorities. 29NOV2016: Bellows conversion TS/Code gap reconciliation and scope of work have been finalized. The next step is to secure funding and issue a purchase order to a machine shop to perform a production run of the conversion. 13Dec2016: SOW completed and approved. OPG-FORM-0214 is in process. 20DEC2016: OPG-FORM-0214 preparation remains in-progress. CCF must be prepared for budgeted cost. 24Jan2017: DRAS completed, in process of completing OPG-FORM-0214. 23Feb2017: Targeting to get the RFP out by the end of March 2017.			
			Outage Window		**Window Description**												
			072		072 - Bellows Inspections												

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14319	Spread of Contamination during RFR Waste Processing of crushed PT (possible similar risks to EF/CT/CTI)	Execution Phase Risk: EVENT: There is a residual risks that that there will be spread of loose contamination in the RFR WTS and RWPB, with negative impacts on the schedule and worker dose due to need to cleanup. This residual risks remains despite best practices in RFR WTS design and procedures. CAUSE: This risk is postulated to occur by loose contamination being spread from the PT chute that links the VRS press to the RWC debris cover. There is a 'O-ring' like barrier that seals the connection between the chute and RWC debris cover during PT crushing, however when the chute is retracted, it is speculated that some of the fine particles in the chute would become loose and spread beyond this ring. By design, it is expected that the 'dirty' pins on the WTS lidding station will become contaminated over time as they lift the debris cover. there are separate 'clean' pins for lidding the RWC lids. However, it is speculated that the partly contaminated debris cover will be lifted over clean RWC lids and transfer some of this loose contamination to the clean lids, therefore requiring cleanup. Note that this lidding station is contained inside a large concrete bunker so direct beams are not a concern. IMPACT: Based on OPEX with a similar WTS VRS press used at Lepreau Refurbishment - when PTs were crushed, the loose contamination led to high dose rates in the vault that required significant cleanup. For RFR, the negative impact would be on the schedule for PT removal and worker dose due to need to cleanup loose contamination.	3	Active	Michael Hersch	Sean Carpenay	27-Feb-17	Monitor	15-Nov-17	2	1	2	4	2	1	2	4
			Outage Window		**Window Description**												
			114		114 - End Fitting Removal												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14516	Poor Imagery Results in Repeated Inspections during Calandria Vessel Inspection	Event: Poor imagery from the Calandria Vessel Inspection may cause the accountable inspection acceptance authority to mandate that particular inspections be repeated. Cause: If the accountable inspection acceptance authority is not present to accept inspection images live-time in the RCC, they may ask that particular inspections be repeated if collected images do not give them the necessary clarity to accept the inspection results. Impact: This would impact critical path activities during the execution of the Retube and Feeder Replacement project.	1	Active	David Kurpjuweit	David Kurpjuweit	27-Feb-17	Monitor	25-May-17	1	1	3	3	1	1	3	3
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			9074	In Progress	CVI inspection Training	OPG to identify who will be the accepting authority for the CVI results and have that individual participate in training activities for the series. Memo to be prepared to delineate OPG vs JV responsibilities.	David Kurpjuweit		01-May-17								
			Outage Window		**Window Description**												
			074		074 - Calandria Inspection												
14561	Discovery of Work During Installation of Junctions Boxes, Causing Both Cost and Schedule Impacts [Work Windows 38 & 82]	Event: Additional work discovered during removal and installation of RAB&C. Cause: Dose over equipment lifetime causes unforeseen failures and requires replacement or repairs. Impact: Schedule could be impacted and the cost of procuring materials required would impact cost and schedule.		Active	Roy Brown	Samad Kasaai	03-Mar-17	Mitigate	15-Aug-26	3	1	1	3	3	1	1	3
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			7958	In Progress	Add Junction Boxes to Reactor Area Bridge and Carriage Refurbishment Scope	A DRAS will be created to add junction box replacement to the scope of the Reactor Area Bridge and Carriage project to ensure all components potentially impacted by radiation exposure are replaced. If approved funding would be transferred along with the scope to cover the replacement.	Sorin Marinescu	Greg Maggs	31-Mar-17	24Jan2017: DRAS has been prepared and submitted to project PM (RFR). Currently waiting for feedback from RFR to proceed.							
			Outage Window		**Window Description**												
			038		038 - Moderator Drained & Flush												
			082		082 - RTP Removals, Bridge Replacement												
14865	Feeder Thermowell Adaptor Schedule may not support Construction Activities	Event: Final working Feeder instrumentation and controls fabrication schedule may not meet the needs of corresponding construction activities. Cause: Delays during procurement efforts causing vendor inability to meet project deadlines are possible causes. Impact: Delay to feeder fabrication and/or construction activities.	4	Active	Chad Da Maren	Cole Stark	23-Feb-17	Mitigate	01-Feb-18	3	1	1	3	2	1	1	2
			Outage Window		**Window Description**												
			180		180 - Upper Feeder Prep												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
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Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
11476	[QUARTERLY MONITORING] Insufficient Tooling Intellectual Property Escrow	Execution Phase Event: Inability to tackle a Tooling technical issue may occur during the Definition / Execution phases Cause: As a result of Incomplete Engineering Package filing and insufficient documentation of software tools in Intellectual Property (IP)Escrow, combined with a contractor default. Impact:: Negative effects on * RFR schedule * RFR cost	2	Active	Michael Hersch	Martin Geary	27-Feb-17	Monitor	01-Jan-27	1	2	2	2	1	2	2	2

Outage Window	Window Description
071	071 - Trial CT Install
114	114 - End Fitting Removal
115	115 - Pressure Tube Removal
116	116 - CTI Removal
117	117 - CT Removal
118	118 - CT Install Series
119	119 - Fuel Channel Install Series
184	184 - RFR-Waste Volume Reduction

There are no Draft, Not Started, In Progress Actions associated with the risk.

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
12428	[QUARTERLY MONITORING] OPG Foreign Material Exclusion (FME) Events Concealed	Execution Phase: Events: FME items sitting inside Concealed Areas that cannot be discovered/identified in Walkdowns may occur during RFR work in Execution Phase Cause: As a result of historical FME events, Impact: Additional inspection / repair activities with negative impacts to * RFR cost * RFR schedule SCR; N-2015-19073 - RFR – Lack of FME Program was filed to identifiy the lack of FME currently in place as practice. For trending; N-2015-22746 - RFR Tooling shipped to DEC from manufacture with visable Foreign Material JV will issue REV-0 of the FME plan as per the meeting on Nov 4th with planning manager - Sebastian Wojewoda. Follow-up by Gerard Edison with JV SME indicated that incororpoartion of comments have been completed and issue date TBD by JV. The JV will require an approved FME plan for the standby plan that has been approved and issued.	3	Active	Roy Brown	Jeffrey Palmateer	03-Mar-17	Accept	01-Jan-26	1	2	2	2	1	2	2	2

Outage Window	Window Description
045	045 - Nozzle Inspection & Weld Preparation
074	074 - Calandria Inspection

There are no Draft, Not Started, In Progress Actions associated with the risk.

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13336	[QUARTERLY MONITORING] Calandria TubeSheet Bore (CTSB) Needs to be Milled	Execution Phase: Event: Calandria Tube Sheet Bore needs to be milledCause: If CTSB is gouged or scratched during the CT Removal, Impact: Negative impacts on Execution schedule.	1	Active	Michael Hersch	Martin Geary	27-Feb-17	Transfer	01-May-18	1	1	2	2	1	1	2	2

Outage Window	Window Description
149	149 - Tubesheet Bore Cleaning

There are no Draft, Not Started, In Progress Actions associated with the risk.

ID	Risk Title	Risk Description		Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13425	RAB Cat ID Exceptions due to changes in material/design results in a cost impact to material procurement [Window 82]	Event: Significant Cat ID tech specs, or drawings exceptions are found for RAB Components. Cause: Changes in the material or design by the vendor since the original Cat ID had been created. Impact: Increased cost due to material/design changes being required.		Active	Roy Brown	Samad Kasaai	03-Mar-17	Mitigate	31-May-18	1	2	1	2	1	1	1	1

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
5715	In Progress	Mitigate Impact to Schedule and Cost Due to Potential Exceptions to Cat ID	Project to work with Supply Chain and Procurement Engineering during procurement process, to assess any Cat ID exceptions identified. Mitigating activities will be determined and the project will then work with Supply Chain to implement actions to mitigate the issues. Ex 1: Design acceptance of deviations. Ex 2: Use of premium time with vendor as required to address exceptions.	Sorin Marinescu	Greg Maggs	31-May-17	

Outage Window	Window Description
082	082 - RTP Removals, Bridge Replacement

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13560	[QUARTERLY MONITORING] Unforeseen Challenges / Complications in installing re-designed components	Execution Phase: Event: Unforeseen challenges / complications in installation of re-designed items may occur Cause: Due to re-design of components such as End Fitting Closure Plugs and Garter Spring Spacers, Impact: Negative impacts on Execution Phase cost and schedule.		Active	Ken Brown	Jeffrey Palmateer	03-Mar-17	Mitigate	15-Oct-16	1	1	2	2	1	1	2	2

Outage Window	Window Description
119	119 - Fuel Channel Install Series

There are no Draft, Not Started, In Progress Actions associated with the risk.

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

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Data Refreshed: 07-Mar-17 10:30 PM

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14897	Feeder Support schedule not supporting construction	Event: Final working Feeder supports schedule may not meet the needs of corresponding construction activities. Cause: Delays during procurement and fabrication efforts causing vendor inability to meet project deadlines are possible causes. Impact: Delay to construction activities.	4	Active	Chad Da Maren	Cole Stark	23-Feb-17	Monitor	30-Apr-18	1	1	2	2	1	1	2	2
			Outage Window		**Window Description**												
			180		180 - Upper Feeder Prep												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14937	Defective Work Performed by JV (Rework)	Event: During Execution, there is a risk that defective work will be performed by the JV and may not be discovered by OPG Cause: One of the causes of risk activation is deviating from approved procedures or accepted work practices. Impact: This results in Costs that are not-recoverable or re-claimed.	1	Active	Jeffrey Palmateer	Joseph Lefebvre	24-Feb-17	Monitor	19-Oct-26	1	2	1	2	1	2	1	2
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			9483	In Progress	OPG NDE Oversight / Review of vendors and sub contractors NDE procedures	OPG project oversight will be involved in the procedure review prior to application by competent certified CGSB level II personnel. OPG project oversight will also be performing oversight for the lifecycle of the execution on feeder welding. Knowing that the review of procedures and inspection oversight will be performed by competent personnel will satisfy the questionability.	Joseph Lefebvre	Joel Phair	30-Apr-17	13JAN2017 (Joe Lefebvre): Vendor NDE procedures are undergoing review by project personnel with support from IMS (TCD: 30 March 2017) Oversight plans are being prepared to identify strategic inspection and review (TCD: 30 April 2017)							

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
149327	Defective Work Performed by JV (Rework)	Event: During Execution, there is a risk that defective work will be performed by the JV and may not be discovered by OPG Cause: One of the causes of risk activation is deviating from approved procedures or accepted work practices. Impact: This results in Costs that are not-recoverable or re-claimed.	9574	In Progress	PAUT equipment, process and qualification of personnel	Oversight involvement/review of the PAUT equipment, process and qualification of personnel prior to the regulator demonstration will be included in the oversight plan specific to this work.	Joel Phair	Joel Phair	30-Apr-17								

Joel Phair - 01-30-2017
Bi-weekly PAUT/NDE meeting took place to update the status of the NDE vendor's progress related to schedule. The NDE vendor has shown a 20% increase in overall schedule progress since Dec 20, 2016. Key highlights include:

All task specific work plans (TSWP) and ITPs associated with the manufacture of calibration blocks have been accepted by the JV.
All drawings for the calibration blocks and flaw specimens have been submitted by the NDE/PAUT Vendor.
Expected date for the completion of all blocks and samples is Feb 14th, 2017.
Expectations moving forward:

Liquid Penetrant (LPI) procedure signed off and submitted to OPG for review and return for 02/03/2017.
Radiography (RT) procedure to be submitted to OPG by 02/10/2017.
UT thickness procedure expected to be submitted by the NDE vendor to the JV by 02/10/2017.
PAUT procedure to be updated once calibration blocks and flaw specimens are received and tested.
Joel Phair - 01-13-2017
Meeting with the CNSC took place in order to establish that OPG and the JV are on course for the qualification of the PAUT procedure as well as being prepared and ready for the performance demonstration (required for CNSC approval to use PAUT in lieu of radiography as per AMSE code case N-659-2) slated to take place in early May, 2017.
Nucleom slated to be on site again within the next week to begin working along side the welding PPQ program. This joint effort is designed to establish Nucleom's performance demonstration will as the same time, providing support to the welding PPQ program.
Joel Phair - 12-12-2016
NDE Vendor (Nucleom) arrived to the DEC to begin participating in preliminary testing of sample welds on sample feeder tubing (3.5", 3", 2.5", 2", 1.5") Technicians qualifications have been verified and certifications are up to date. JV NDE SPOC and JV training personnel are in the midst of providing/ensuring that appropriate training and CBT's are completed for tasks to be perf

Outage Window	Window Description
000	000 – No Window Related

Project: Retube and Feeder Replacement - 10000

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14650	Type A Overpack Packages required for Feeder Shipments within Low Level Waste Containers	[Execution Phase] Event:: RFR project has initiated a plan to procure newly designed LLW Type A overpack packages that LLW containers would be placed into for transportation shielding purposes Cause: Through waste planning and estimation the RWN process has identified that Feeders contained within LLW containers will meet Western Waste Management Facility (WWMF) storage acceptance criteria, however these LLW's may not meet Transportation regulations when shipped from DNGS to WWMF. Impact: The following are the impacts: OPG RP has provided extensive calculations noting the transportation requirements may not be met and as a result is included in the attachments Shielded Overpack will need to be designed, licensed, tested and fabricated There is a Financial Impact There is a Logistics Impact	2	Active	Ken Brown	Tara Dhekney	16-Feb-17	Mitigate	30-Apr-17	4	2	3	12	3	1	1	3

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
8371	In Progress	Implement Project Management on Overpack Design and Fabrication	Implement Project Management on Overpack Design and Fabrication Please see attached schedule of actions.	Ken Brown	Yung Cheung	15-Jul-17	T. Dhekney (23FEB2017): Project kickoff meeting with Candu took place on Feb. 21, 2017. Candu has advised that they expect to be able to provide 16 overpacks by early July (i.e. before the start of feeder removal series). Contingency plans for late delivery of the overpacks such as on-site storage in RWSB and loading of the feeder waste containers in an ISO-40 are in development. Tara D (16FEB2017): Detailed Engineering by Candu will commence based on letter to proceed. Due Date is changed to mid-july as per latest vendor schedule (based on feeder execution window). 2016-07-26 Cam W: The MOD design and preliminary engineering is underway, along with nuclear waste design engineering.

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14650	Type A Overpack Packages required for Feeder Shipments within Low Level Waste Containers	[Execution Phase] Event:: RFR project has initiated a plan to procure newly designed LLW Type A overpack packages that LLW containers would be placed into for transportation shielding purposes Cause: Through waste planning and estimation the RWN process has identified that Feeders contained within LLW containers will meet Western Waste Management Facility (WWMF) storage acceptance criteria, however these LLW's may not meet Transportation regulations when shipped from DNGS to WWMF. Impact: The following are the impacts: OPG RP has provided extensive calculations noting the transportation requirements may not be met and as a result is included in the attachments Shielded Overpack will need to be designed, licensed, tested and fabricated There is a Financial Impact There is a Logistics Impact	10056	In Progress	Assessing the feasibility of shipping feeders in an ISO 40 container in shielded pallets	An action has been created to assess the feasibility of shipping feeders in an ISO 40 trailer in shielded pallets. Currently, contingency planning is progressing with several alternatives assessed for transportation of the LLW containers, tracked in the attached spreadsheet. This action is to track the primary alternative option identified as a contingency option based on the assessed feasibility.	Tara Dhekney	Patrick Ho	15-Jul-17							

T. Dhekney 22FEB2017:
Plan B - Shielded pallet in an ISO-40:
The Refurb Waste SPOC conducted a feasibility study to assess if the shielded pallet could be loaded into an ISO-40 and proved the concept to be feasible. The team has performed a walkdown of the weather enclosure to look at constraints that might affect loading of an ISO-40. RFR, JV and Refurb Waste SPOC have met with Specialty Handling to discuss opportunities for equipment rentals to facilitate loading of the ISO-40 in the weather enclosure and it appears that the forklift elevator is not feasible given the space constraints in the weather enclosure. the Refurb Waste SPOC has secured the use of a modular ramp (borrowed from the station) for loading in the unzoned area adjacent to U0.

PLAN C - RWSB Temporary Storage
Waste Nuclear Safety has reached out to their preferred third party vendor to discuss an accelerated safety analysis of feeders in the RWSB. The vendor has provided an estimate for the work and RFR is working on securing the funds to get the PO issued.

16FEB207 (Tara D.): Looking at contingency options. They are

Onsite storage (performing nuclear safety assessment and discussing license amendments with CNSC - TCD April 30, 2017)
ISO 40: Trucks to be used in absence of overpacks of shielded Type A overpacks. (RMT group is procuring additional trucks to support RFR and running transportation logistics study to look at different feeder contingencies TCD: July 10, 2017 and Feb 28, 2017). For shielded pallets design and procurement, OPG has submitted Task Order request to third party vendor for shielding analysis (TCD: March 3 2017). Next step is to complete ARRAM
Loading location onsite (Looking at feasibility and weather enclosure TCD: April 30, 2017)

Outage Window	Window Description
042	042 - Feeder Removal

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14687	Interface for Discharging Primary HEPA Filters and VFF Filters into RWC	Execution Phase: Event: Waste processing cannot proceed to discharge filters. Cause: The commercial and contractual issues disrupting the progress of the design and testing of the interface Impact: Negative impact on schedule (work stopped)	3	Active	Ken Brown	Kwok Tsang	24-Feb-17	Monitor	30-Jun-17	3	1	4	12	1	1	1	1

Outage Window	Window Description
184	184 - RFR-Waste Volume Reduction

There are no Draft, Not Started, In Progress Actions associated with the risk.

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13266	Waste - ILW containers for non-standard waste streams	[Execution Phase] Event:: Gap in JV Planning for managing non standard ILW waste streams (VRS press, chute, and VRS/VFF filters) and miscellaneous ILW. Cause: There may be a requirement for ILW containers to be designed for some ILW that are not the standard waste stream. This is identified in the JV document, "RFR Waste Forecast Quarterly Update Report" (509407-0000-00000-40RA-0094) and the Radioactive Waste Notifications (RWN) for the waste streams of interest. Impact: Cost Impact Schedule Impact	3	Active	Tara Dhekney	Yung Cheung	15-Feb-17	Mitigate	31-Jul-16	3	3	2	9	1	1	1	1

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments

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13266	Waste - ILW containers for non-standard waste streams	[Execution Phase] Event:: Gap in JV Planning for managing non standard ILW waste streams (VRS press, chute, and VRS/VFF filters) and miscellaneous ILW. Cause: There may be a requirement for ILW containers to be designed for some ILW that are not the standard waste stream. This is identified in the JV document, "RFR Waste Forecast Quarterly Update Report" (509407-0000-00000-40RA-0094) and the Radioactive Waste Notifications (RWN) for the waste streams of interest. Impact: Cost Impact Schedule Impact	5929	In Progress	The plan for the VRS press and chute	The plan for the press and chute is: 1: Decontaminate in the WTS using CO2 blasting 2: Debris from CO2 blasting will go into a RWC/DSO assembly 3: Following decontamination, the press will be removed and placed in a "strong box". This "strong box" will either be stored on-site or off-site for approximately 10-15 years (after storage period, the press will be size reduced), or will be shipped to a decontamination facility for further decontamination and size reduction. For this plan to be viable, the following concerns will need to be addressed: 1: Impact of decontamination debris in the RWC/DSO assembly (long term storage) 2: Potential and impact of condensation build up during decontamination. There should be no water in the retube waste container. 3: Need specification of the proposed "strong box". At a minimum, this will still need to meet Minstry of Transportation requirements (tie-downs) for on-site transfer. 4: To confirm that the EA and licence of the RWSB can accept the new waste stream.	Yung Cheung	Yung Cheung	31-Mar-17								

25JAN2017: Action is being discussed weekly in the waste forecast meeting. Meeting minutes from 18-Jan have been attached with history of the updates on the action. The following is the latest update:
- No update on the potential 3rd party vendors. JV is still in the process of reaching out to the various vendors. -
The MOU was discussed. JV asked if information on the overpacks such as mass will be included in the MOU. OPG will provide the overpack technical specification document to the JV, so they can plan the overpack logistics.
Update as of November 15, 2016:
The LLW portion of the waste (Press and chute) has been approved by WWMF. THe plan is to place this in the LLWC (Cat ID: 539596) following 3rd party decontamination.
The ILW portion of the waste is pending. Waiting for NWDE to sign off forms.
CO2 blasting was observed at ATS with good results.
Update as of October 3, 2016:
Yung Cheung will be setup as the owner of this risk moving forward as she's interfacing with the JV regularly. Last correspondence was between Yung and Eric Freeman of NWDE asking for compliance verification. Yung will update this risk with her response to Eric.

From: FREEMAN Eric -NUCLEAR Sent: Friday, September 16, 2016 1:29 PMTo: CHEUNG Yung -NUCLEARCc: RAGUNATHAN Sangeeth -NUCLEAR; SATO Jim - NUCLEARSubject: RE: RWSB NWFRs Press & Chute COMPLETED

Yung,

Please let me know if the attached clarifications address the RFR Project's concerns about the acceptance conditions in the NWFRs for the Press and the Chute. If the clarifications are acceptable then I will work with Sangeeth to append the clarifications to the NWFRs.
Regards,

Eric FreemanSection ManagerRadioactive Waste Transportation DesignNuclear Waste Design Engineering DepartmentNuclear Design Engineering DivisionOntario Power Generation Inc. + P84 - A1
Pickering Town Centre 1340 Pickering Parkway
Pickering, Ontario, Canada

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

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25JAN2017: Action is being discussed in the weekly waste forecast meeting, meeting minutes have been uploaded as of 18-Jan.
For Misc ILW, the plan has been agreed to obtain new ILW utility containers for storage of the planned Misc ILW. MOD package has been approved, but vendor has yet to be selected. Preferred vendor has been told to prioritize design of the EFWC, meeting with alternative vendor to be scheduled. Contingency planning for misc ILW is in progress, with the plan to use drums for storage.
For the HEPA filters, RFR is to provide a sketch of the possible interface tooling for the JV to proceed. TCD 26-Jan
Update as of October 3, 2016:
JV had engaged ATS (Tooling provider) to design and build this new interface. At the moment conceptual design drawings have been produced with RFR project reviewing.
Michael Hersch will now be put down as Action Owner as his team is well involved with providing oversight for JV and ATS.
August 10, 2016:
Hepa Filter Interface- Risk remains the same however, commercial discussions between OPG RFR and JV are ongoing about pursuing the interface and working out the commercial details later.
Misc. ILW Container - OPG modification paperwork and design specification are proceeding for review by DTL August 11th.

July 27, 2016: OPG are in the process of designing a new Misc. ILW container that will be placed in the vault and used like a garbage can for Misc ILW streams.
Modification outline and technical specification are with NWDE for review.
Alex Lempp is the engineer assigned to this document review which will go to the DA for signatures.
HEPA Filter interface letter should be soon issued by OPG to the JV with regards to obligations of who's to incur cost and complete the design, testing and implementation of interface design.

30May2016: No change.
05 May 16 - The primary HEPA filters and VFF (Vacuum Filter Flask) filters will be going into the RWC. The types of assessments that need to be performed to demon

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Outage Window	Window Description
114	114 - End Fitting Removal
115	115 - Pressure Tube Removal
116	116 - CTI Removal
117	117 - CT Removal
184	184 - RFR-Waste Volume Reduction

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
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13426	[QUARTERLY MONITORING] Restriction for Craft to Enter the Vault	Execution Phase: Event: Imposing restriction on craft to enter the vault may occur Cause: Due to radiological condition (contamination level too high, loss of component, or spikes of radioactivity) Impact: Results in productivity losses and impacting schedule.	1	Active	Roy Brown	Jeff Johansson	03-Mar-17	Monitor	01-Jan-26	3	1	3	9	3	1	3	9

Outage Window	Window Description
023	023 - Install Bulkheads
024	024 - Containment Pre Test, Achieve Dew Point & Containment Test
025	025 - Install Bulkhead Shielding
101	101 - Remove FM Bridge and Install RTPs
111	111 - Feeder Cabinet Removal
112	112 - PT Sever
113	113 - Sever Bellows
114	114 - End Fitting Removal
115	115 - Pressure Tube Removal
116	116 - CTI Removal
117	117 - CT Removal
173	173 - RFR- Bulk Interference Removal

There are no Draft, Not Started, In Progress Actions associated with the risk.

ONTARIO POWER GENERATION

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12214	[QUARTERLY MONITORING] Claims from Retube and Feeder Replacement (RFR) Engineering, Procurement and Construction (EPC) Vendor [000 - No Window Related]	Definition Phase As a result of OPG not meeting its obligations there are risks of the RFR EPC vendor making claims for additional cost and schedule in the Definition Phase, per article 4 of the Agreement. Note: It will be raised as another risk (#13329) for the Execution Phase.	3	Active	Roy Brown	Cameron Macleod	27-Feb-17	Monitor	31-Jan-17	1	3	4	4	1	2	2	2

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
2628	In Progress	Engage OPG commercial lead with OPG counterparties on Claims	Engage OPG commercial lead with OPG counterparties on Claims due to OPG not meeting obligations. This process has ramped up throughout the end of Definition Phase as potential claims and commercial issues arise.	Cameron Macleod	Isaac Smith	28-Feb-17	OPG commercial lead with OPG project team on potential Claims due to OPG not meeting obligations. Commercial lead attends regular project management meetings internally and with Contractor where such items could arise. Although the Definition Phase is winding down, this action will continue through Execution Phase. Jan 20 - This process is ongoing - there is a bi-weekly commercial meeting with the JV to discuss and progress commercial issues, including "escalation" issues such as potential claims Feb 27 - This process is ongoing, to add to the bi-weekly meeting above, there are issue-specific meetings scheduled with the JV to close open commercial issue more expeditiously.

Outage Window	Window Description
000	000 – No Window Related

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
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11584	Waste - Inefficient Waste planning and practices	Execution Phase: Event: 1) Activity of the waste targeted for the containers are higher than assumed preventing the containers from being filled to capacity. 2) The process of loading Intermediate Level Waste into the containers impacts the packing factor. 3) New waste stream arises that no one has considered before 4) Waste that were to be LLW could now be ILW, such as DFBs. Cause: Unplanned waste combined with inefficient practices Impact: negative impact on both schedule and cost.	3	Active	Cameron Webb	Yung Cheung	15-Feb-17	Monitor	31-Mar-17	1	2	3	3	1	1	1	1

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
9540	In Progress	Develop a Plan for Liquid waste generated from RFR project	1: As per SOW, OPG will be supplying the waste containers for liquid waste. Need to determine which group within OPG is responsible for procuring the drums. 2: OPG waste handling has agreed, based on small volumes of liquid waste expected (3-4 drums), to process liquid waste for the JV. Processing of the liquid waste includes: - Collecting samples and sending it to the appropriate lab for analysis - Any further processing (solidification, filtering), if required - Preparation and submission of RWN to WWMF for acceptance of waste 3: The JV will need to secure a spot within DNGS to hold the liquid waste in drums. This location has not been confirmed.	Jeffrey Palmateer	Kwok Tsang	31-Mar-17	15FEB2017: JV advised that liquid waste will likely be generated towards the end of 2017 (end of moderator drying). The expectation is that there will be 2 to 3 rinses. JV is still in process of developing a list of expected contaminants. 3FEB2017: Action extended for two months for JV to provide more information on the expected contaminants to see if waste can be diverted to active liquid system. New Action item generated from weekly OPG/JV waste meeting held on Friday at 2pm.

Outage Window	Window Description
114	114 - End Fitting Removal
115	115 - Pressure Tube Removal
116	116 - CTI Removal
117	117 - CT Removal
184	184 - RFR-Waste Volume Reduction

Project: Retube and Feeder Replacement - 73105

ONTARIO POWER GENERATION

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14669	Main Heat Transport Header Movement when the MHTS is drained and feeders cut	Event: During Feeder Removal, both disconnect, and subsequent feeder and supports removal, it is possible that the feeder headers may move (rotate or shift). Cause: The Reactor Headers with upper feeders attached, were originally hung from the reactor vault concrete ceiling. The lower feeders were then bolted to end fittings and welded to the upper feeders. The entire assembly was then moved outboard of the reactor by 3" to line up with the MHTS Piping and Steam Generator Piping and the reactor headers were then welded to that piping. When the feeders are disconnected from the end fittings and cut near the headers during RFR, there is a risk that the headers will move to the extent that reconnection and welding of the replacement feeders to the headers will be challenging to impossible without the introduction of welding in spool pieces with additional welds in the piping. The JV has no current plans to restrain the headers prior to feeder disconnect and cutting. Impact: Should the header move, it may be difficult to return the header to it's needed position. The impact of this movement is that it is possible that some of the upper row feeders will have fit-up issues, leading to a push to critical path. JV Risk # 4.122		Active	David Kurpjuweit	Ed Nowakowski	03-Mar-17	Monitor	08-Apr-17	3	2	2	6	2	1	1	2
			Outage Window		**Window Description**												
			023		023 - Install Bulkheads												
			076		076 - Upper Feeder Installation												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

Project: Retube and Feeder Replacement - 73106

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14669	Main Heat Transport Header Movement when the MHTS is drained and feeders cut	Event: During Feeder Removal, both disconnect, and subsequent feeder and supports removal, it is possible that the feeder headers may move (rotate or shift). Cause: The Reactor Headers with upper feeders attached, were originally hung from the reactor vault concrete ceiling. The lower feeders were then bolted to end fittings and welded to the upper feeders. The entire assembly was then moved outboard of the reactor by 3" to line up with the MHTS Piping and Steam Generator Piping and the reactor headers were then welded to that piping. When the feeders are disconnected from the end fittings and cut near the headers during RFR, there is a risk that the headers will move to the extent that reconnection and welding of the replacement feeders to the headers will be challenging to impossible without the introduction of welding in spool pieces with additional welds in the piping. The JV has no current plans to restrain the headers prior to feeder disconnect and cutting. Impact: Should the header move, it may be difficult to return the header to it's needed position. The impact of this movement is that it is possible that some of the upper row feeders will have fit-up issues, leading to a push to critical path. JV Risk # 4.122		Active	David Kurpjuweit	Ed Nowakowski	03-Mar-17	Monitor	08-Apr-17	3	2	2	6	2	1	1	2
			Outage Window		**Window Description**												
			023		023 - Install Bulkheads												
			076		076 - Upper Feeder Installation												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

Project: Retube and Feeder Replacement - 73111

ONTARIO POWER GENERATION

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14684	Clean Room Construction Delays	Description The Clean Room (which will be located at the DEC) is required to be in service to support Calandria Tube Installation, and Fuel Channel Installation activities. Currently (as of 16Feb2017), the design completion date is scheduled for 17March2017 and the construction schedule has yet to be provided to OPG. Cause Procurement activities on the Clean Room have been delayed due to focus on the other Procurement Packages that were originally required to be delivered as part of the Definition Phase Complete Milestone. Currently, the Clean Room is scheduled to be delivered, and set-up at the DEC by 23JAN2017, however, until the design is completed, the Lead Time associated with manufacturing and delivery is an estimate only, and manufacturing start will not occur until the design is finalized. Currently, there is significant float available in the schedule, as the Clean Room is not required to be in service until late 2017, however, consequences in delays to construction beyond this need date would be very significant. Impact Currently, there is significant float available in the schedule, as the Clean Room is not required to be in service until late 2017, however, consequences of delays to construction beyond this need date would be very significant as CT Preparation (to support CT Installation) and Subassembly Preparation/EF Preparation (to support FC Installation) could not be completed. Day-over-day Critical Path delays would be experienced until the Clean Room could be placed into service.	2	Active	Jeffrey Palmateer	Kevin Hill	16-Feb-17	Monitor	31-Oct-16	4	4	3	16	2	2	2	4
			Outage Window		**Window Description**												
			071		071 - Trial CT Install												
			118		118 - CT Install Series												
			185		185 - RFR-Clean Room CT and FC Preps												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14681	Shortage of Mock-up Components to Support Training Programs	Description In order to support the needs of the Execution Phase of the project, the JV will be required to train a large number of staff on RFR activities. All of these training programs will require some mock-up components, such as Welded Bellows Flange Coupons to support Bellows Cut Training for example. The requirement for mock-up components is expected to be particularly intensive for the CT Install Series, where Operator Qualification requires fabrication of multiple consecutive replacement CT rolled joints that meet leak tightness and geometric criteria. It should be noted that fluctuations in the Project Execution Schedule can also impact mock-up component need dates as Training start dates will have to be tied to the start date for Execution of the work in the field plus appropriate float. Cause In order to complete the Job Performance Measure (JPM) portion of the RFR Training Programs, it is expected that Trainees will be required to operate the RFR Tooling, and complete a varying number of cycles of RFR Series Work Programs on the mock-up. This will require varying quantities of mock-up components to support this work. For CT Install activities, mock-up component demands are expected to be particularly high due to the requirement for each Operator to fabricate multiple replacement CT rolled joints meeting leak tightness criteria. Providing a once rolled, released and conditioned CTSB to facilitate completion of 1 replacement rolled joint will require a CTSB, a CTI, and a CT Spool Piece to fabricate the "original construction" CT rolled joint. Another CTI and CT Spool Piece will be required for the replacement rolled joint. If any of the replacement rolled joints fail to meet either the geometric or leak test requirements, operator qualification would require repeating the qualification program, driving the requirement for even more mock-up components. Impact Unavailability of mock-up components to support training would result in an increase in Proj	3	Active	Jeffrey Palmateer	Kevin Hill	03-Mar-17	Mitigate	01-Dec-18	2	2	1	4	2	1	1	2
			Outage Window		**Window Description**												
			071		071 - Trial CT Install												
			076		076 - Upper Feeder Installation												
			082		082 - RTP Removals, Bridge Replacement												
			083		083 - Lower Feeder Installation												
			098		098 - CTI Release												
			101		101 - Remove FM Bridge and Install RTPs												
			112		112 - PT Sever												
			113		113 - Sever Bellows												
			114		114 - End Fitting Removal												
			115		115 - Pressure Tube Removal												
			116		116 - CTI Removal												
			117		117 - CT Removal												
			118		118 - CT Install Series												
			119		119 - Fuel Channel Install Series												
			920		920 - RFR Series Training												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

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14682	Lack of Availability of Mock-ups for Use in Zone 3 Areas (RWPB, and Offsite) with Contaminated Tooling	Description During Execution Phase, there is a high probability that some of the Tooling used for RFR Activities will become contaminated through use. In the event that an issue with a tool is experienced, the tool is contaminated (and cannot be easily decontaminated/has fixed contamination on it), and troubleshooting of the tool is decided to be done off the face, mock-ups will be required in a Zone 3 Contaminated Tooling Workshop (i.e. the RWPB). Additionally, even if a Tool functions as planned during use on Unit 2, it is stated in 509407-0002-00000-30IM-0025 that Tooling will be taken to a Tooling Contaminated Storage Facility, with Level 1 Commissioning prior to use on a subsequent Unit being completed in the RWPB rather than at the DEC. Mock-ups will be required in the RWPB to support complete this Commissioning. It needs to be ensured that an adequate quantity of mock-ups, and space to set-up these mock-ups are provided in the RWPB, and in the Tooling Maintenance Facility. Cause Contaminated Tooling that requires work may be very challenging to release outside the Protected Area to an offsite facility (Tooling Maintenance Facility) to allow appropriate troubleshooting, repairs and testing to be completed. UTPs may require significant remedial actions to be completed to remove contamination before release. These actions may be impractical from a schedule perspective, or may not be successful. Return to Service of Tooling following completion of repairs will often require a mock-up for completion of Testing and Level 1 Commissioning before the Tool is declared "Ready for Service". Additionally, in order to complete Level 1 Commissioning and "Ready for Service" tagging on Tooling being brought back to site for use on Subsequent Units, mock-ups in the RWPB will be required. Impact Generally, in the event of an issue with a Tool during Execution that requires troubleshooting and repairs to be completed off the Reactor Face, spare Tools will be available to	3	Active	Jeffrey Palmateer	Kevin Hill	03-Mar-17	Mitigate	01-Sep-17	2	2	2	4	2	1	1	2

Outage Window	Window Description
071	071 - Trial CT Install
076	076 - Upper Feeder Installation
082	082 - RTP Removals, Bridge Replacement
083	083 - Lower Feeder Installation
098	098 - CTI Release
101	101 - Remove FM Bridge and Install RTPs
112	112 - PT Sever
113	113 - Sever Bellows
114	114 - End Fitting Removal
115	115 - Pressure Tube Removal
116	116 - CTI Removal
117	117 - CT Removal
118	118 - CT Install Series
119	119 - Fuel Channel Install Series
522	522 - Retube Waste Processing Building RWPB
910	910 - RFR Series Tooling
920	920 - RFR Series Training
920	920 - RFR Series Training

There are no Draft, Not Started, In Progress Actions associated with the risk.

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
Project: Retube and Feeder Replacement - 73113																	
14260	Vault communications between RPCs and RFR (JV) workers to support RFR Project execution is at Risk	EVENT: There is a risk of lack of vault communications between RPCs and RFR (JV) workers to support RFR Project execution work. CAUSE: A plan for the integration of the Joint Venture's Voice Communication System (VCS) with OPG's RP Audio Visual Teledosimetry System (AVTS) has not been finalized. The RFR Project workers (JV) will be utilizing a JV designed VCS for the RFR Project. The only other work group that can use the JV VCS system is Refurbishment RP so that the RPCs can communicate with the JV workers from within OPG's AVTS system. The benefit is one communication system is used for RFR only. IMPACT: The impact will be the inability of RP Radiation Protection Coordinators (RPC) to communicate with and provide radiation protection for JV workers inside the vault. Additionally, the associated costs to engineer and implement the JV VCS system into the RP AVTS trailer, including required personnel training on the use of the system is approximately $2M. It is expected that the costs for this will be borne from within RP's budget for Refurbishment. RP's RQE did not include the costs of supporting a new AVTS communication system for RFR work. OPG RP will continue to use it's current (tested and proven at both Pickering and Darlington reactor buildings) AVTS communication (wireless headset) system for all other non-RFR project work.	3	Active	Johnathon Hash	Jeff Johansson	22-Feb-17	Monitor	28-Apr-17	4	4	4	16	2	2	2	4
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**							
			7829	In Progress	Monitor and Perform Oversight on RFR/JV Activities associated with VCS EPC for Radiation Protection Trailer (RPT)	Post-CCB action for RP to monitor and provide oversight on RFR/JV activities associated with the engineering, procurement and construction of VCS (Voice Communication System) for the Radiation Protection Teledosimetry Trailer. CCF1000 was approved by the CCB for funding of the work associated with providing VCS capability in the RPT for the RPCs to communicate with the RFR workers being covered under AVTS. RP needs to follow up with RFR (Kevin Hill, Chris Rambaran of RFR Projects) to obtain a status of the project work associate with VCS. RP, upon obtaining the update, will enter status notes in the "Status Notes" section below, dated and initialed.		Johnathon Hash	Joe Cicchini	31-Mar-17	(1) (June 7, 2016, Johansson): See attachment #1 (email "CCF1000 RP VCS for RFR") from CCB to Finance to disposition to transfer of funding to RFR for the VCS work. (2) (09 Aug; JJ): Initiated contact with RFR SPOCs to obtain a status on the VCS PCD milestones and current progress. Awaiting progress update. (3) (13 Sep; JJ) Have not received any updates from the RFR SPOC to date. Individual has made contact with RP but no update on the subject matter. RP will attempt to follow up again with RFR SPOC to obtain an update. 29DEC2016 JC Whitby HP and JV are working towards the resolution of this. Contact for HP is Matt Lai.							
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			174		174 - RFR-Pre-reqs Prior to Islanding												
14669	Main Heat Transport Header Movement when the MHTS is drained and feeders cut	Event: During Feeder Removal, both disconnect, and subsequent feeder and supports removal, it is possible that the feeder headers may move (rotate or shift). Cause: The Reactor Headers with upper feeders attached, were originally hung from the reactor vault concrete ceiling. The lower feeders were then bolted to end fittings and welded to the upper feeders. The entire assembly was then moved outboard of the reactor by 3" to line up with the MHTS Piping and Steam Generator Piping and the reactor headers were then welded to that piping. When the feeders are disconnected from the end fittings and cut near the headers during RFR, there is a risk that the headers will move to the extent that reconnection and welding of the replacement feeders to the headers will be challenging to impossible without the introduction of welding in spool pieces with additional welds in the piping. The JV has no current plans to restrain the headers prior to feeder disconnect and cutting. Impact: Should the header move, it may be difficult to return the header to it's needed position. The impact of this movement is that it is possible that some of the upper row feeders will have fit-up issues, leading to a push to critical path. JV Risk # 4.122		Active	David Kurpjuweit	Ed Nowakowski	03-Mar-17	Monitor	08-Apr-17	3	2	2	6	2	1	1	2
			Outage Window		**Window Description**												
			023		023 - Install Bulkheads												
			076		076 - Upper Feeder Installation												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14630	RFR PHT Dry - Potential loss or degradation of NV internals	Execution Event: There is a risk that upon removal of non-return valves (NV), as part of mod package for PHT bulk drying scope of RFR, the internals are damaged or lost and therefore are unavailable to be re-installed at the end of the refurbishment. Current plan is for immediate evaluation of component condition upon removal per protocol established by SDLU and ordering at time of removal if necessary. Cause: Valve internals in bad condition or not able to be stored until re-installation. Impact: New valve internals would need to be purchased, with a lead time of ~ 1 year.	1	Active	Marc Paiment	Steve Fernandes	03-Mar-17	Monitor	30-Apr-17	2	2	1	4	2	2	1	4
			Outage Window		**Window Description**												
			029		029 - HTS Vac Dry												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14926	[QUARTERLY MONITORING] New Fuel Loading First Execution in ~25 Years- OPG Obligations	Event: Following completion of all Fuel Channel and Feeder Replacement Activities, New Fuel will be manually loaded into all Fuel Channels of the Reactor for the first time at Darlington since new construction (~25 years). The Risk Event is that OPG does not meet its obligation to provide the level of support required to meet the Project Schedule for the New Fuel Load Series, or the proposed New Fuel Loading Sequence is rejected by a Regulatory Authority and the Series Duration is extended. Cause: Extensive interfacing is required with OPG- Fuel Handling and OPG- Security to issue a large volume of New Fuel to the JV in a timely manner to support the production rates required to meet schedule targets. This volume of fuel transfer is significantly larger than that seen during normal operations. In addition, the New Fuel Loading Sequence being followed for Refurbishment will vary from that followed for New Construction (loading of NFBs into a Fuel Channel without immediately installing the Inlet SP and CP) and there is a risk of Regulatory Authority rejection of this sequence. Use of this sequence is a key assumption in the Basis of Estimate for this Series. Impact: Inadequate planning and understanding of Interfaces and Division of Responsibilities between the JV and OPG or rejection of the proposed New Fuel Loading Sequence by a Regulatory Authority could result in an increase of the New Fuel Load Series Duration. This will increase the critical path of the Refurbishment Outage as a whole.	2	Active	Jeffrey Palmateer	Ian Wilcox	02-Mar-17	Mitigate	17-Feb-17	2	1	2	4	1	1	2	2

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
9449	In Progress	FFRB - New Fuel Loading Training Plan to be submitted by JV Training Department to Nuclear Refubishment	New Fuel Loading Training Plan to be submitted by JV Training Department to Nuclear Refurbishment Training Department (Silviu Idita) for review. This Training Plan should define the following: 1. Detail what Training JV Trainers require from OPG (what material/scope, by when, and for how many people). 2. Detail what Training will be delivered by the JV Trainers to all Personnel involved in the New Fuel Load Series. This Training Plan should be delivered before the start of New Fuel Loading Rehearsals.	Ian Wilcox		31-Mar-17	Ian Wilcox- 15DEC: The New Fuel Loading Training Plan has been drafted by the OPG Training Department (Sean Methot) with assistance from Ian Wilcox. The Training Plan is currently with the JV for finalization and sign-off. TCD is 15JAN2017. Following sign-off of the Training Plan, development of any additional course materials by OPG and the JV will begin. Ian Wilcox- 16JAN: The TCD for finalization of the New Fuel Loading Training Plan (15JAN) has been missed. Follow-up with Tom Wigglesworth to take place, and a new TCD will be established. Target was to be no later than 31JAN, however, higher priority JV Work has required pushing this TCD to 31MAR.
9450	In Progress	FFRB - New Fuel Loading Security Requirements	Search direction from Refurbishment Licensing Support Department (David Train) and OPG Safeguards Department (Jai Sanasi), the CNSC and the IAEA on New Fuel Security Requirements as they relate to: - The New Fuel Loading Process (i.e. requirement to secure fuel in channel by immediately installing Inlet Shield Plug and Closure Plug). - IAEA Camera Monitoring (where are cameras required, who sets them up?, can we use VOS or do we need dedicated cameras?). - Security Requirements for the Intermediate Storage Area (do we need a fixed barrier accessed by lock and key). - Do fuel transport runs within the station require Security monitoring? - Does access to the Vault and the 100M RAB need to be restricted to Authorized Personnel? - Does the Fuel Bundle Retrieval Tool need a locked quarantine area?Where/when is Fuel Handling Oversight required?	Ian Wilcox		17-Feb-17	Ian Wilcox (08FEB): No response received as of yet from IAEA, CNSC, or Regulatory Affairs. Follow-ups underway for updated TCD. Pushed TCD to 17FEB2017 for now. Ian Wilcox (18JAN): TCD for IAEA feedback was updated to 31JAN based on direct feedback from CNSC and Regulatory Affairs. Ian Wilcox (15DEC2016): TCD requested for IAEA feedback. Feedback is expected by 31DEC2016. Ian Wilcox (01DEC2016): TCD requested for IAEA feedback. Ian Wilcox(22Nov2016): CNSC has reviewed documentation and requested additional feedback from OPG station personnel. This feedback has been provided to the CNSC. The information will now be socialized with the IAEA. A decision on the NFL security process is pending from the IAEA. WILCOXIA (18NOV): Additional CNSC queries answered. CNSC Review continues. WILCOXIA (02NOV): OPG Regulatory Affairs has been interfacing with the CNSC/IAEA to solicit feedback on whether the New Fuel Load Series Sequence as proposed is acceptable. The Series Leads (Chris Doyle-JV and Ian Wilcox-OPG) have provided Regulatory Affairs with a Process Overview Flowchart as requested by the CNSC. This has been provided to the CNSC, and a response is expected by mid-November.

Outage Window	Window Description
084	084 - Fuel Load

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

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Report Owner: L. Greenland
Process Owner: L. Ren
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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
15080	risk to HT vac dry (project 73113) timing & duration affected by transmitter blowbacks (RTM project 73425)	1. The full scope of the RTM project 73425/ DSR MS0280-1 transmitter blowbacks is not approved in ROOMS. Several work orders are to be added to scope at the SRB on 16Dec16. Impact: the work is not ready at <T-4 weeks to execution. This applies to all items below as well. Note: several more work orders will be added to scope at a future SRB when the work orders are generated. 2. The work order to fabricate the blowback tool is not in scope. Work order 4995692 is to go to the SRB on 16Dec16. It is not currently known how many tools are to be fabricated. 3. The workplan to perform the blowbacks has not been issued. Refer to NK38-WPL-33000-0597379. An action has been added to the PCC managers list to track the WPL to its issue tcd (29Dec16). 4. The workplans documenting the timing of the blowbacks has not been issued. This WPL is being tracked on the daily WPL conference call. 5. There is a threat that the WPLs will not be assessed and scheduled in time for the start of HT drain (~ 9Jan16). 6. Control mtce and ops resources required to support the blowbacks is TBD. Impact: additional resources may not be available at the time required because the work is not scheduled.. 7. JV eng are determining the impact of the blowbacks on the HT vac dry. HT vac dry may have to stop for the blowbacks. Impact: the window duration may have to be increased.	4	Active	Jeffrey Palmateer	Samad Kasaai	02-Mar-17	Mitigate	01-Apr-17	1	1	1	1	1	1	1	1
			Outage Window		**Window Description**												
			029		029 - HTS Vac Dry												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
Project: Retube and Feeder Replacement - 73118																	
14464	RWPB - Increased Risk of Surface/Airborne Contamination Spread inside/outside RWPB	EVENT: There is an increased probability/risk of surface/airborne radioactive contamination spread inside/outside of the RWPB during RWC/DSO filling/lidding activities. CAUSE: The critical activities associated with the high risk is RWC/DSO travels between the lidding station and the hardware station. There is a high potential for presence of loose surface contamination on the RWC/DSO containers from the filling activities (PT, IEF, CTI, AS) and the lidding activities (debris cover removal/installation, RWC and DSO lids removal/installation). The RWC/DSO is expected to exit from the lidding station to the hardware station several times during the process. IMPACT: During these times, surface contamination on the RWC/DSO can become loose and spread across un-controlled areas/barriers causing loss of contamination control in the vicinity, in the building and potentially outside of the building in the unzoned area, and ultimately to the public domain. Without a barrier/structure/enclosure installed within the lidding station and the hardware station corridor to assist with control of contamination, there will be a high potential for work stoppage associated with the WTS activities leading to a backlog of reactor components to be processed. Ultimately, leading to a major impact to RFR critical path work while a makeshift structure/enclosure is designed and installed, or major cleanup of the area inside and potentially outside the RWPB. It is estimated that it might take up to 2 weeks to either design/install a controlled structure/barrier, and to perform decon activities. There is also the risk that the Regulator may demand additional barriers to prevent recurrence and additional analyses to ensure public safety.	3	Active	Johnathon Hash	Scott Stafford	22-Feb-17	Mitigate	01-Aug-17	5	3	4	20	1	1	1	1
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							

14464	RWPB - Increased Risk of Surface/Airborne Contamination Spread inside/outside RWPB	EVENT: There is an increased probability/risk of surface/airborne radioactive contamination spread inside/outside of the RWPB during RWC/DSO filling/lidding activities. CAUSE: The critical activities associated with the high risk is RWC/DSO travels between the lidding station and the hardware station. There is a high potential for presence of loose surface contamination on the RWC/DSO containers from the filling activities (PT, IEF, CTI, AS) and the lidding activities (debris cover removal/installation, RWC and DSO lids removal/installation). The RWC/DSO is expected to exit from the lidding station to the hardware station several times during the process. IMPACT: During these times, surface contamination on the RWC/DSO can become loose and spread across un-controlled areas/barriers causing loss of contamination control in the vicinity, in the building and potentially outside of the building in the unzoned area, and ultimately to the public domain. Without a barrier/structure/enclosure installed within the lidding station and the hardware station corridor to assist with control of contamination, there will be a high potential for work stoppage associated with the WTS activities leading to a backlog of reactor components to be processed. Ultimately, leading to a major impact to RFR critical path work while a makeshift structure/enclosure is designed and installed, or major cleanup of the area inside and potentially outside the RWPB. It is estimated that it might take up to 2 weeks to either design/install a controlled structure/barrier, and to perform decon activities. There is also the risk that the Regulator may demand additional barriers to prevent recurrence and additional analyses to ensure public safety.	**8429**	In Progress	NR-Radiation Protection to monitor JV progress on implementation of an enclosure between lidding and hardware stations in RWPB.	A memo was submitted to the JV from OPG RFR requesting the JV to implement an enclosure between the lidding and hardware stations of the RWPB to ensure proper contamination controls. See Action #8428 for more details and a copy of the memo. As an oversight activity, NR-RP will MONITOR work on the enclosure to ensure that it is progressing according to JV schedule. NR-RP will work closely with OPG RFR to ensure that the work does not get stalled or derailed. This action will be closed once assurance has been granted that the enclosures will be installed on both assembly lines of the waste tooling system. 25AUG2016 - JC - Liette Lemieux, Johnathon Hash and Jeff Johansson are at a walk down/ site tour of ATS. This topic is to be discussed.	Johnathon Hash	Joe Cicchini	30-Jun-17	(10 Aug; JJ). This is a brief summary of the latest oversight activities on the subject enclosure. Trolley access door at the Lidding Station creates a potential of contamination spread when opened. RFR had communicated to the JV that an enclosure is needed to minimize the potential of contamination spread and help facilitate WTS execution, see attached correspondence. The enclosure would extend from the east end of the Lidding Station covering the whole of the Hardware Station, see attached WTS layout. Two independent enclosures would be erected to avoid cross contamination between the two lines. RFR considered the original RPS PermaCon design (see attachment #1 e-mail below) too expensive. RFR would like to explore if the Project can benefit from the tenting experience of the IMS group at Pickering for the proposed enclosure design and had communicated to the JV to start the enclosure design based on a scaffolding concept. RFR had communicated to the JV high level expectations of the enclosure including the need to provide breath air headers at the Hardware Station, see attached e-mail. Currently the JV is in the process of developing a conceptual design; OPG will have the opportunity to review and accept. (Sept 13/2016; JJ) A meeting was held at the ATS facility in Cambridge on Thursday, Aug 25 to review JV RP enclosure concept and confirm elimination of the need for loose contamination survey and decontamination on each exit of DSO from lidding station. The meeting was attended by the JV design team and OPG RFR & RP Teams. Attached below (attachment #2) is the minutes of meeting from the meeting. A working group committee to be established and meet to discuss the requirements for the enclosure and its operational use. An update will be included herein upon issuance of minutes of meeting from the first committee meeting. 15OCT2016 JC - Discussion are in progress as to whether or not a full enclosure, including a roof, will

Outage Window	Window Description
114	114 - End Fitting Removal
522	522 - Retube Waste Processing Building RWPB

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

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13991	RWPB - Rework	[Definition Phase] Event: Vendor Rework Cause: Ineffective work practices and/or inefficient work preparation Impact: Potential impact on critical path.		Active	John Hamilton	Adam Coyle	14-Feb-17	Monitor	31-Jul-17	4	2	2	8	1	1	1	1

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
6198	In Progress	Track Rework	Track rework and develop mechanism to minimize construction and engineering rework.	John Hamilton	Adam Coyle	31-Jul-17	12-Jan-16: No rework tracked so far. Will develop mechanism to track rework. Engineering rework is defined as revised design post DEC approval. Construction rework is defined as re-installation or re-fabrication. 29-Jan-16: Rework means that work that is required to correct original work (or rework) that is not defective. To proactively minimize pilecap pour rework, they are now scheduled to the weekends, as any delay at the Sally Port during the weekdays will incur rework to this task. 19-Feb-16: To minimize potential rework/delay, the first pilecap zone pour will use 3 pump trucks, 1 station outside the PA incase one of the other 2 inside the PA fails. 22-Mar-16: Update to Critical Path: Zone 1 pour was executed per logistics plan and executed in 2 hours less than planned. The next 10 pours will be planned and executed in the same manner. 13-Apr-16: Zones 3 and 2 poured within allocated time. No rework. 12-May-16: Zone 4 and 5 poured within allocated time. No rework. 10-Jun-16: Zone 6 and 7 poured within allocated time. No rework. Structural Steel erection has begun with no rework. 15-Jul-16: All pilecap pours completed, structural steel 18% complete. No re-work to date. 08-Aug-16: Structural steel ~50% completed. No re-work to date. 29-Aug-16: Structural steel ~75% completed. Transfer Corridor Caissons 100% completed. No re-work to date. 19-Sep-16: Structural Steel and Transfer Corridor Caissons 100% Completed. South Bunker Wall Pour completed. No re-work to date. 3-Oct-16: No re-work to date. North bunker wall pour scheduled 15-Oct-16. Decking and exterior walls ongoing. 17-Oct-16: No re-work to date. North bunker wall poured 15-Oct-16. Q-Decking completed. Roof and Cladding to begin. 1-Nov-16: No re-work to date. Exterior walls completed. Roofing and Cladding to begin. 14-Nov-16: No re-work to date. Cladding installation ongoing, HVAC ductwork ongoing, crane rail installation on going. 25-Nov-16: No re-work to date. Cladding installati

Outage Window	Window Description
522	522 - Retube Waste Processing Building RWPB

ONTARIO POWER GENERATION

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13980	RWPB Engineering - Delay or Schedule inaccuracy impacting Critical Path	[Definition Phase] Event: delay to Engineering or inaccurate schedule estimate Cause: Inefficient Engineering hand-offs and/or P6 misalignment to need dates Impact: Negative impact to Construction schedule.	3	Active	John Hamilton	Peter Kempton	14-Feb-17	Monitor	31-Aug-17	2	1	3	6	2	1	3	6

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
6199	In Progress	Meet Regular to Identify Delays or Schedule Inaccuracy	Hold regular engineering and construction schedule meetings to identify delay and schedule risks and mitigate as required.	John Hamilton	Peter Kempton	31-Aug-17	12-Jan-16: Meeting held as planned. Report weekly to senior team to ensure full transparency. JV construction/engineering team will be at site to expedite resolution of issues. 01-Feb-16: A 4-week look ahead process is developed for JV to explain weekly the status of all work that is completed as planned, not-completed when it should have been, and the tasks for the next four weeks. Meeting are held weekly on Wednesday with OPG and JV, both construction and engineering teams. 19-Feb-16: Binder Review, Pre-DCAVR/DCAVR dates are tracked daily and discuss weekly with OPG/JV to identify any delays and determine mitigating/recovery actions as required. 22-Mar-16: Engineering is tracking on schedule to the milestone dates. 13-Apr-16: Engineering is tracking on schedule to the milestone dates. 12-May-16: Engineering is still tracking on schedule to the milestone dates. 10-Jun-16: Engineering is still tracking on schedule to the milestone dates. 15-Jul-16: Engineering DCAVRs completed to milestone date. Schedule modifications completed for superstructure installation and has been incorporated into the project schedule with no impact. 08-Aug-16: Meeting still held very frequently (i.e., multiple times per week) to review engineering/construction/procurement schedules. On track to meet superstructure installation milestone date. 29-Aug-16: Meeting still held very frequently (i.e., multiple times per week) to review engineering/construction/procurement schedules. On track to meet superstructure installation milestone date. 19-Sep-16: Meetings held frequently to review engineering/construction/procurement schedules. Superstructure installation milestone met. 3-Oct-16: Meetings still held frequently to review engineering/construction/procurement schedules. 17-Oct-16: Meetings still held frequently to review engineering/construction/procurement schedules. 1-Nov-16: Meetings still held frequently to review engineering/construction/procurement schedules. 14-Nov-

Outage Window	Window Description
522	522 - Retube Waste Processing Building RWPB

ONTARIO POWER GENERATION

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14800	RWPB - Engineering and Vendor Support Documentations not completed in time for CWP development and Commissioning	[Definition Phase] Event: Late submission of JV Engineering or Vendor Support Documentation. Cause: Ineffective coordination between JV Engineering, Construction and Vendors. Impact: Negative Impact on Construction Schedule.		Active	John Hamilton	Peter Kempton	14-Feb-17	Mitigate	31-Jul-17	2	3	1	6	1	2	1	2

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
8993	In Progress	OPG Oversight to work with JV to review CWP Commissioning dates and JV Commissioning Documentation Submissions	OPG Oversight to work with JV to review CWP Commissioning dates and JV Commissioning (i.e. Vendor Submissions) and Engineering (i.e. commissioning specs) submission dates to identify conflicts. (i.e. Commissioning Matrix)	John Hamilton	Peter Kempton	17-Mar-17	30-Aug-2016: OPG Oversight spreadsheet developed identifying all CWP Collaborative Review Dates and JV Engineering submission dates. Issues, Actions, and Owners being tracked during review of spreadsheet with engineering and construction team during weekly meetings. 19-Sep-2016: CWP Collaborative review finalized dates expected 22-Sep-2016 with issues and actions resolve/assigned. 3-Oct-2016: CWP Collaborative review dates provided by coordinators and superintendents. JV Project management reviewing confidence in dates. OPG review to follow. 17-Oct-2016: CWP Collaborative review dates provided and OPG/JV are confident. Engineering Support documentation sheet from JV engineering is outstanding TCD: 21-Oct-16. 31-Oct-16: Engineering Support documentation sheet from JV engineering is outstanding. Deliverable dates need to be provided. Action extended to finalize dates. 14-Nov-16: Engineering Support documentation sheet from JV engineering has outstanding items with required dates. OPG/JV engineering and project management meeting weekly to resolve outstanding issues.25-Nov-16: RWPB Oversight met with JV team and resolved who's responsibilities it is for various deliverables. JV identifying names for the various deliverables relating to commissioning, and will sent the documentation to OPG once completed. 16-Dec-16: Due date moved to February 2016 to align with Commissioning vendor award which will provide final commissioning deliverable dates required in spreadsheet. 13-Jan-17: No update, Commissioning vendor award in February 2016 will provide final commissioning deliverable dates required in spreadsheet. 31-Jan-17: Engineering submission dates only outstanding for commissioning documents. Collaborative reviews ongoing and scheduled inline with engineering deliverables. Meeting scheduled Feb 2, 2017 to review all commissioning documentation requirements. 14-Feb-17: Commissioning manager from JV is now at site. Commissioning manager now has the new Co

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Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14800	RWPB - Engineering and Vendor Support Documentations not completed in time for CWP development and Commissioning	[Definition Phase] Event: Late submission of JV Engineering or Vendor Support Documentation. Cause: Ineffective coordination between JV Engineering, Construction and Vendors. Impact: Negative Impact on Construction Schedule.	10120	In Progress	OPG oversight to work with JV to ensure ITF is updated and closed out as required.	OPG Oversight to work with JV to ensure the following ITF related actions are completed: 1. ITF is split into "Construction" and "Post Construction or Operation" issues. 2. ITF is cleaned up to comply with OPG ITF procedures. 3. All Construction Issues to be resolved prior to 15-May-17.	John Hamilton	Peter Kempton	15-May-17								
			10121	In Progress	OPG Oversight to Ensure JV Completed Engineering Deliverables as per Graded Lette	Engineering Deliverables Spreadsheet as per Graded Letter has been outstanding since September 2016. The attached spreadsheet needs to be completed and have dates provided.	John Hamilton	Peter Kempton	01-Apr-17								
			10122	In Progress	OPG Oversight to identify missing Engineering Deliverables via 4 Week Lookahead	OPG Oversight has created the Construction and Engineering 4 Week Lookaheads, which are reviewed weekly. This document is being used to identify any missing engineering deliverables which are impacting the schedule. Tasks will be flagged weekly and raised to JV Construction and Engineering management for a recovery plan.	John Hamilton	Peter Kempton	31-Jul-17								
			Outage Window		**Window Description**												
			522		522 - Retube Waste Processing Building RWPB												
15121	Procurement of Engineered and Bulk Materials not on Time for Construction	[Definition Phase] Event: Late Delivery of Engineered or Bulk Materials. Cause: Ineffective coordination between JV Construction and JV Engineering. Impact: Negative Impact on Construction Schedule		Active	Peter Kempton	Peter Kempton	14-Feb-17	Mitigate	31-Jul-17	2	3	1	6	1	2	1	2
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			10118	Draft	OPG oversight to ensure JV provides comprehensive list of all BOMs and confirmation of Delivery Dates	OPG oversight to work with the JV to ensure a comprehensive list of all the latest BOMs (Bill of Materials), showing what has been ordered from these BOMs and the confirmed delivery dates is provided. If there is any equipment or materials that is not on a BOM but is required, the same information will be required. The comprehensive list shall be issued to OPG. OPG has injected "Confirm BOM (FCN if required) Complete/Order Missing Items" as a barrier 2 weeks prior to the Collaborative review of the CWP for all remaining packages. This is a construction tasks to ensure all materials have been provided for construction.	John Hamilton	Peter Kempton	31-Jul-17	14-Feb-17: JV submitted a list of all material being procured at status, to be reviewed by oversight. Initial review suggests the lists may not be completed. The list needs to be aligned with Monday procurement meeting.							
			Outage Window		**Window Description**												
			522		522 - Retube Waste Processing Building RWPB												
12412	RWPB - Retube Waste Processing Building Not Meeting Campus Plan Requirements	[Definition Phase] Event: Retube Waste Processing Building (RWPB) construction activities do not meet the requirements of the Campus Plan Cause: insufficient planning, review and approval of construction strategy Impact: schedule delay and/or additional cost during the Definition Phase.	3	Active	John Hamilton	Adam Coyle	14-Feb-17	Mitigate	30-Jun-17	2	2	2	4	1	1	1	1
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
12412	RWPB - Retube Waste Processing Building Not Meeting Campus Plan Requirements	[Definition Phase] Event: Retube Waste Processing Building (RWPB) construction activities do not meet the requirements of the Campus Plan Cause: insufficient planning, review and approval of construction strategy Impact: schedule delay and/or additional cost during the Definition Phase.	7957	In Progress	Re-evaluate RWPB Flooding Assessment with Final Grading and Flood Mitigating Measures	OPG to re-evaluate RWPB flooding assessment taking into consideration the final RWPB grading and flood mitigating strategy and confirm mitigating impacts to other Darlington Facilities.	John Hamilton	Khai Ngo	30-Jun-17								

17-Jun-16: OPG to re-evaluate RWPB flooding assessment taking into consideration the final RWPB grading and flood mitigating strategy and confirm mitigating impacts to other Darlington Facilities.
15-Jul-16: Re-evaluation currently in progress. Discussions taking place on potentially installing another manhole in the Transfer Corridor to accommodate other Darlington Facilities.
29-Aug-16: Disposition of comments near completion, expected first week of September. New requirements will be tracked. AMEC to put together estimate cost for iterative run of the RWPB flooding assessment so that design team can determine what changes are required/can be incorporated to mitigate potential flood risk.
19-Sep-16: Disposition to comments near completion, expected acceptance this week from remaining stakeholders in Nuclear Safety. New requirements will be tracked. AMEC to put together estimate cost for iterative run of the RWPB flooding assessment so that design team can determine what changes are required/can be incorporated to mitigate potential flood risk.
3-Oct-16: All dispositions resolved. AMEC to issue report.
17-Oct-16: Flooding assessment accepted by OPG Nuclear Safety. AMEC provided 14 recommendations and 4 requirements. All 4 requirements may be resolved via the iterative RWPB flooding assessment. The recommendations and requirements are saved in SharePoint. JV has been provided the flooding report to review and determine what site changes can be incorporated as part of the iterative RWPB flooding assessment. Afterwards, scope to be discussed with AMEC.
1-Nov-16: JV (Ashrf Mohamed) reviewing flooding assessment. JV to meet with OPG (Khai Ngo), tentatively Friday Nov. 4, 2016 to discuss what changes can be incorporated.
14-Nov-16: JV(Ashrf Mohamed) and OPG (Khai Ngo) met on 9-Nov-16 and discussed various options available to further mitigate the impact from flooding. Ashrf to provide drawings to Khai and Khai to define scope for iterative run and inform AME

Outage Window	Window Description
522	522 - Retube Waste Processing Building RWPB

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14983	RWPB - Radiation Monitoring Shielding Installation	[Definition Phase] Event: Late delivery of shielding for RWPB Fixed radiation monitoring equipment. Cause: Ineffective coordination between Engineering, Construction and Vendors to support supply and install of shielding. Impact: Negative Impact on Construction Schedule.		Active	John Hamilton	Kwok Tsang	14-Feb-17	Mitigate	31-Mar-17	3	1	1	3	1	1	1	1

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
9457	In Progress	RWPB Oversight to request weekly updates from JV/CANDU on status of shielding design and expected delivery date of fixed RP equipment.	RWPB Oversight to request weekly updates from JV/CANDU on status of shielding design and expected delivery date of fixed radiation protection equipment shielding.	John Hamilton	Khai Ngo	31-Mar-17	1-Nov-11: Status of shielding report and design will be requested at the next JV/CANDU analysis meeting. RWPB Oversight will also follow up directly with JV lead to obtain status. 14-Nov-16: JV (Ricky Khaloo) is working on report. JV to provide status update on 18-Nov-16. 25-Nov-16: WBM Shielding Report completed by JV and will be sent to OPG for review. 16-Dec-16: JV to internally provide table of all shielding requirements (Candu to JV Civil Design) in December 2016. Report to be formally issued in new year. 13-Jan-17: Report development in progress. OPG/JV determining the feasibilityof moving the WBM by the north west corner to further away from the overhead door. 14-Feb-17: Report with Candu - draft completed and at review stage. WBM has arrived - at Whitby Warehouse.

Outage Window	Window Description
522	522 - Retube Waste Processing Building RWPB

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
Project: Shutdown, Layup, Services -																	
14318	Quality Issues [No Window Related]	EVENT: Additional effort needed due to quality issues in design and field work. CAUSE: Human error IMPACT: Additional cost and schedule delay to develop/implement solutions		Active	Andy Ireland		03-Mar-17	Mitigate	31-Oct-19	4	3	4	16	2	3	4	8

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
5510	In Progress	Initiate Readiness Stakeholder meeting for Breathing Air	Stakeholder meeting to be set at T-5 to ensure Vendor has everything to start execution.	Andy Ireland	Kris Dabiran	31-Dec-16	July 12, 2016-Free Event Challenge Meeting-Civil portion successful. The construction start is scheduled for July 21, 2016. Free Event Challenge Meeting for Mechanical, electrical and I&C will be scheduled for later date. Free Event Challenge Meeting for Mechanical to be scheduled by July 30, 2016. July 28, 2016- Free Event Challenge Meeting-Header portion delayed. Spool prefabrication in the shop behind the schedule, and therefore header construction delayed. One of 3 ITPs for fabrication at Darlington shop approved. 2 with the vendor and approval in progress. August 08, 2016- ITP #2 accepted. ITP # 3 on hold, waiting for ESFOX/WP to issue a FIG and revise the pressure test requirement of FD change paper.
7922	Not Started	Initiate Readiness Stakeholder meeting for Nuclear Dry Air	Stakeholder meeting to be set at T-5 May 1 2017 to ensure Vendor has everything to start execution.	Jos Diening	Greg Gordon	01-May-17	

Outage Window	Window Description
000	000 – No Window Related

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14541	SDLU: Low Confidence on Vendor Estimate Based on OPEX [No Window Related]	EVENT: SDLU Projects cost exceeds estimate class at RQE. CAUSE: Scope growth, estimate quality, and productivity issues. IMPACT: Expenditure over allocated contingency		Active	Andy Ireland		15-Jan-17	Mitigate	10-Oct-19	3	3	5	15	2	3	4	8

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
5510	In Progress	Initiate Readiness Stakeholder meeting for Breathing Air	Stakeholder meeting to be set at T-5 to ensure Vendor has everything to start execution.	Andy Ireland	Kris Dabiran	31-Dec-16	July 12, 2016-Free Event Challenge Meeting-Civil portion successful. The construction start is scheduled for July 21, 2016. Free Event Challenge Meeting for Mechanical, electrical and I&C will be scheduled for later date. Free Event Challenge Meeting for Mechanical to be scheduled by July 30, 2016. July 28, 2016- Free Event Challenge Meeting-Header portion delayed. Spool prefabrication in the shop behind the schedule, and therefore header construction delayed. One of 3 ITPs for fabrication at Darlington shop approved. 2 with the vendor and approval in progress. August 08, 2016- ITP #2 accepted. ITP # 3 on hold, waiting for ESFOX/WP to issue a FIG and revise the pressure test requirement of FD change paper.
7864	Not Started	SDLU to engage resources to perform oversight	1. Biweekly monitoring of vendor. 2. Resident engineer in the field for prompt technical issue resolution. 3. Dedicated cost look-ahead team.	Andy Ireland		10-Oct-19	
7922	Not Started	Initiate Readiness Stakeholder meeting for Nuclear Dry Air	Stakeholder meeting to be set at T-5 May 1 2017 to ensure Vendor has everything to start execution.	Jos Diening	Greg Gordon	01-May-17	

Outage Window	Window Description
000	000 – No Window Related

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14452	Vendor Resource constraints impacting SDLU execution [No Window Related]	EVENT: SDLU project deliverables not completed as planned. CAUSE: Vendor does not have sufficient qualified personnel to complete SDLU project deliverables IMPACT: Delayed project AFS.		Active	Andy Ireland		15-Jan-17	Mitigate	01-Mar-17	3	2	4	12	1	2	4	4

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
7923	In Progress	Oversight on Vendor Performance	Assess the vendor staff performance and proactively request the contractor to take corrective actions where needed Nov 25, 2016 - There are weekly in house project meetings specifically to go over vendor cost performance reports and schedule. See attached meeting notice.	Andy Ireland		31-Jan-17	

Outage Window	Window Description
000	000 – No Window Related

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14543	Addition of New / Revised Program Requirements to the SDLU PO Agreement [No Window Related]	EVENT: OPG requires the contractor to implement new and / or revised refurbishment program processes that are not currently in the signed PO agreement. CAUSE: New and / or revised refurbishment processes being implemented that the contractor must adhere to. IMPACT: This could lead to an increase in the PO value. This risk is identified based on recent project OPEX where new requirements for reporting frequency and execution schedule requirements have resulted in Contractor initiated change requests to increase the fixed price portion of the project.		Active	Andy Ireland		15-Jan-17	Accept	31-Jan-17	5	2	1	10	5	2	1	10

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
5987	In Progress	Complete PMT review at ES Fox	Initiate and complete a project management review at ES Fox (by consultant)	Andy Ireland		31-Dec-16	PO issued for consultants and review underway. Report expected in spring of 2016.July 8, 2016 - The PMT Review has been completed. New PO from BOP to ES Fox. Alston is on Service Air Oncore approvals. Need to add Oversight findings. 14JUL2016, AI: more time required to adequately address this action.29JUL2016, AI: Service Air / WCA fire fighting has resulted in more time required to address this action appropriately.

Outage Window	Window Description
000	000 – No Window Related

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13514	Procurement of materials is delayed [No Window Related]	EVENT: Material is ordered/delivered late. CAUSE: Delays in engineering/design/ transit or late release of procurement funds. IMPACT: Delayed Project Schedule and increased costs.		Active	Andy Ireland	Andy Ireland	15-Jan-17	Mitigate	31-Dec-16	3	2	3	9	2	1	2	4

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
7796	In Progress	Perform Oversight to mitigate Risk	Perform Oversight as described by Oversight Activities 181 and 242	Andy Ireland	Kris Dabiran	31-Dec-16	
7952	Not Started	Initiate procurement of NC1 and NC3 Valves	Complete engineering review at a minimum 18 months in advance of restoration window to provide ample lead time for placing purchase order with the vendor	Jos Diening		31-May-18	

Outage Window	Window Description
000	000 – No Window Related

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14576	SDLU Project estimates increase past Class 5 Limit [WIndow 130, 131, 132, 133, 539]	EVENT: SDLU Project estimates for Permanent Equipment Monitoring and Temporary Power Supply increase beyond Class 5 Limit as they are Budgetary estimates. CAUSE: Preliminary Assessing determines additional costs are needed to execute the work IMPACT: Additional cost to project to cover refined estimate.		Active	Andy Ireland		15-Jan-17	Monitor	31-Jan-17	3	3	1	9	3	3	1	9

Outage Window	Window Description
130	130 - LEAD IN Segment PMs & Miscellaneous Work
131	131 - REMOVAL Segment PMs & Miscellaneous Work
132	132 - INSPECT & INSTALL Segment PMs & Misc Work
133	133 - RTS Segment PMs & Miscellaneous Work
539	539 - Temporary Power Distribution System (TPDS)

There are no Draft, Not Started, In Progress Actions associated with the risk.

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14622	Delay to Installation of Unit Power Distribution	EVENT: Delay to installation of Unit Power Distribution project CAUSE: There is a lack of station resources in place to install the breaker. IMPACT: Increased costs to SDLU to pay for premium hours.		Active	Andy Ireland	Jos Diening	15-Jan-17	Monitor	31-Mar-17	3	1	3	9	3	1	3	9
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
15043	Refurbishment Breathing Air Support for Bulkhead Installation	EVENT: SDLU project group is preparing EC 136384 as a contingency to allow Refurbishment Breathing Air to be used to install the U2 containment bulkhead. The current refurbishment plan is to use Station Breathing Air for the installation of the Bulkhead. In the case that station breathing air is not available (i.e. D1711 outage moves, or unplanned long forced outage) the contingency plan is to have EC 136384 available to allow refurbishment to become independent from the station needs for bulkhead installation. Use of EC 136384 relies on the Refurbishment Breathing Air System being installed on time. Note that as the defueling campaign moves ahead, there is less of an overlap between the bulkhead installation and D1711. CAUSE: Shutdown Layup has a planned schedule with the Vendor and pulling tasks ahead may not be feasible. In addition, there are delays day-by-day in the field on the breathing air project. There is no room for schedule float as the AFS date is currently February 17, 2017 to support bulkhead installation. IMPACT: Delay to critical path of Refurbishment. Increased costs for more labour work etc.	3	Active	Andy Ireland	Kris Dabiran	15-Jan-17	Accept	29-Jan-17	3	3	3	9	3	3	3	9
			Outage Window		**Window Description**												
			505		505 - Breathing Air - Install and Tie-In (SDL)												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13536	Storage of Component Internals [Window 2, 3, 48]	EVENT: Procurement of new parts for replacement is needed. In addition, there is no plan in place to store valve internals which can lead significant quality degradation of the valve internals. CAUSE: 1) Poor/inadequate storage. 2) Poor/Inadequate Layup of parts taken out. 3) Obsolescence of components IMPACT: The delay of finding replacement parts (via ordering of new parts, NICR, etc) may cause additional costs (e.g. replacing degraded components) and schedule delays to refurbishment restart.	4	Active	Andy Ireland	Jos Diening	15-Jan-17	Monitor	31-Jan-17	2	2	4	8	2	2	4	8
			Outage Window		**Window Description**												
			002		002 - Conventional Side Layup												
			048		048 - HTS Aux Drain,Purge,Outside Vault												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13619	SDLU Pre-requisite projects excusable delays [No Window Related]	EVENT: Prerequisite work required before breaker open may be delayed. CAUSE: 1) Poor quality vendor installation planning due to excusable delays.(Some project designs are currently delayed and challenging N-PROC-MA-0022 milestones. These delays are partially caused by OPG inefficiencies in reviews and late scope identification). 2) Productivity lower than planned due to OPG coordination and planning (e.g. permitry, work authorization, RP support). IMPACT: Increased labour costs and additional trades standby costs.		Active	Andy Ireland		15-Jan-17	Mitigate	01-Feb-17	2	4	4	8	1	4	1	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			5510	In Progress	Initiate Readiness Stakeholder meeting for Breathing Air	Stakeholder meeting to be set at T-5 to ensure Vendor has everything to start execution.	Andy Ireland	Kris Dabiran	31-Dec-16	July 12, 2016-Free Event Challenge Meeting-Civil portion successful. The construction start is scheduled for July 21, 2016. Free Event Challenge Meeting for Mechanical, electrical and I&C will be scheduled for later date. Free Event Challenge Meeting for Mechanical to be scheduled by July 30, 2016. July 28, 2016- Free Event Challenge Meeting-Header portion delayed. Spool prefabrication in the shop behind the schedule, and therefore header construction delayed. One of 3 ITPs for fabrication at Darlington shop approved. 2 with the vendor and approval in progress. August 08, 2016- ITP #2 accepted. ITP # 3 on hold, waiting for ESFOX/WP to issue a FIG and revise the pressure test requirement of FD change paper.							
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			000		000 – No Window Related												

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14565	Service Air Pipe Routing [Window 506]	EVENT: Lack of space and possibility of encountering rebar in pipe route. CAUSE: Selected pipe route is at heights and certain sections have limited access and/or space. IMPACT: Risk on personal safety and quality during installation.		Active	Andy Ireland	Alston Castelino	15-Jan-17	Mitigate	31-Jan-17	4	1	2	8	3	1	2	6
			Outage Window		**Window Description**												
			506		506 - Service Air - Install and Tie-In (SDL)												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
11824	Insufficient bulk gases for Refurb work [Window 13, 38]	EVENT: Existing system supply may not have enough bulk gases to do refurbishment work, specifically the gases for SG/Conventional systems layup (Nitrogen and Helium gases). CAUSE: Amount of bulk gases required to fill the systems are unknown. IMPACT: Increased cost and schedule delays to project.		Active	Andy Ireland		15-Jan-17	Accept	30-Apr-17	2	1	3	6	2	1	3	6
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			6752	In Progress	Assess quantity of bulk gases needed (Nitrogen/Helium)	Determine the amount of bulk gases needed for Refurbishment Layup.	Andy Ireland	Alston Castelino	05-May-17	Bulk Nitrogen & Helium Supply will be used for cover gas during draining and layup for the boilers, PHT & Moderator 13May2016: Assumptions used in SRE calculation should be validated. Nitrogen needed for PHT system and Helium for Moderator not taken into account.							
			Outage Window		**Window Description**												
			013		013 - PHT Bulk Drain (Includes V42 Mod)												
			038		038 - Moderator Drained & Flush												
13432	New 600 lb flanges not installed in Unit 2 BO1/2 [Window 3]	EVENT: New 600 lb flanges will not be installed prior to installation of the wet layup skids during U2 refurbishment on BO1/BO2. CAUSE: Based on OPEX from previous outages, WOs 2391690 and 32391692 were constantly pushed from outage to outage. IMPACT: Will impact Costs, schedule of DNRU2 if not implemented prior to outage.		Active	Andy Ireland	Alston Castelino	15-Jan-17	Mitigate	30-Oct-16	3	2	2	6	3	1	1	3
			Outage Window		**Window Description**												
			003		003 - Secondary Side SG Layup												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13608	No PMT Cost Reduction [No Window Related]	EVENT: Vendor PMT costs do not reduce if vendor workload is decreased. CAUSE: ESFox has stated that it needs to maintain PMT resources across all SDLU/RSF projects.IMPACT: PMT costs may be increased per project as the overhead for the entire team is to be maintained upon project cancellation		Active	Andy Ireland		15-Jan-17	Monitor	31-Jan-17	3	2	1	6	3	2	1	6
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			5987	In Progress	Complete PMT review at ES Fox	Initiate and complete a project management review at ES Fox (by consultant)	Andy Ireland		31-Dec-16	PO issued for consultants and review underway. Report expected in spring of 2016.July 8, 2016 - The PMT Review has been completed. New PO from BOP to ES Fox. Alston is on Service Air Oncore approvals. Need to add Oversight findings. 14JUL2016, AI: more time required to adequately address this action.29JUL2016, AI: Service Air / WCA fire fighting has resulted in more time required to address this action appropriately.							
			Outage Window		**Window Description**												
			000		000 – No Window Related												
14045	Insufficient Breathing Air for Power Track work during Refurbishment [Window 505]	EVENT: Breathing Air distribution and capacity assessment concludes that there is insufficient Breathing Air to support Refurbishment activities in the Fuelling Machine Duct CAUSE: Refurbishment requirements of 24 workers in plastic suits exceeds the maximum number of workers that have ever worked in the Fuelling Machine Duct (based on OPEX). IMPACT: Additional cost to the project to create a new modification to support this work. Delay to SDLU Breathing Air schedule		Active	Andy Ireland	Kris Dabiran	15-Jan-17	Mitigate	03-Jul-17	2	2	3	6	1	1	1	1
			Outage Window		**Window Description**												
			505		505 - Breathing Air - Install and Tie-In (SDL)												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14420	Wet Layup Skids not Meeting Intended Design Function [Window 37]	EVENT: Wet layup skids may not meet intended design function CAUSE: Procurement/fabrication of skids does not meet the required specifications IMPACT: Delay to project schedule and increase in project costs		Active	Andy Ireland	Jos Diening	15-Jan-17	Monitor	30-Aug-17	2	1	3	6	2	1	3	6
			Outage Window		**Window Description**												
			003		003 - Secondary Side SG Layup												

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14420	Wet Layup Skids not Meeting Intended Design Function [Window 37]	EVENT: Wet layup skids may not meet intended design function CAUSE: Procurement/fabrication of skids does not meet the required specifications IMPACT: Delay to project schedule and i	037		037 - Sec Side SG Clean & Install Access Ports												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14421	Inflatable Bung does not provide Adequate Sealing [Window 37]	EVENT: Inflatable bung may not provide adequate sealing of nitrogen blanket CAUSE: Issues in bung design or bung fabrication IMPACT: Transfer of nitrogen beyond the intended system barriers leading to a delay in the T/G refurbishment schedule. Minimal impact to cost. Schedule delay to project.		Active	Andy Ireland	Jos Diening	15-Jan-17	Mitigate	17-Mar-17	2	1	3	6	1	1	2	2
			Outage Window		**Window Description**												
			037		037 - Sec Side SG Clean & Install Access Ports												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14451	Refurbishment Compressors AFS to support Bulkhead Tie-in [Window 505]	EVENT: Breathing Air Pre Bulkhead Tie-in (MEC #135592) not installed in time. Assuming that the breathing air refurbishment compressors will be available to support bulkhead tie-in. (ECR# 24553) CAUSE: Compressor AFS date does not give float time to install Bulkhead tie-in before January 2017. There is little room for schedule slippage as the AFS date for the compressors is to be January 17, 2017 and installation of the bulkhead begins in February 2017. IMPACT: Delay to critical path of Refurbishment. Increased costs to expedite procurement/installation of compressors.	3	Active	Andy Ireland	Kris Dabiran	15-Jan-17	Mitigate	31-Jan-17	3	2	2	6	2	1	2	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			7796	In Progress	Perform Oversight to mitigate Risk	Perform Oversight as described by Oversight Activities 181 and 242	Andy Ireland	Kris Dabiran	31-Dec-16								
			Outage Window		**Window Description**												
			505		505 - Breathing Air - Install and Tie-In (SDL)												
14566	LPSW Drain Tie-in (Service Air) [Window 506]	EVENT: LPSW line integrity is poor. CAUSE: There is high corrosion and low wall thickness at planned hot tap location. IMPACT: Schedule delays and higher cost to execute planned hot tap.		Active	Andy Ireland		15-Jan-17	Mitigate	31-Jan-17	3	1	2	6	3	1	1	3
			Outage Window		**Window Description**												
			506		506 - Service Air - Install and Tie-In (SDL)												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
11361	Degraded condition of PHT IX columns may affect layup strategies [Window 13]	EVENT: High pressure differential across IX columns.Degraded conditions of the PHT IX columns. CAUSE: Degraded conditions of the PHT IX columns. IMPACT: Might affect unit startup schedule by prolonging purification	2	Active	Andy Ireland		15-Jan-17	Monitor	31-Oct-16	2	2	2	4	2	2	2	4
			Outage Window		**Window Description**												
			013		013 - PHT Bulk Drain (Includes V42 Mod)												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
12012	Station configuration does not support layup alignment (Layup/Services) [No Window Related]	EVENT: Station configuration does not support layup alignment. CAUSE: 1) MP"K" and "F" work not completed, or if there is work required to support layup has not been identified yet (not known because system will be in non-standard operation). 2) Field configurations different than planned and discovery issues requiring design field changes. For example, Dry Air purge component alignment IMPACT: Results in additional costs and schedule delays.	2	Active	Andy Ireland		15-Jan-17	Monitor	15-Oct-16	2	2	1	4	2	2	1	4
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13462	SGECS N2 blanketing design (MEC 123794) [Window 3]	EVENT: Layup of SGECS for U3/U1/U4 will be delayed due to unavailbility of Nitrogen. CAUSE: Current design for Unit 2 SG secondary side layup uses nitrogen supply from the existing SGECS but the configuration of U3/U1/U4 are not the same - they use air. Currently no EPC contract for U3/1/4 nitrogen supply. IMPACT: Increased cost and schedule delay to project.		Active	Andy Ireland		15-Jan-17	Mitigate	31-Jan-17	2	2	1	4	1	2	1	2
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			5329	In Progress	SG Layup redesign for U3/U1/U4	A redesign for the layup of the top of the SG for U3/U1/U4 has to be made. Design will be initiated after U2 refurbishment starts. This will allow for evaluating effectiveness of Unit 2 design and use OPEX for Unit 1, 3, and 4 Nitrogen Blanketing design.	Andy Ireland	Alston Castelino	24-Feb-17	28Jan2016: ECR 24399 approved. 29Oct2015: Needs Doc signed. ECR to be initiated. 15Oct2015: Needs Doc drafted and routed for review/signatures. 28July2015: SDLU Project to create ECR for approval. 05Dec2016: Re-design for U1/U3/U4 will be determined based on effectiveness for N2 blanketing modification for U2							

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13462	SGECS N2 blanketing design (MEC 123794) [Window 3]	EVENT: Layup of SGECS for U3/U1/U4 will be delayed due to unavailbility of Nitrogen. CAUSE: Current design for Unit 2 SG secondary side layup uses nitrogen supply from the existing SGE	**Outage Window**		**Window Description**												
			003		003 - Secondary Side SG Layup												
13593	CCW may need to be laid up [Window 57]	EVENT: CCW system may need to be laid up (Contingent cost to be allocated for this project). CAUSE: If LPSW outage lasts more than 60 days. IMPACT: Schedule delays, increased scope and costs		Active	Andy Ireland		15-Jan-17	Monitor	03-Nov-17	2	2	1	4	2	2	1	4
			Outage Window		**Window Description**												
			057		057 - LPSW Outage Phase 2 & 3												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13848	Requirements for monitoring of permanent station system components and equipment are not optimized [No Window Related]	EVENT: The contractor's resource strategy for completing scope associated with monitoring of permanent station system components and equipment is not optimized. CAUSE: Uncertainties associated with the scope IMPACT: Increased project cost to execute scope.	4	Active	Andy Ireland	Andy Ireland	15-Jan-17	Mitigate	15-Sep-16	4	1	1	4	1	1	1	1
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14360	Contractors Field Staff Not Prepared To Perform Field Work [No Window Related]	EVENT: Contractor field staff are not prepared (knowledge, experience) to perform field work CAUSE: Contractor field staff lack required qualifications RESULT: Delay to the execution schedule		Active	Andy Ireland	Andy Ireland	15-Jan-17	Mitigate	15-Oct-16	2	1	2	4	1	1	2	2
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			6810	Not Started	Obtain Vendor employee training matrix	Review Vendor employee training matrix to ensure field staff are qualified	Andy Ireland	Andy Ireland	15-Oct-16								
			Outage Window		**Window Description**												
			000		000 – No Window Related												
14361	Contractor Field Staff Impact Station Operations [No Window Related]	EVENT: Contractor field staff negatively impact station operations CAUSE: Lack of contractor awareness of impact to station operations during field execution IMPACT: Delay to the station schedule		Active	Andy Ireland	Andy Ireland	15-Jan-17	Mitigate	15-Oct-16	2	1	2	4	1	1	2	2
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14580	Additional minor mods may be required to support the Dry Air Conventional Scope of Work [Window 2]	EVENT: Additional minor mods may be required to support the Dry Air Conventional Scope of Work. CAUSE: Constructability team uncovering new needs as assessing progressesIMPACT: Result in increase in scope, schedule and cost	2	Active	Jos Diening	Wayne Allen	15-Jan-17	Monitor	31-May-19	2	2	1	4	2	2	1	4
			Outage Window		**Window Description**												
			002		002 - Conventional Side Layup												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13509	Dose rates higher than planned [No Window Related]	EVENT: Actual dose is higher than planned. CAUSE: This can be caused by higher fields in the vault. IMPACT: Delays to schedule, associated costs, and increased dose to workers and/or increased personnel required.		Active	Andy Ireland	Andy Ireland	15-Jan-17	Accept	31-Dec-16	1	1	2	2	1	1	2	2
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13636	Currently no alternate cooling water design for SA compressors [Window 506]	EVENT: No cooling water available during 60 day LPSW outage. CAUSE: No alternate connection designed in SA mod or LPSW alternate cooling mod, to LPSW. IMPACT: More design work required on existing mods (T/P mod) or reduced service air capacity.		Active	Andy Ireland		15-Jan-17	Accept	01-Nov-17	2	1	1	2	2	1	1	2
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							

13636	Currently no alternate cooling water design for SA compressors [Window 506]	EVENT: No cooling water available during 60 day LPSW outage. CAUSE: No alternate connection designed in SA mod or LPSW alternate cooling mod, to LPSW. IMPACT: More design work required on existing mods (T/P mod) or reduced service air capacity.								5Feb2016: For U3 outage, provisions available to supply temporary power/cooling water to SA compressor. Impact on U3 will be determined by begining of U3 outage. 15 July 2016-Kris Dabiran-ENA Holds below assigned to NR Design Engineering: WO Task ENA Hold Description Need Date Department Crew 04931745 01 DURING U1 LPSW OUTAGE, TEMPORARY WATER SUPPLY TO 0-75130-CP12 WILL BE REQUIRED TO SUPPORT CONTINUED BREATHING AIR SUPPLY TO CONTAINMENT Sept. 15.16 NRDEM NRDD 04931746 01 DURING U2 LPSW OUTAGE, TEMPORARY WATER SUPPLY TO 0-75130-CP14 WILL BE REQUIRED TO SUPPORT CONTINUED BREATHING AIR SUPPLY TO CONTAINMENT Sept. 15.16 NRDEM NRDD 04931747 01 DURING U4 LPSW OUTAGE, TEMPORARY WATER SUPPLY TO 0-75130-CP16 WILL BE REQUIRED TO SUPPORT CONTINUED BREATHING AIR SUPPLY TO CONTAINMENT Sept. 15.16

			5476	In Progress	Investigate impact of no alternate cooling water for SA compressors during U3 LPSW outage	SDLU to investigate the the impact of having no alternate cooling water to Service Air Compressors during the U3 LPSW outage.	Andy Ireland	Alston Castelino	28-Apr-17	NRDEM NRDD 04931748 01 BREATHING AIR COMPRESSOR MOTOR BREAKERS WILL BE SUPPLIED FROM 4-53340-28CB11 (0-75130-CP16). IN CASE OF BUS 28 OUTAGE, THE POWER TO THE COMPRESSOR MUST BE SUPPLIED FROM OTHER SOURCES. Sept. 15.16 NRDEM NRLD 04931749 01 BREATHING AIR COMPRESSOR MOTOR BREAKERS WILL BE SUPPLIED FROM 2-53340-28CB11 (0-75130-CP14). IN CASE OF BUS 28 OUTAGE, THE POWER TO THE COMPRESSOR MUST BE SUPPLIED FROM OTHER SOURCES. Sept. 15.16 NRDEM NRLD 04931883 01 BREATHING AIR COMPRESSOR MOTOR BREAKERS WILL BE SUPPLIED FROM 1-53340-28CB11 (0-75130-CP12). IN CASE OF BUS 28 OUTAGE, THE POWER TO THE COMPRESSOR MUST BE SUPPLIED FROM OTHER SOURCES. Sept. 15.16 NRDEM NRLD 04931888 01 INSTALL/REMOVE TEMPORARY WATER AND POWER SUPPLIES TO 0-75110-CP13 DURING U3 BU27 AND/OR LPSW OUTAGE Sept. 15.16 NRDEM NRGD

																					04931891 01 INSTALL/REMOVE TEMPORARY LPSW AND/OR POWER TO 0-75110-CP12 DURING U3 BU28 OR LPSW OUTAGE Sept. 15.16 NRDEM NRGD 04931892 01 INSTALL/REMOVE TEMPORARY WATER AND ELECTRICAL SUPPLY TO 0-75110-
			5477	Draft	Operations to revise OM	Operations to revise Operating Manual to turn off CP11 during U2 outage.															
			Outage Window		**Window Description**																
			506		506 - Service Air - Install and Tie-In (SDL)																
14129	OPG Acceptance of Design ECs without having Final Certified Vendor (Atlas Copco) Documents [Window 505]	EVENT: Rework might be needed for Design EC to allign with final approved Atlas Copco documents. CAUSE: Accepting the Design ECs without verifying information from Approved Atlas Copco Documents. IMPACT: Additional cost and schedule delay for rework.		Active	Andy Ireland	Kris Dabiran	15-Jan-17	Mitigate	30-Aug-16	1	1	2	2	1	1	1	1				
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**											
			7272	In Progress	Monitor Receipt of Atlas Copco Documentation	Refer to NK38-CORR-09701-0579150. Breathing Air Design for Header was accepted without all of vendor documentation provided. OPG MTL to track receipt of documents from vendor to DSP and ensure that documents are reviewed against design to ensure that no changes are required. Update this action as required until all documents in NK38-CORR-09701-0579150 are received all changes to EC are identified.	Andy Ireland	Kris Dabiran	10-Jan-17	It is in progress. More document received from Atlas Copco, but it is not completed yet. Discussed with ESFOX PM in Project meeting, 14 July 2016 and he will make a conference call to follow up on Friday July 15, 16. August 08, 16-Kris Dabiran- FMEA (failure mode analysis issued by Atlas Copco on August 08, 16, reviewed and accepted by WP (DSP) and issued to OPG. Still waiting and follow up for all the documentations to be issued September 22,16-Kris Dabiran- ESFOX informed SDLU in the project meeting, that documentation from one of the compressor component supplier delayed and affect CSA requirement in progress in Atlas Copco Montreal office. Dec. 05, 2016-KrisDabiran- ESFOX re-base lining the P6 schedule and Post DCAVR activities (including verification of I & C supplier documentation) is due 04-Jan-17. Action is then extended to Jan. 10, 2016.				
			Outage Window		**Window Description**																
			505		505 - Breathing Air - Install and Tie-In (SDL)																
14323	Breathing Air Additional Scope Increase [Window 505]	EVENT: Design of TMOD for Breathing Air Tie-in (for bulkhead installation) is delayed. ECR 24637 has been initiated to use the refurbishment breathing air system to install the refurbishment containment bulkhead. CAUSE: Scope was not identified in the Scope of Work or the MDR and thus was identified late in the design IMPACT: Additional cost to expedite design and field work.	4	Active	Andy Ireland	Kris Dabiran	15-Jan-17	Mitigate	01-Dec-16	1	2	1	2	1	1	1	1				
			Outage Window		**Window Description**																
			505		505 - Breathing Air - Install and Tie-In (SDL)																
			There are no Draft, Not Started, In Progress Actions associated with the risk.																		

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

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Report Owner: L. Greenland
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Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14563	Breathing Air/Service Air Compressors Maintenance [Window 57, 505, 506]	EVENT: Human performance issue for operations & maintenance personnel CAUSE: New compressors may not meet intended design function. IMPACT: Delay in schedule due to insufficient knowledge of the new compressors by operations & maintenance personnel.		Active	Andy Ireland		15-Jan-17	Monitor	16-Oct-19	2	1	1	2	2	1	1	2
			Outage Window		**Window Description**												
			057		057 - LPSW Outage Phase 2 & 3												
			505		505 - Breathing Air - Install and Tie-In (SDL)												
			506		506 - Service Air - Install and Tie-In (SDL)												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14624	New Breakers Interface with Obsolete MCC	EVENT: New breakers will not interface with older obsolete MCC. CAUSE: MCC is too old causing interface problems with the new equipment. IMPACT: Delay in schedule to solve the interface problems.		Active	Andy Ireland	Jos Diening	15-Jan-17	Mitigate	17-Oct-16	1	1	2	2	1	1	1	1
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
12022	Additional minor mods may be required to support the SGECS Scope of Work [Window 3]	EVENT: Additional minor mods may be required to support the SGECS Scope of Work. CAUSE: Constructability team uncovering new needs as assessing progresses. IMPACT: Result in increase in scope, schedule and cost	2	Active	Andy Ireland	Alston Castelino	15-Jan-17	Monitor	31-May-19	1	1	1	1	1	1	1	1
			Outage Window		**Window Description**												
			003		003 - Secondary Side SG Layup												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13588	Discovery work [No Window Related]	EVENT: There is a risk that there will be work that is not accounted for. Funding might not be allocated to something that is unplanned. CAUSE: Unforeseeable events such as a broken component in the field. For example, SG internal condition is different than expected. IMPACT: Addition of work during next phase which will increase cost and schedule delays.		Active	Andy Ireland		15-Jan-17	Accept	31-Oct-19	1	1	1	1	1	1	1	1
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

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Project: Specialized Projects - 73310																	
11982	Delay In Contracting Process Impacting SDS Project Schedule [Window 7]	Event: Delay in material availability. Cause: Delay in SDS procurement contract issuance results in a delay of material availability for installation. Impact: Cost and schedule of the project would be impacted if materials were unavailable on time.	4	Active	Sorin Marinescu	Dale Schnedler	02-Mar-17	Mitigate	31-Dec-17	2	1	4	8	2	1	4	8

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
2713	In Progress	Expedite new contract process	Hold regular periodic meetings are held with Supply Chain to review the status and expedite pending contracts until all Project contracts have been issued.	Sorin Marinescu	P Sharawy	31-Dec-17	Update June 6, 2016 - Action date changed to correspond to the date currently scheduled for issuing the last production Purchase Order for the SDS Computers Replacement Project, including the operational spare parts for the SDS2 Trip Computers. This Purchase Order is scheduled after completion of the Hardware Qualification Tests of the system in order to ensure a complete list of spare parts has been compiled. Regular periodic meetings are held with Supply Chain to review the status and expedite pending contracts. As a result, a number of contracts have been issued. This level of oversight will continue as required. All the other contracts, including service and cables (regarding to 3220) We may still need to exercise and expedite hiring of resources for installation - 31-Jun-2017

Outage Window	Window Description
007	007 - SDS1 & SDS2 Mods & Rehab

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current Probability	Current Financial	Current Schedule	Current Score	Post Probability	Post Financial	Post Schedule	Post Score
12323	Hardware Delivery Delay Impacting SDS Software Integration [Work Window 7]	Event: Hardware delivery is late reducing the time available to integrate hardware components with avilable software. Cause: The late issuance of hardware contracts squeezes the equipment supplliers reducing their available float and their ability to handle unexpected changes. Impact: This risk would cause a significant schedule impact which would in turn impact cost.	1	Active	Sorin Marinescu	Dale Schnedler	02-Mar-17	Monitor	31-Dec-17	2	1	3	6	2	1	3	6

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
2713	In Progress	Expedite new contract process	Hold regular periodic meetings are held with Supply Chain to review the status and expedite pending contracts until all Project contracts have been issued.	Sorin Marinescu	P Sharawy	31-Dec-17	Update June 6, 2016 - Action date changed to correspond to the date currently scheduled for issuing the last production Purchase Order for the SDS Computers Replacement Project, including the operational spare parts for the SDS2 Trip Computers. This Purchase Order is scheduled after completion of the Hardware Qualification Tests of the system in order to ensure a complete list of spare parts has been compiled. Regular periodic meetings are held with Supply Chain to review the status and expedite pending contracts. As a result, a number of contracts have been issued. This level of oversight will continue as required. All the other contracts, including service and cables (regarding to 3220) We may still need to exercise and expedite hiring of resources for installation - 31-Jun-2017

Outage Window	Window Description
007	007 - SDS1 & SDS2 Mods & Rehab

ONTARIO POWER GENERATION

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ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current Probability	Current Financial	Current Schedule	Current Score	Post Probability	Post Financial	Post Schedule	Post Score
13463	SDS Interface Compatibility Issues Discovered During Installation [Window 7]	Event: SDS computer compatibility issues during installation. Cause: The system will be thoroughly tested prior to installation under simulated conditions but some conditions (Ispecifically driving actual field solenoid valves) cannot be simulated and therefore must be tested in the field. Impact: Both cost and schedule would be impacted by the interface compatibility issues if they arise.	1	Active	Sorin Marinescu	Dale Schnedler	02-Mar-17	Accept	30-Jun-18	2	1	3	6	1	1	3	3
			Outage Window		**Window Description**												
			007		007 - SDS1 & SDS2 Mods & Rehab												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
12327	SDS Computer Project Failure to Meet Hardware Design Requirements [Window 7]	Event: The system as designed fails to meet design requirements during design testing and qualification. Cause: Latent design flaws. Impact: Both cost and schedule could be impacted due to substantial rework being required.	1	Active	Sorin Marinescu	Dale Schnedler	02-Mar-17	Monitor	31-Dec-17	1	1	4	4	1	1	4	4
			Outage Window		**Window Description**												
			007		007 - SDS1 & SDS2 Mods & Rehab												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14511	SDS Computer Qualified Resources Unavailable During Execution [Window 5,7,12]	EVENT: Delay due to a reassignment of SDS execution resources CAUSE: The resources currently assigned per the current SDS execution resourcing strategy are unavailable, requiring the contracting of resources less familiar with the site, system and scope of work and resulting in a delay to the schedule. IMPACT: Schedule is pushed resulting in a cost impact to the project because the work cannot be completed as planned.		Active	Ivan Dimitrov	Dale Schnedler	02-Mar-17	Mitigate	31-Dec-17	1	1	4	4	1	1	4	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			7761	In Progress	SDS Computers Resourcing Follow Up	Follow up with Darlington Projects and Control Maintenance to ensure that SDS qualified resources are available to support installation of the replacement SDS Computers. Develop and document a resource strategy for execution.	Ivan Dimitrov	P Sharawy	30-Jul-17	Work in this area has progressed as follows. · Breakdown of BTU and PWU installation effort provided and approved in accordance with CPAA in October, 2016. · Follow up meeting with Darlington Projects and Control Maintenance (Refurbishment) to review scope, effort and resource requirements in October, 2016. · Follow up meeting with Control Maintenance Darlington to review scope, effort and resource needs in December, 2016. · There is still a risk that sufficient SDS qualified resources would not be available to support installation. Need to confirm availability closer to installation							
			Outage Window		**Window Description**												
			007		007 - SDS1 & SDS2 Mods & Rehab												
12328	SDS Computer Project Grounding Problem [Window 7]	Event: SDS Computer grounding discovered during install. Cause: Grounding has been an issue in past computer system installations therefore there is a risk tha the same issue will arise with the installation of the new equipment. Impact: Both cost and schedule ofthe project would be impacted.	1	Active	Sorin Marinescu	Dale Schnedler	02-Mar-17	Monitor	30-Jun-18	1	1	3	3	1	1	3	3
			Outage Window		**Window Description**												
			007		007 - SDS1 & SDS2 Mods & Rehab												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13464	SDS Equipment Fails During Installation [Window 7]	Event: SDS Equipment fails during or before installation. Cause: All SDS computer components are being prcured at the same time therefore, by the time the parts are installed for U4 refrubishmnet they will have been in storage for 7 years creating a risk that they will fail when installed. Impact: The failure of the equipment will have an impact on both cost and schedule as replacement components will have to be procured and installed.	2	Active	Sorin Marinescu	Dale Schnedler	02-Mar-17	Mitigate	30-Jun-18	1	1	3	3	1	1	3	3
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			5194	In Progress	Spare part purchases for vulnerable components	Confirm and order spares for vulnerable components.	Sorin Marinescu	P Sharawy	31-Dec-17	Update June 6, 2016 - Action date changed to correspond to the date currently scheduled for issuing the last production Purchase Order for the SDS Computers Replacement Project, including the operational spare parts for the SDS2 Trip Computers. This Purchase Order is scheduled after completion of the Hardware Qualification Tests of the system in order to ensure a complete list of spare parts has been compiled. Spares must be ordered before AFS - 3-Jun-2017							

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13464	SDS Equipment Fails During Installation [Window 7]	Event: SDS Equipment fails during or before installation. Cause: All SDS computer components are being prcured at the same time therefore, by the time the parts are installed for U4 refrubi	**Outage Window**		**Window Description**												
			007		007 - SDS1 & SDS2 Mods & Rehab												

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
Project: Steam Generators -																	
13448	PSC Execution Window Extended as a Result of Integrating Schedule with Other Work Groups	EVENT: Baseline execution window for primary side clean work impacted and extended. CAUSE: Schedule integration between multiple work groups performing work during the SG primary side window, including IMS and other projects. IMPACT: This will impact SG critical path and result in additional costs to the project.	3	Active	Pejman Asgaripour	Mike Lutz	16-Feb-17	Accept	02-Jul-18	5	2	4	20	5	2	4	20
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**						
			9198	In Progress	Process PCD 16 to address the integration of Window 62	Review of PCD 16 is underway.		Pejman Asgaripour	Mike Lutz	01-Apr-17							
			Outage Window	**Window Description**													
			062	062 - Primary Side SG Clean and Inspect													
13450	SG Primary Side Demobilization Activities Extended Due to Layup and Inspection Schedule	EVENT: EPC vendor will need to carry resources (trades and PMT) for an extended duration in order to support SG demobilization activities at the end of the SG primary side maintenance window while IMS is executing work. CAUSE: Changes to the overall refurbishment schedule that are not driven by the EPC contractor. IMPACT: This could result in an extension to the baseline schedule and a significant cost increase to the project.	3	Active	Pejman Asgaripour	Mike Lutz	16-Feb-17	Accept	02-Jul-18	5	2	4	20	5	2	4	20
			Outage Window	**Window Description**													
			062	062 - Primary Side SG Clean and Inspect													
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14709	Steam Generator New Manway Manipulator's Not Procured In Time For Start of Layup	EVENT: Steam Generator new manway manipulator's are not procured in time for start of layup [Window 34] CAUSE: Delays to design and/or procurement of new manipulators IMPACT: Delays in executing the SG primary side layup activities	3	Active	Pejman Asgaripour	Iman Afshar	27-Feb-17	Accept	28-Apr-17	5	1	3	15	5	1	3	15
			Outage Window	**Window Description**													
			034	034 - Primary Side SG Layup													
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13415	Site services/support unavailable	EVENT: Field services like electrical connections, water connections, layout areas, service air, breathing air, station provided PPEs, permitry, scaffolding area, and/or rad protection may not be available when required by the schedule. CAUSE: Two groups assigned to the same resource at the same time. Priority being given to other project groups to use services identified by the SG project. IMPACT: Delays to project schedule and/or increased costs.		Active	Pejman Asgaripour	Jennifer Nodwell	08-Feb-17	Mitigate	15-Dec-18	3	2	4	12	2	1	2	4
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**						
			1893	In Progress	Confirm NR services has provided connection pt and adequate contaminated exhaust capacity for SG project.	Confirm NR services has provided connection pt and adequate contaminated exhaust capacity for SG project. Sources of contaminated exhaust for the SG project are SG Primary Side Layup, primary side clean, and bleed cooler inspection.		Pejman Asgaripour	Mike Lutz	24-Mar-17	Feb 23, 2017 - Site infrastructure plan submission delayed. TCD for OPG review is March 7. OPG Acceptance Planned for March 17. Jan 27, 2017 - Site infrastructure plan TCD revised based on Vendor forecast. Dec 16, 2016 - Site Infrastructure Plan is not finalized, information cannot be routed to SRE. TCD revised. Nov 3, 2016 - Site Infrastructure Plan to be finalize dby the end of November. Communicate Contaminated exhaust requirements to SRE Dec 15/16 Aug. 16/16: Connection points for contaminated exhaust are identified in the vendor's site infrastructure plan for PSC and in the work plan for bleed cooler. Since the windows for both of these projects are under review it is not possible to properly perform an capacity review at this time. Due date moved to November 2016. July 18/16: Due date moved due to customer validation testing. On going discussion with all stakeholders. Action will be completed after schedule integration.			

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13415	Site services/support unavailable	EVENT: Field services like electrical connections, water connections, layout areas, service air, breathing air, station provided PPEs, permitry, scaffolding area, and/or rad protection may not be available when required by the schedule. CAUSE: Two groups assigned to the same resource at the same time. Priority being given to other project groups to use services identified by the SG project. IMPACT: Delays to project schedule and/or increased costs.	7016	In Progress	Steam Generators - Provide Site Requirements to Refurbishment SPOCS	Provide finalized site requirements from the Site Infrastructure Plan to Refurb SPOCS.	Pejman Asgaripour	Jennifer Nodwell	17-Mar-17									Dec. 16/16: Action dependant on the site infrastructure plan being updated which has been delayed due to changes to the CWPs. Due date revised. Oct 24/16: Due Date Updated. August 26, 2016: Due date moved due to pending changes to the execution dates for both the primary and secondary side windows (windows 037 and 062). July 18/16: Due date moved due to customer validation testing. May 24/16: Draft requirements have been provided to all SPOCs previously. This action is to provide the finalized requirements based on walkdown results and the CWP process. Site Infrastructure plan is scheduled to be finalized on June 10/16.
			9194	In Progress	Steam Generators - Summarization of Services in the Site Infrastructure Plan	Summarizing the services required from the vendors given in the Site Infrastructure Plan. Services includes, but are not limited to: -Electrical -Service Air -Breathing Air -Water -Decontamination Services -Active Ventilation -Drains -Radiation Protection Services -Communication Requirements	Pejman Asgaripour	Jennifer Nodwell	17-Mar-17									Nov 3/16: Due Date Updated. Oct 5/16: Action created.
			Outage Window		**Window Description**												
			034		034 - Primary Side SG Layup												
			037		037 - Sec Side SG Clean & Install Access Ports												
			062		062 - Primary Side SG Clean and Inspect												
			105		105 - Vault Projects After Feeder Removal												
13581	Materials procured and fabricated to support SG project do not meet contractual requirements	EVENT: Materials procured and/or fabricated by the EPC vendor does not satisfy the requirements outlined in the contract agreement and purchase order. CAUSE: Potential causes include: counterfit or fraudulent materials, late or wrong materials, materials without sufficient quality documentation, non-adherence to technical specifications, errors implementing revisions to specifications, sub-contractor issues IMPACT: Delays and rework in procurement activities which could result in increases to the execution cost and schedule delays.	3	Active	Pejman Asgaripour	Mike Lutz	16-Feb-17	Monitor	14-Dec-18	2	1	5	10	2	1	5	10
			Outage Window		**Window Description**												
			034		034 - Primary Side SG Layup												
			037		037 - Sec Side SG Clean & Install Access Ports												
			062		062 - Primary Side SG Clean and Inspect												
			105		105 - Vault Projects After Feeder Removal												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13824	Addition of New / Revised Program Requirements to the SG EPC Agreement	EVENT: OPG requires the contractor to implement new and / or revised refurbishment program processes that are not currently in the signed EPC agreement. CAUSE: New and / or revised refurbishment processes being implemented that the contractor must adhere to. IMPACT: This could lead to an increase in the EPC fixed contract price. This risk is identified based on recent project OPEX where new requirements for reporting frequency and execution schedule requirements have resulted in Contractor initiated change requests to increase the fixed price portion of the project.		Active	Pejman Asgaripour	Iman Afshar	27-Feb-17	Accept	15-Dec-18	5	2	1	10	5	2	2	10
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current Probability	Current Financial	Current Schedule	Current Score	Post Probability	Post Financial	Post Schedule	Post Score
13824	Addition of New / Revised Program Requirements to the SG EPC Agreement	EVENT: OPG requires the contractor to implement new and / or revised refurbishment program processes that are not currently in the signed EPC agreement. CAUSE: New and / or revised refurbishment processes being implemented that the contractor must adhere to. IMPACT: This could lead to an increase in the EPC fixed contract price. This risk is identified based on recent project OPEX where new requirements for reporting frequency and execution schedule requirements have resulted in Contractor initiated change requests to increase the fixed price portion of the project.	6143	In Progress	Review New / Revised OPG Governance for Impact to SG Agreement	Review new / revised OPG governance that the refurbishment program requires the contractor to adhere in order to determine the impact to the SG agreement. Project change directives may be required for changes that impact the overall contract schedule and / or price.	Pejman Asgaripour	Rex Harvey	15-Feb-17								

Oct 24/16: Due date updated.
August 23, 2016: OPG provided feedback on Contract Implications to the NR Execution Expectations on August 3, 2016, with vendor response requested August 17, 2016. Still awaiting vendor feedback. TCD update.
June 29, 2016: Vendor has reviewed NR Execution Expectations #1-15 and assessed for impact to contract. Ongoing discussions between vendor, project team and Contract Management to to assess and understand impact and resolve per the terms and conditions of the agreement.
Dec. 22/15: On-going activity that will need to be revised as new requirements are issued.

Outage Window	Window Description
000	000 – No Window Related

ID	Risk Title	Risk Description		Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current Probability	Current Financial	Current Schedule	Current Score	Post Probability	Post Financial	Post Schedule	Post Score
15104	Steam Generators Access Ports - Existing Material in the Preheater Delays Foreign Material Retrieval	EVENT: Following preheater access port installation, foreign material introduced during machining needs to be removed from inside the steam generator. Existing foreign material inside the preheater region may make it more difficult for the vendor to remove any new foreign material. CAUSE: Existing foreign material inside the steam generator. IMPACT: Delays to the project schedule. May also impact the 40 day chemistry drain requirement on the steam generators (see Risk 14359).		Active	Pejman Asgaripour	Jennifer Nodwell	08-Feb-17	Mitigate	31-Aug-17	3	1	3	9	3	1	2	6

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
9685	In Progress	Preheater Access Ports: Testing by Vendor on Modified Mock-Up	Vendor to modify existing preheater access port mock-up to more accurately represent the field conditions (tube pitch, diameter, set-off...) at Darlington and perform testing on the new mock-up to demonstrate that the results are consistent with the results documented in vendor's report DSG0-LR-01.	Pejman Asgaripour	Jennifer Nodwell	17-Mar-17	Feb. 9/17: Latest update from vendor is that testing will be completed and report issued March 8/17. Due date adjusted. Dec. 5/16: Vendor's proposal for modifying the mock-up currently under review by OPG. To be linked to the action once review and update is complete. Target completion for implementing the changes to the mock-up is Jan. 15/17. Testing to be scheduled after mock-up updates are completed and around other vendor commitments.
9687	In Progress	Steam Generators - Preheater Access Ports - Vendor to Update CWP/Schedule to include Planned Retrieval of Machining Chips	The vendor is to update their Comprehensive Work Package (CWP) and schedule to include the planned retrieval of the machining chips during field execution for each of the three preheater access ports. This will include updates and/or additional FME plans to address the machining chips.	Pejman Asgaripour	Jennifer Nodwell	24-Mar-17	Feb. 9/17: Delays in completion of additional preheater testing will delay completion of the CWP. Due date adjusted.

Outage Window	Window Description
037	037 - Secondary Side SG Clean & Install Access Ports

ID	Risk Title	Risk Description		Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current Probability	Current Financial	Current Schedule	Current Score	Post Probability	Post Financial	Post Schedule	Post Score
13416	Workplace congestion during refurb	EVENT: Workplace congestion due to other project groups causes changes to the detailed plan for the SG project. CAUSE: Other project groups using laydown areas assigned to the SG project. Laydown areas not correctly identified by the project. IMPACT: Delays to the project schedule and/or increased project costs		Active	Pejman Asgaripour	Iman Afshar	27-Feb-17	Mitigate	01-Nov-18	4	1	2	8	1	1	2	2

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
9194	In Progress	Steam Generators - Summarization of Services in the Site Infrastructure Plan	Summarizing the services required from the vendors given in the Site Infrastructure Plan. Services includes, but are not limited to: -Electrical -Service Air -Breathing Air -Water -Decontamination Services -Active Ventilation -Drains -Radiation Protection Services -Communication Requirements	Pejman Asgaripour	Jennifer Nodwell	17-Mar-17	Nov 3/16: Due Date Updated. Oct 5/16: Action created.

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13416	Workplace congestion during refurb	EVENT: Workplace congestion due to other project groups causes changes to the detailed plan for the SG project. CAUSE: Other project groups using laydown areas assigned to the SG project. Laydown areas not correctly identified by the project. IMPACT: Delays to the project schedule and/or increased project costs	9195	In Progress	Update the SATMs	The SATMs will be updated to provide a clear understanding on where work will be taking place to ensure that the work area is available, and that other projects won't be occupying the same space. Is currently in progress; waiting for completion to close out.	Pejman Asgaripour	Iman Afshar	14-Apr-17								

Feb 27/17: SATMs have been approved and are on HOLD for SG Project except for 3 locations in elevations 107.5 and 115 on F-13, M-16 and J-16 Column lines which are submitted and awaiting for CA approval.
Feb 13/17: On weekly status update meeting dated February 9, it has been asked from BWXT to follow up with approval of SATMs and get all approvals by 28-February-2017.
Jan 29/17: Some SATMs have already been approved but for the rest, BWXT will follow up to get the approval by the end of February 2017.
Jan 5/17: Updated delegate. Updated Due Date.
Jan 04/17: A follow up Email has been sent to BWXT to Revise, Update and Re-submit the SATMs according to overall schedule changes. BWXT confirmed that they got approval for SATMs for windows 34 and 37 and pending approval for window 62. See Attached correspondences.
Dec 9/16: Due Date Updated. Description Updated. NOTE: Vendor is off site, and won't be available until next year.
Nov 3/16: Due Date Updated.
Oct 5/16: Action created.

			9196	In Progress	Attend Vault Meetings	Attend the Vault Meetings to prevent possible risks from forming. This will be completed by informing other projects what is required for the SG project, and listening to other projects to understand what they require.	Pejman Asgaripour	Iman Afshar	31-Mar-17								

Feb 13/17: Vault meeting scheduled for every Thursday starting February 23, SG project representative will attend the meeting.
Feb 01/17: No Vault meeting has been scheduled by the Vault coordinator since 23-December-2016.
Jan 24/17: The contact information for the JV person (Dan Olson) who is the coordinator for space assignment inside the vault has been provided to the contractors for assigning the locations for equipment decontamination and storing the insulations.
Jan 5/17: Updated Due Date.
Dec 23/16 Attended the Vault meeting: Congested area for decontamination of the equipment and also location for storage of Insulation removal is a concern
Dec 9/16 Number of people working in the Vault in different project had been discussed for the duration which Window 101 is performing, Window 34 is in parallel and require 8+RPO

Outage Window	Window Description
034	034 - Primary Side SG Layup
037	037 - Sec Side SG Clean & Install Access Ports
062	062 - Primary Side SG Clean and Inspect
105	105 - Vault Projects After Feeder Removal

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

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ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14160	Schedule Impact to SG Primary Side Window 062 from Feeder Installation	EVENT: Steam Generator Primary Side Clean Window 062 is impacted by Upper Feeder Installation Window 076 CAUSE: Upper Feeder Installation Window 076 will use all/most float provided which runs to the beginning of Lower Feeder Installation Window (RFR Critical Path) and preventing the Primary Side Window 062 from commencing as suggested in Level 1 IMPACT: The impact will mean that the Steam Generator Primary Side Window 062 will reduce/shorten in duration resulting in the scope of work to not be completed as currently scheduled nor as currently budgeted. Additional shifts may be required to recover by the window finish date. Additional shifts will result in additional costs to the project. Since Steam Generator Primary Side Clean Window 062 is schedule immediately preceding Fuel Load, the impact will be to both the Steam Generator Project and return to service of the unit.	2	Active	Pejman Asgaripour	Melanie Lahti	22-Feb-17	Monitor	01-Apr-18	2	1	4	8	2	1	4	8

Outage Window	Window Description
062	062 - Primary Side SG Clean and Inspect
076	076 - Upper Feeder Installation

There are no Draft, Not Started, In Progress Actions associated with the risk.

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13302	Foreign Material Enters Steam Generator-Secondary Side	EVENT: Unexpected foreign materials is introduced into station systems during waterlancing and access port installation. This risk does not apply to machining chips entering the steam generator during installation of the preheater access ports (see RMO issue 371 and decision 781. CAUSE: Inadequate human performance, work processes and / or design features. IMPACT: Additional cost and schedule for FME retrieval. May require tube plugging		Active	Pejman Asgaripour	Jennifer Nodwell	08-Feb-17	Mitigate	15-Sep-17	3	2	2	6	1	1	2	2

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
1898	In Progress	If vendor supplying FME Retrieval tools and workers, Ensure qualification requirements includes training, mock-ups, etc	If vendor supplying FME Retrieval tools and workers, Ensure qualification requirements includes training, mock-ups, etc	Pejman Asgaripour	Jennifer Nodwell	24-Mar-17	Feb 14, 2017 - FME personel were not included. Request sent to D.Dhar Feb 14, 2017 to provide supporting information for qualification of tooling and personnel for FME Retrieval support activities at site. Awaiting final training plan submission to confirm adequate inclusion of qualification requirements to use vendor supplied tools.
1899	In Progress	SG - Secondary Side - FME Plans and Controls in Place Prior to Field Execution	FME plans and controls in place prior to field execution. includes having a process flowchart on steps to build a new tool for "must retrieve" FME that includes authorization to use.	Pejman Asgaripour	Jennifer Nodwell	17-Mar-17	Feb. 9/17: Preparation of FME plans in progress. Due date adjusted. Dec. 30/16: Decision has been made that OPG FME program will be followed resulting in additional FME plans being prepared and added to the CWPs. New plans are currently undergoing review by OPG FME SPOC. No new tooling is required as part of this project. NOTE: This action does not include the plans for the foreign material generated during preheater access port installation (action #9861) Sept. 19/16: FME plans are part of the CWP. Path forward currently being reviewed regarding which FME program to follow (OPG or vendor). Due date moved to Nov. 15/16 to allow time to revise FME plans based on this decision. FME contingency approach identified via e-mail August 28th. Further work to follow. FME contigency plan will be an appendix to future CWP for secondary side work.

Outage Window	Window Description
037	037 - Sec Side SG Clean & Install Access Ports

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13411	Steam Generator does not meet dryness criteria as requested by SNC Lavalin	EVENT: Steam generator does not meet the dryness criteria requestedby SNC Lavailin potentially caused by OPG not providing a dry SG to the contractor. CAUSE: Drying performed by layup contractor does not sufficiently dry the steam generator. IMPACT: Cost associated with modification to existing drying system or new pre-maintenance drying required to ensure dryness criteria is met. This could delay execution window start.		Active	Pejman Asgaripour	Mike Lutz	16-Feb-17	Mitigate	15-Aug-18	2	1	3	6	2	1	1	2

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
5227	In Progress	Confirm dryness specification are met from SG Primary side layup	This action is to ensure SG Primary side meets dryness crtieria required for most effective primary side cleaning, and add task in schedule to confirm dryness criteria is met at T-9 (months) for PSC.	Pejman Asgaripour	Mike Lutz	28-Jul-17	July 19, 2016 - SDLU has agreed to incorporate verification and pre-req activities in their schedule to confirm -8 degrees dewpoint is achievable (11% relative humidity at 25 degress celcius). Once SG layup requirements have been achieved and maintained following window 34, ES fox will calibrate the dryers to increase the dryness to meet SG maintenance requirements (Tentatively July 2017). Once this is confirmed, ES fox will change the dryer controls back to layup conditions. Prior to the SG Primary Side Maintenance Window, ES Fox will dry the primary side to -8 degrees dewpoint, in accordance with the SG Contract requirements. TCD moved to 2017 to align with confirmation of dryness capability for SG dryers. June 30, 2016 - Discussion with SDLU DTL regarding capability fo dryness system in order to confirm dry system has capability to dry to SNC required dryness (-8 degrees dewpoint). Due date extended to allow time for assessment. June 6/16: Work order being finalized. Due date moved to July 8/16. March 8, 2016 - ES Fox temporary equipment monitoring project will monitor dryness of SGs. Work Orders and schedule are in progress of being assessed. Once this is finalized, SG Project to communicate with ES Fox to ensure SG dryness criteria is met and maintained prior to SG maintenance window. OPEX from pt. lepreau indicated that vac dry was sufficient for drying. SG will be undergoing addiitonal layup dry.Follow up with layup to determine if they will be monitoring humidity levels, and confirm their target is achieved and maintained per the design requirements.

Outage Window	Window Description
062	062 - Primary Side SG Clean and Inspect

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14499	Delay in Transfering PSC Flask to Trillium Container	EVENT: As part of the Primary Side Clean (PSC) project, magnetite waste will be collected in a shielding flask that needs to be transferred to a trillium container. Due to this being FOAK, there may be delays in executing this transfer. CAUSE: FOAK work that may result in delays in completing the flask transfer to the container IMPACT: Delay the schedule		Active	Pejman Asgaripour	Mike Lutz	16-Feb-17	Mitigate	15-Dec-18	3	1	2	6	1	1	2	2

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
7746	In Progress	Execute Trial Run of PSC Waste Transfer	Execute Trial Run of PSC Waste Transfer in order to mitigate FOAK risk.	Pejman Asgaripour	Mike Lutz	15-Dec-17	June 9, 2016 - Work plan preparation in progress. Stakeholder comments are being incorporated into Work plan and then document to be routed for approval. Work Plan to be used as basis for PSC Waste Transfer Trial run with empty PSC waste container.

ONTARIO POWER GENERATION

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14499	Delay in Transfering PSC Flask to Trillium Container	EVENT: As part of the Primary Side Clean (PSC) project, magnetite waste will be collected in a shielding flask that needs to be transferred to a trillium container. Due to this being FOAK	**Outage Window**		**Window Description**												
			062		062 - Primary Side SG Clean and Inspect												
14585	Work Calendar for OPG Support resources (Ops, Chemistry, RP) does not align with vendor work calendar	Event: Integrated vendor execution schedule duration is extended. Cause: OPG Support resources do not support execution activities on the same work calendar. Impact: Vendor must re-schedule activities on OPG work calendar, resulting in significant increase to work duration and additional cost. May impact predecessor projects and impact chemistry requirements.	3	Active	Pejman Asgaripour	Iman Afshar	27-Feb-17	Mitigate	28-Apr-17	2	2	3	6	1	1	2	2
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			7944	In Progress	SG Project - Prepare MOU with Project, and OPG Support Resources (RP, Ops, Chemistry) regarding required Work Schedules	Resolve during vertical integration meetings. Prepare MOU, and get sign off from support resource managers: -Chemistry -Operations -Rad Protection	Pejman Asgaripour	Iman Afshar	31-Mar-17	Feb 13/17: The MOU has been signed by SG Project Director, Chemistry and RP Managers, awaiting for Operations and Construction Oversight managers signature. Jan 17/17: MOU draft has been prepared and distributed for signature between supporting groups such as RP, Construction Oversight, Operations, Chemistry. See attached draft version of the Memorandum. Dec 19, 2016 - TCD revised Sep 8, 2016 - Memo to be routed across different functional stakeholders. Aug 11, 2016 - Memo is in draft and under internal project review							
			Outage Window		**Window Description**												
			034		034 - Primary Side SG Layup												
			037		037 - Sec Side SG Clean & Install Access Ports												
			062		062 - Primary Side SG Clean and Inspect												
			105		105 - Vault Projects After Feeder Removal												
14775	Station Manipulators may not be available in time for Window 34 execution	EVENT: Station Manipulators are not repaired/decontaminated in time for Window 34 SG Open activities CAUSE: D1711 delay to boiler window, significant repair activities required to tooling. RESULT: Vendor is delayed leading to cost and schedule impacts, and push to establishing layup conditions on SGs.		Active	Pejman Asgaripour	Iman Afshar	27-Feb-17	Monitor	28-Apr-17	2	1	3	6	2	1	3	6
			Outage Window		**Window Description**												
			034		034 - Primary Side SG Layup												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14776	TSSA availability may delay documents acceptance as well as ITP hold/witness sign offs	EVENT: TSSA availability may delay documents acceptance as well as ITP hold/witness sign offs CAUSE: TSSA representative is unavailable during ITP holds/witness sign offs IMPACT: Delay to project schedule/increased project costs		Active	Pejman Asgaripour	Jennifer Nodwell	08-Feb-17	Mitigate	15-Mar-19	3	2	2	6	1	1	1	1
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			9095	In Progress	SG TSSA Hold Points Incorporated in Project Schedule	Once SG project ITP's have been reviewed by TSSA and any hold points have been assigned, ensure that all TSSA hold points are incorporated into the project schedule.	Pejman Asgaripour	Jennifer Nodwell	24-Mar-17	Nov. 22/16: Several ITPs currently being revised based on CWP updates and a decision regarding path forward for preheater access ports. ITPs will be sent to TSSA following OPG acceptance. Due date moved to Feb. 2017.							
			Outage Window		**Window Description**												
			034		034 - Primary Side SG Layup												
			037		037 - Secondary Side SG Clean & Install Access Ports												
			062		062 - Primary Side SG Clean and Inspect												
15106	Steam Generator Access Ports - Foreign Material in Preheater is More Extensive than Expected	EVENT: During inspections of steam generator interior after installation of the preheater access ports it is discovered that the extent of foreign material introduced into the steam generator is more extensive than expected based on testing performed on the mock-up. CAUSE: Differences in material properties and/or internal geometry as a result of operations that could not be anticipated during testing on the mock-up. IMPACT: Schedule delays to accommodate the extra time required to retrieve the material inside the steam generator.		Active	Pejman Asgaripour	Jennifer Nodwell	08-Feb-17	Mitigate	31-Aug-17	2	1	3	6	2	1	2	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current Probability	Current Financial	Current Schedule	Current Score	Post Probability	Post Financial	Post Schedule	Post Score
15106	Steam Generator Access Ports - Foreign Material in Preheater is More Extensive than Expected	EVENT: During inspections of steam generator interior after installation of the preheater access ports it is discovered that the extent of foreign material introduced into the steam generator is more extensive than expected based on testing performed on the mock-up. CAUSE: Differences in material properties and/or internal geometry as a result of operations that could not be anticipated during testing on the mock-up. IMPACT: Schedule delays to accommodate the extra time required to retrieve the material inside the steam generator.	9685	In Progress	Preheater Access Ports: Testing by Vendor on Modified Mock-Up	Vendor to modify existing preheater access port mock-up to more accurately represent the field conditions (tube pitch, diameter, set-off...) at Darlington and perform testing on the new mock-up to demonstrate that the results are consistent with the results documented in vendor's report DSG0-LR-01.	Pejman Asgaripour	Jennifer Nodwell	17-Mar-17								
			9687	In Progress	Steam Generators - Preheater Access Ports - Vendor to Update CWP/Schedule to include Planned Retrieval of Machining Chips	The vendor is to update their Comprehensive Work Package (CWP) and schedule to include the planned retrieval of the machining chips during field execution for each of the three preheater access ports. This will include updates and/or additional FME plans to address the machining chips.	Pejman Asgaripour	Jennifer Nodwell	24-Mar-17								
			Feb. 9/17: Latest update from vendor is that testing will be completed and report issued March 8/17. Due date adjusted. Dec. 5/16: Vendor's proposal for modifying the mock-up currently under review by OPG. To be linked to the action once review and update is complete. Target completion for implementing the changes to the mock-up is Jan. 15/17. Testing to be scheduled after mock-up updates are completed and around other vendor commitments.												
			Feb. 9/17: Delays in completion of additional preheater testing will delay completion of the CWP. Due date adjusted.														
			Outage Window	**Window Description**													
			037	037 - Secondary Side SG Clean & Install Access Ports													
11294	Steam Generator Primary Side Clean Magnetite Contamination Event	EVENT: Loose contamination event during steam generator primary side clean magnetite collection CAUSE: Hose rupture or other issue with the contractor's primary side cleaning equipment. IMPACT: Delay to critical path for the SG project. A large scale contamination event could result in work stoppage of PSC and other refurbishment/operating units work until the affected area is decontaminated.	1	Active	Pejman Asgaripour	Mike Lutz	16-Feb-17	Mitigate	04-Jan-19	1	3	5	5	1	2	3	3
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			1890	In Progress	complete design reviews and performance mock up demonstrations to ensure process interlocks/connection integrity meets contamination co	Complete design reviews and performance mock up demonstrations to ensure process interlocks/connection integrity meets contamination control requirements. Ongoing discussion with all stakeholders. Services demand will be finalized after schedule integration.	Pejman Asgaripour	Mike Lutz	30-Jun-17	Aug 3, 2016 - PSC validation testing is not scheduled until 2017. TCD updated accordingly.							
			Outage Window	**Window Description**													
			062	062 - Primary Side SG Clean and Inspect													
13919	CWP completion far in advance of execution date may result in CWP revisions/rework	EVENT: Changes are required to the CWP's based on validation testing performed by the contractor prior to field execution. CAUSE: OPG imposing early CWP completion date for CWPs and procedures. IMPACT: Re-work to the CWP's which will be an extra cost to the project. CWP will be aproved in April. The validation testing will take place following CWP approval, which mayresult in revisions to CWP documentation.	1	Active	Pejman Asgaripour	Mike Lutz	16-Feb-17	Accept	08-Oct-17	5	1	1	5	5	1	1	5
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			6142	In Progress	Determine Impact of Validation Testing on PSC CWP	The CWP for primary side clean is being prepared in advance of validation testing at the contractor's facility. Post validation testing the approved CWP needs to be reviewed to determine if the results of the validation testing drives any changes to the CWP.	Pejman Asgaripour	Mike Lutz	14-Jul-17	Nov 8, 2016 - Due Date moved to align with schedule forecast date for the completion of PSC validation testing. Dec. 22/15: Need to revise completion date to align with completion of the validation testing.							
			Outage Window	**Window Description**													
			034	034 - Primary Side SG Layup													
			037	037 - Secondary Side SG Clean & Install Access Ports													
			062	062 - Primary Side SG Clean and Inspect													
14388	Manipulators not available for future units	EVENT: SG primary head manway cover manipulators not available as required in the project schedule for future units (After unit 2 refurb). CAUSE: Unit 2 refurb occurs without any overlap. However, Unit 3 refurb will overlap with Unit 1 refurb. Unit 3 will be using all of the manipulator sets, leaving Unit 1 with no refurb sets. IMPACT: Delays in executing the SG primary side layup activities due to overlap with units using all of the manipulator sets.		Active	Pejman Asgaripour	Iman Afshar	27-Feb-17	Monitor	15-May-19	5	1	1	5	5	1	1	5
			Outage Window	**Window Description**													
			000	000 – No Window Related													
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current Probability	Current Financial	Current Schedule	Current Score	Post Probability	Post Financial	Post Schedule	Post Score
11278	Damage to Steam Generator Tubes During Access Port Installations	EVENT: Damage to steam generator tubes during access port installations. CAUSE: Potential causes include tool failure or human performance. IMPACT: Additional inspections and/or tube plugging which will impact cost and schedule of SG project. Significant rework adds cost and extends the project schedule.	3	Active	Pejman Asgaripour	Jennifer Nodwell	08-Feb-17	Mitigate	31-Aug-17	1	2	4	4	1	1	1	1

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
1812	In Progress	Access Port Training on Mock-ups	Workers to be trained to operate tooling on mockup, before being approved to execution work at the station	Pejman Asgaripour	Jennifer Nodwell	14-Jul-17	Sept. 19/16: Action title updated based on risk association; due date moved to July 2017 due to window 037 moving in the level 1 schedule.

Outage Window	Window Description
037	037 - Sec Side SG Clean & Install Access Ports

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current Probability	Current Financial	Current Schedule	Current Score	Post Probability	Post Financial	Post Schedule	Post Score
11989	IMS Unable to Support Steam Generator Inspections for SG Secondary Side & Bleed Cooler	EVENT: IMS is unable to support steam generator inspections during window 037 and bleed cooler inspections during window 105 as schedued during refurbishment CAUSE: IMS has schedule conflict due to the need to support other planned, forced, or external business activities. IMPACT: Delays to the refurbishment steam generator and bleed cooler execution window and additional costs.	1	Active	Pejman Asgaripour	Iman Afshar	27-Feb-17	Mitigate	15-Oct-17	2	1	2	4	1	1	1	1

Outage Window	Window Description
037	037 - Sec Side SG Clean & Install Access Ports
062	062 - Primary Side SG Clean and Inspect
105	105 - Vault Projects After Feeder Removal

There are no Draft, Not Started, In Progress Actions associated with the risk.

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current Probability	Current Financial	Current Schedule	Current Score	Post Probability	Post Financial	Post Schedule	Post Score
12467	Risk of Vendor Default/ Business Continuity	The risk is that the vendor is unable to meet the contractual obligations due to vendor default.	3	Active	Pejman Asgaripour	Melissa Hernandez-Chiang	23-Feb-17	Accept	15-Oct-25	1	3	4	4	1	3	4	4

Outage Window	Window Description
000	000 – No Window Related

There are no Draft, Not Started, In Progress Actions associated with the risk.

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current Probability	Current Financial	Current Schedule	Current Score	Post Probability	Post Financial	Post Schedule	Post Score
13412	Work area restrictions due to Hot Particle	EVENT: Work area restrictions due to high radiological conditions. CAUSE: Hot particle being trapped in the primary side clean system or SG. IMPACT: Schedule delays, costs, and increased dose to crew.		Active	Pejman Asgaripour	Mike Lutz	16-Feb-17	Mitigate	15-Oct-17	2	1	2	4	1	1	2	2

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
6144	In Progress	Known Hot Particle Information for Steam Generators	Obtain Dose Data from OPG for any known Hot Particles before each unit outage.	Pejman Asgaripour	Mike Lutz	24-Feb-17	Feb 8, 2017 - ALARA SPOC for SG currently on night shift. Project to follow up week ending Feb 17, 2017 to determine path forward for acquiring information. Jan 20, 2017 - Awaiting dose survey data for Unit 2 Boiler Platforms from ALARA Rep. TCD revised. Dec 15, 2016 - D1321 data requested, and timeline for dose survey data to be available for unit 2 around Boilers form the Refurb ALARA group. TCD updated to Jan 13, 2016, and will be revised if SG unit 2 dose surveys are not available at this time. Dec. 22/15: Due date set as start of refurbishment outage. This may need to be revised.

Outage Window	Window Description
034	034 - Primary Side SG Layup
105	105 - Vault Projects After Feeder Removal

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13967	Transportation of the Shielding Flask Through the Un-zoned Area	EVENT: As part of the Primary Side Clean (PSC) project, magnetite waste will be collected in a shielding flask that needs to be transferred to a trillium container. The project plans to move the full shielding flask from the station to the WFFAA outside through the un-zoned area. As part of a project meeting with the ALARA group it was identified that it may not be possible to transport the shielding flask through the un-zoned area. CAUSE: Decision by RP that the flask cannot be transported through the un-zoned area. IMPACT: New transportation method and / or route will need to be planned. This would lead to increased costs and potential schedule delays.		Active	Pejman Asgaripour	Mike Lutz	16-Feb-17	Mitigate	10-Oct-18	2	2	1	4	1	1	1	1

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
6139	In Progress	Determine Flask Transportation Options	Work with the RP department to determine possible transportation routes for the primary side clean flask once it has been filled with magnetite.	Pejman Asgaripour	Mike Lutz	24-Mar-17	Jan 27 - SNC has provided an assessment for flask transfer. It is not possible to perform 1 lift, due to space constraints. 2 lifts will be required. Lift strategy to be determined through cross functional review meeting. TCD updated. Oct 6/16: Updated Due Date. Sept 8, 2016 - Waste Trasportation Route vetted by ALARA and additional measures incorporated into work plan. Work Plan is still in development due to segment priority (segment 3 work) and potential changes in Candu's waste handling strategy at site. March 8,2016 - Work Plan prepared that identifies transfer route. Walkdown held with Maintenance, ALARA and Waste SPOC to assess transfer route and identify any issues or concerns, and incorporate into Work Plan. TCD for work plan approval is March 31, 2016. Jan 27, 2016: process/approval requirements requested from RP. Awaiting response by Jan 29, 2016.

Outage Window	Window Description
062	062 - Primary Side SG Clean and Inspect

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14269	Blowdown pipe work causes delays to refill the boiler	EVENT: The boiler blowdown pipe project, which is performed by another project group, takes longer than planned resulting in the SG vendor being unable to complete their work as scheduled. Fill of the SGs cannot take place until the boiler blowdown pipe project is complete and SG vendor cannot finish their work until the SGs have been filled. CAUSE: Boiler blowdown pipe project takes longer than planned. IMPACT: Delays to SG vendor's execution schedule and cost increases due to delay costs. This has the potential to impact the 40 day window however this risk is managed under Risk #14359.		Active	Pejman Asgaripour	Jennifer Nodwell	08-Feb-17	Monitor	31-Aug-17	2	2	2	4	2	2	2	4

Outage Window	Window Description
037	037 - Sec Side SG Clean & Install Access Ports

There are no Draft, Not Started, In Progress Actions associated with the risk.

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14438	Other projects may impact Bleed Cooler execution window	EVENT: Bleed Cooler inspection window does not have sufficient time to complete inspections CAUSE: The EHS Project can interfere with Bleed Cooler Work. RFR may complete their work (Window 113) earlier than scheduled. IMPACT: Delay or extension to Bleed Cooler inspections start which may not provide enough time to complete inspections before RFR transitions from Sever Bellows (113) to End Fitting Removal (114)		Active	Pejman Asgaripour	Mike Lutz	16-Feb-17	Mitigate	29-Sep-17	2	1	2	4	1	1	1	1

Outage Window	Window Description
104	104 - Post Feeder Vault Projects

There are no Draft, Not Started, In Progress Actions associated with the risk.

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14500	Significant amounts of coolant enters SG during Access Port Installation	EVENT: Significant amounts of coolant enters SG during Access Port Installation CAUSE: 1) Inadequate human performance 2) Incorrect work processes IMPACT: Require flush of SG in order to establish chemistry. Can result in schedule delays.		Active	Pejman Asgaripour	Jennifer Nodwell	27-Feb-17	Monitor	30-Aug-17	2	2	2	4	2	2	2	4

Outage Window	Window Description
037	037 - Sec Side SG Clean & Install Access Ports

There are no Draft, Not Started, In Progress Actions associated with the risk.

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14660	Bleed Cooler work stopped due to loss of contam control	EVENT: During Bleed Cooler inspection work, tritium levels in vault exceed the back condition Maximum Permissible Concentration in Air (MPCa) CAUSE: Loss of contam control (due to dryer issues, tenting effectiveness) IMPACT: All Bleed Cooler work will be stopped. AL1 doors to be closed. Dryers will be required to reduce the tritium levels in the vault to below the MPCa		Active	Pejman Asgaripour	Mike Lutz	16-Feb-17	Mitigate	29-Sep-17	2	1	2	4	1	1	2	2

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
8950	Not Started	Assess effectiveness of glove box tenting during D1711	Assess effectiveness of glove box tenting during D1711 and incorporate lessons learned into unit 2 refurb bleed cooler inspections	Pejman Asgaripour	Mike Lutz	31-Mar-17	

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current Probability	Current Financial	Current Schedule	Current Score	Post Probability	Post Financial	Post Schedule	Post Score
14660	Bleed Cooler work stopped due to loss of contam control	EVENT: During Bleed Cooler inspection work, tritium levels in vault exceed the back condition Maximum Permissible Concentration in Air (MPCa) CAUSE: Loss of contam control (du	**Outage Window**	**Window Description**													
			105	105 - Vault Projects After Feeder Removal													
14710	First time evolution in Bleed Cooler Inspections scope	EVENT: During DNRU2, Bleed Cooler (2-33320-HX2) inspections are first of a kind evolution and have never been performed before on the DNGS Bleed Coolers. CAUSE: 1) The unavailablity of validated procedures for first time maintenance activities presents some level of unknowns. 2) Schedule integration needs to be completed to ensure footprint + resources are available IMPACT: This can potentially result in adverse cost/schedule/quality impact.	2	Active	Pejman Asgaripour	Mike Lutz	23-Feb-17	Mitigate	29-Sep-17	2	1	2	4	1	1	1	1
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			8954	Not Started	Incorporate lessons learned from D1711 Bleed Cooler inspections into Unit 2 Bleed Cooler during Darlington Nuclear Refurbishment	Incorporate lessons learned from D1711 Bleed Cooler inspections into Unit 2 Bleed Cooler during Darlington Nuclear Refurbishment. During DNRU2, Bleed Cooler (2-33320-HX2) inspections are first of a kind evolution and have never been performed before on the DNGS Bleed Coolers. As a result, the unavailablity of validated procedures for first time maintenance activities presents some level of unknowns. This can potentially result in adverse cost/schedule/quality impact.	Pejman Asgaripour	Mike Lutz	31-Mar-17	Aug 29/16: Action created							
			Outage Window	**Window Description**													
			105	105 - Vault Projects After Feeder Removal													
13968	Munter is Not Available for Bleed Cooler Inspection	EVENT: The risk is that a munter is not available for the bleed cooler inspection. CAUSE: Munter in use by other projects. IMPACT: Increase costs and / or schedule delays.		Active	Pejman Asgaripour	Mike Lutz	16-Feb-17	Mitigate	20-Oct-17	1	2	3	3	1	1	1	1
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			8945	Not Started	Confirm with RFR-JV no issues with placement of Munter for Bleed Cooler Inspections during Window 105	Once schedule window is finalized, confirm with RFR-JV that there are no issues with placement of the Munter in the vault prior to start of Bleed Cooler inspections. Refer to RMO action # 8801 for details of the agreement.	Pejman Asgaripour	Mike Lutz	30-Jun-17	Aug 29/16: Action created based on risk meeting							
			Outage Window	**Window Description**													
			105	105 - Vault Projects After Feeder Removal													
14158	Steam Generator Schedule impacts with Emergency Heat Sink (EHS)	Event: Steam Generator Primary Side Clean Window 062 is potentially impacted by a delay to Emergency Heat Sink (EHS) Window 068 CAUSE: Due to delay in Emergency Heat Sink (EHS) Window 068, the SG vendors will not be able to move from the west side boilers to the east side boilers IMPACT: Cost increases due to resource availability, schedule delays impacting the finish date of the Steam Generator Primary Side Clean Window 062, as well as, impacting the return to service since the Fuel Load is immediately succeeding the Steam Generator Primary Side Clean Window 062.	2	Active	Pejman Asgaripour	Melanie Lahti	22-Feb-17	Monitor	02-Jul-18	1	2	3	3	1	2	3	3
			Outage Window	**Window Description**													
			062	062 - Primary Side SG Clean and Inspect													
			068	068 - Emergency Heat Sink													
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
15016	Layup Bungs Arrival not in Time for Window 34	EVENT: During testing and analysis of bung components, new design issues may be discovered or fabrication vendor is unable to meet schedule timeline. CAUSE: Additional testing and analysis required prior to procurement/fabrication and delivery of SG layup bungs to site IMPACT: Delays to delivery schedule and impact to Window 34 Start Date.		Active	Pejman Asgaripour	Iman Afshar	27-Feb-17	Monitor	31-Mar-17	1	1	3	3	1	1	3	3
			Outage Window	**Window Description**													
			034	034 - Primary Side SG Layup													
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
11925	Foreign Material Enters Steam Generator-PS	EVENT: Foreign materials are introduced into station systems during divider plate inspections, bunge install, and IMS inspections CAUSE: Inadequate human performance, work processes and design features. IMPACT: Cost and schedule impacts for FME retrieval	1	Active	Pejman Asgaripour	Mike Lutz	16-Feb-17	Monitor	28-Feb-19	1	1	2	2	1	1	2	2
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			1898	In Progress	If vendor supplying FME Retrieval tools and workers, Ensure qualification requirements includes training, mock-ups, etc	If vendor supplying FME Retrieval tools and workers, Ensure qualification requirements includes training, mock-ups, etc	Pejman Asgaripour	Jennifer Nodwell	24-Mar-17	Feb 14, 2017 - FME personel were not included. Request sent to D.Dhar Feb 14, 2017 to provide supporting information for qualification of tooling and personnel for FME Retrieval support activities at site. Awaiting final training plan submission to confirm adequate inclusion of qualification requirements to use vendor supplied tools.							

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
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Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current Probability	Current Financial	Current Schedule	Current Score	Post Probability	Post Financial	Post Schedule	Post Score
11925	Foreign Material Enters Steam Generator-PS	EVENT: Foreign materials are introduced into station systems during divider plate inspections, bunge install, and IMS inspections CAUSE: Inadequate human performance, work processes and design features. IMPACT: Cost and schedule															

Outage Window	Window Description
034	034 - Primary Side SG Layup
062	062 - Primary Side SG Clean and Inspect

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current Probability	Current Financial	Current Schedule	Current Score	Post Probability	Post Financial	Post Schedule	Post Score
11928	Steam Generator Primary Side Cleaning Waste Container Dose Rates or Activity Loading Exceeds Limits	EVENT: The shield flask for primary side cleaning waste collection system does not provide sufficient shielding or the waste collected exceeds licensed activity preventing road shipment offsite. CAUSE: This could be caused by an under estimation in waste volume and/or activity, errors in shielding flask design/selection. IMPACT: Incomplete cleaning or the need to store wastes on site until dose decays to appropriate levels for shipment/license limits for activity.	1	Active	Pejman Asgaripour	Mike Lutz	16-Feb-17	Mitigate	28-Feb-19	2	1	1	2	1	1	1	1

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
1383	In Progress	Investigate location for temporary storage of contingency/partially filled containers	Investigate location for temporary storage for contingency containers, if required.	Pejman Asgaripour	Mike Lutz	17-Mar-17	Jan 12/17: Explore potential use of Retube Waste Storage Facility for temporary storage of PSC waste containter, and waste transfer location. Feb. 26/16: Changed action due date to end of June Jan 27, 2016: SATM request for EFFA laydown area in progress. Refurb Waste Management supporting MOU with station identifying waste container laydown requirements for PSC. Dec. 18/15: Plans for radioactive material shipments being finalized. Due date moved to align with the assessing complete milestone (April 15/16) refurb Ops/maint issued a refurb radioactive storage assessment. Sg has provided input on what's req'd for this project. As the final options for radioactive material storage prior to offsite shipment has not been determined, this action cannot close.

Outage Window	Window Description
062	062 - Primary Side SG Clean and Inspect

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current Probability	Current Financial	Current Schedule	Current Score	Post Probability	Post Financial	Post Schedule	Post Score
12461	Inadequate Quality Control on PSC control software	EVENT: Improper tracking of blast plan and inability to monitor pressure and duration setpoints during primary side cleaning of the SGs. CAUSE: PSC system control software not tested and controlled prior to execution. IMPACT: Blasting of the same tubes more than intended and / or blasting of small radius tube regions at a higher pressure setpoint than what is qualified. This could result in tube damage.	1	Active	Pejman Asgaripour	Mike Lutz	16-Feb-17	Mitigate	28-Sep-18	1	2	2	2	1	1	1	1

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
3679	In Progress	Inadequate Quality Control for PSC Control Software	-Software Validation on mockup (test failure modes and cleaning sequence) -Implement Procedural controls for software changes/modifications prior to and during execution	Pejman Asgaripour	Mike Lutz	19-Jul-17	Nov 8, 2017 - TCD updated to align with schedule forecast for validation testing completion for PSC System: SG EPC UC PSC On Boiler System - Testing and Commissioning - 4/21/2017 SG EPC UC PSC Process System - Testing and Commissioning - 5/9/2017 SG EPC UC Control Monitoring and Communications - Testing and Commissioning - 6/5/2017 SG EPC UC PSC Robotics and Process System - Testing and Commissioning - 7/19/2017

Outage Window	Window Description
062	062 - Primary Side SG Clean and Inspect

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current Probability	Current Financial	Current Schedule	Current Score	Post Probability	Post Financial	Post Schedule	Post Score
13418	Defects in the Shell	EVENT: Will require redesign of port location or require a repair before proceeding. CAUSE: Defects identified in the shell during mag particle and UT scans. IMPACT: This could lead to significant schedule delays and cost impact.		Active	Pejman Asgaripour	Jennifer Nodwell	08-Feb-17	Mitigate	30-Jun-17	1	1	2	2	1	1	1	1

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post				
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score	
13418	Defects in the Shell	EVENT: Will require redesign of port location or require a repair before proceeding. CAUSE: Defects identified in the shell during mag particle and UT scans. IMPACT: This could lead to significant schedule delays and cost impact.	6140	Not Started	Review Results of NDE Scans of the SG Shell	Non-destructive examination (NDE) of the SG shell are scheduled as a pre-req to the installation of the access ports to check for defects in the SG shell. Planned testing includes visual, UT, and/or PT scans. The results of the NDE testing need to be reviewed by OPG to confirm that the planned access port location is acceptable.	Pejman Asgaripour	Jennifer Nodwell	30-Jun-17	Sept. 19/16: Activities moved due to changes in the Level 1 schedule; work now planned for May 2017; due date moved to June 30 2017. Dec. 22/15: Due date of Jan. 30/17 based on the current project schedule. This will need to be confirmed once rev. 0 of the program schedule is released.								
			Outage Window		**Window Description**													
			037		037 - Sec Side SG Clean & Install Access Ports													
13729	Non-adherence to chemistry specified cleanliness requirements during field execution	EVENT: The contractor does not adhere to cleanliness requirements during field execution. CAUSE: Lack of adherence to cleanliness requirements by the contractor during field execution. IMPACT: Negative impact to the plant's system chemistry.	2	Active	Pejman Asgaripour	Jennifer Nodwell	08-Feb-17	Monitor	30-Jul-17	2	1	1	2	2	1	1	2	
			Outage Window		**Window Description**													
			034		034 - Primary Side SG Layup													
			037		037 - Sec Side SG Clean & Install Access Ports													
			062		062 - Primary Side SG Clean and Inspect													
			105		105 - Vault Projects After Feeder Removal													
			There are no Draft, Not Started, In Progress Actions associated with the risk.															
13975	Changes to SG Primary Side Inspection window may conflict with IMS support during Darlington and Pickering Planned Outages	EVENT: IMS have committed to the original Refurbishment inspection window in order to coordinate support for Pickering and Darlingnton Planned outages (per IMS blackout dates). As the window moves, it may conflict with the planned outage blackout dates resulting in resource conflicts for Refurbishment and Planned Ouatges. CAUSE: Changes to the SG primary side inspection and maintenance window as work control finalizes and refines the DNRU2 Level 1 Schedule IMPACT: IMS resources not available as required by the SG project. Additional costs to the projects and delays to the execution window	2	Active	Pejman Asgaripour	Iman Afshar	27-Feb-17	Monitor	02-Jul-18	1	2	2	2	1	2	2	2	
			Outage Window		**Window Description**													
			062		062 - Primary Side SG Clean and Inspect													
			There are no Draft, Not Started, In Progress Actions associated with the risk.															
14355	ALW sump is filled by SG project or other projects	EVENT: High demand on ALW causes delays to waterlancing CAUSE: Demand due to parallel activities from waterlancing, mod flush, D1711 activities, and other online station activities produces more water than ALW capacity IMPACT: Delays to SG project schedule and threats to 40 day window		Active	Pejman Asgaripour	Jennifer Nodwell	08-Feb-17	Monitor	10-Sep-17	1	1	2	2	1	1	2	2	
			Outage Window		**Window Description**													
			037		037 - Sec Side SG Clean & Install Access Ports													
			There are no Draft, Not Started, In Progress Actions associated with the risk.															
14359	Extension to 40 day SG Secondary Side Maintenance Window	Event: The maintenance window on the Secondary Side of the SGs may extend beyond the 40 day allowable duration (chemistry constraint) Cause: Due to delays in the schedule and integration with other work groups and resources (IMS, Operations) Impact: The SG project will need specific approved exemption from chemistry to allow a drained state for longer than the allowable duration, which could result in harm to the Steam Generators. To avoid extending beyond this timeframe, the SGs may need to be refilled and then drained to reset the clock. This requires additional support activities and will result in schedule and cost impact to the project.		Active	Pejman Asgaripour	Jennifer Nodwell	08-Feb-17	Monitor	31-Aug-17	1	1	2	2	1	1	2	2	
			Outage Window		**Window Description**													
			037		037 - Sec Side SG Clean & Install Access Ports													
			There are no Draft, Not Started, In Progress Actions associated with the risk.															
14584	Additional Waterlancing Required Post-Inspections	EVENT: After reviewing the post waterlancing inspections it is determined that additional waterlancing and/or flushing is required to adequately clean the SG. CAUSE: Insufficient cleaning by the SG vendor. IMPACT: Delay to the project schedule while additional cleaning occurs. No cost impact since this work is fixed price.		Active	Pejman Asgaripour	Jennifer Nodwell	08-Feb-17	Monitor	21-Aug-17	1	1	2	2	1	1	2	2	
			Outage Window		**Window Description**													
			037		037 - Sec Side SG Clean & Install Access Ports													
			There are no Draft, Not Started, In Progress Actions associated with the risk.															

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14662	Radiography in the vault by other projects delays execution of Bleed Cooler Work	EVENT: Radiography in the vault by other projects delays execution of Bleed Cooler work CAUSE: The use of radiography as the inspection method to evaluate weld integrity will require all non-radiography crew personnel to vacate the vault. This will delay all projects, ultimately delaying Bleed Cooler Work IMPACT: Delay to all projects happening at the same time as Bleed Cooler work and delays to Bleed Cooler work		Active	Pejman Asgaripour	Mike Lutz	16-Feb-17	Monitor	20-Oct-17	1	1	2	2	1	1	2	2

Outage Window	Window Description
105	105 - Vault Projects After Feeder Removal

There are no Draft, Not Started, In Progress Actions associated with the risk.

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14777	Document deficiencies delay CCD/AFS acceptance	EVENT: Document deficiencies delay CCD/AFS acceptance. CAUSE: Deficiencies in documents and completion of documents RESULT: Delay to project schedule		Active	Pejman Asgaripour	Iman Afshar	27-Feb-17	Mitigate	03-Dec-18	2	1	1	2	1	1	1	1

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
9525	In Progress	Preparation/Acceptance of Turnover Package for Secondary Side	Preparation and acceptance of a Turnover Package for Window 37 (Secondary Side Work) will create a clear path forward of what is to be expected during execution. This includes the work to be completed, and any paperwork that is required by the project (ie. CCDs, AFSs) for the work completed.	Pejman Asgaripour	Jennifer Nodwell	10-Mar-17	Jan. 19/17: further updates to plan completed; will be routed for review next week; due date adjusted Dec. 30/16: Draft turnover package has been prepared and discussed with RTS group; finalization of plan in progress to route for formal review; due date updated to allow time for document review
9825	In Progress	Preparation/Acceptance of Turnover Package for Primary Side	Preparation and acceptance of one Turnover Package comprised of Window 34, Window 62, and Primary Side Boiler Close, will create a clear path forward of what is to be expected during execution. This includes the work to be completed, and any paperwork that is required by the project (ie. CCDs, AFSs) for the work completed.	Pejman Asgaripour	Mike Lutz	10-Mar-17	Feb 23, 2017: Stakeholder review complete. Routing for signatures. TCD Revised. Jan 31, 2017: Primary Side Turnover Plan submitted for stakeholder review January 26, 2017. Comments expected by Feb 8, 2017. Target for plan approval is February 17, 2017. TCD Revised. Jan 01/17: A draft for Window 34 Turnover package has been prepared. Dec 21/16: Action created.
9826	In Progress	Preparation/Acceptance of Turnover Package for Bleed Cooler Inspections	Preparation and acceptance of a Turnover Package for Window 105 will create a clear path forward of what is to be expected during execution. This includes the work to be completed, and any paperwork that is required by the project (ie. CCDs, AFSs) for the work completed.	Pejman Asgaripour	Iman Afshar	31-Jul-17	Feb 13/17: Turnover package for Windows 34 and 62 has been distributed for stakeholders' signature, the same plan for Bleed coolers (Window 105) is under internal review. Feb 01/17: The Turnover package has been distributed to the stakeholders for review and comment. Jan 03/17: A draft for Turnover Package has been prepared. See Attached drafts of the documents. Dec 21/16: Action created.

Outage Window	Window Description
034	034 - Primary Side SG Layup
037	037 - Secondary Side SG Clean & Install Access Ports
062	062 - Primary Side SG Clean and Inspect
105	105 - Vault Projects After Feeder Removal

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
15105	Steam Generator Secondary Side - Failed Zero Power Hot Leak Checks	EVENT: During reactor restart activities, leak checks need to be performed for the newly installed access ports and the existing handholes when the reactor is at zero power hot. CAUSE: Incorrect installation of the access port or handhole covers. IMPACT: Delay to critical path during start-up to retorque the covers (best case) or drain the steam generator and reinstall the covers (worst case).		Active	Pejman Asgaripour	Jennifer Nodwell	09-Feb-17	Mitigate	01-Jun-19	1	2	1	2	1	1	1	1

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
9687	In Progress	Steam Generators - Preheater Access Ports - Vendor to Update CWP/Schedule to include Planned Retrieval of Machining Chips	The vendor is to update their Comprehensive Work Package (CWP) and schedule to include the planned retrieval of the machining chips during field execution for each of the three preheater access ports. This will include updates and/or additional FME plans to address the machining chips.	Pejman Asgaripour	Jennifer Nodwell	24-Mar-17	Feb. 9/17: Delays in completion of additional preheater testing will delay completion of the CWP. Due date adjusted.

Outage Window	Window Description
037	037 - Secondary Side SG Clean & Install Access Ports

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
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Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
11959	Steam Generator Legacy Foreign Material Cannot Be Removed	EVENT: Steam Generator Vendor FME removal tooling may not be able to support the removal of all known legacy foreign material in hard to reach regions of the steam generator. CAUSE: Legacy FME located in a hard to reach region of the SG that the contractor's tool can't reach. IMPACT: This will result in additonal FME tooling development by the vendor or engineering to disposition leaving material in the SG.	3	Active	Pejman Asgaripour	Jennifer Nodwell	08-Feb-17	Mitigate	30-Aug-17	1	1	1	1	1	1	1	1

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
1899	In Progress	SG - Secondary Side - FME Plans and Controls in Place Prior to Field Execution	FME plans and controls in place prior to field execution. includes having a process flowchart on steps to build a new tool for "must retrieve" FME that includes authorization to use.	Pejman Asgaripour	Jennifer Nodwell	17-Mar-17	Feb. 9/17: Preparation of FME plans in progress. Due date adjusted. Dec. 30/16: Decision has been made that OPG FME program will be followed resulting in additional FME plans being prepared and added to the CWPs. New plans are currently undergoing review by OPG FME SPOC. No new tooling is required as part of this project. NOTE: This action does not include the plans for the foreign material generated during preheater access port installation (action #9861) Sept. 19/16: FME plans are part of the CWP. Path forward currently being reviewed regarding which FME program to follow (OPG or vendor). Due date moved to Nov. 15/16 to allow time to revise FME plans based on this decision. FME contingency approach identified via e-mail August 28th. Further work to follow. FME contigency plan will be an appendix to future CWP for secondary side work.

Outage Window	Window Description
037	037 - Sec Side SG Clean & Install Access Ports

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
12460	Inadequate Quality Control for Waterlancing Control Software	EVENT: Honing issues, system shutoff parameters, and / or repeat lane visits during waterlancing of the steam generator. CAUSE: Inadequate control of the waterlancing control software. IMPACT: Inadequate sludge removal and / or steam generator asset damage.	1	Active	Pejman Asgaripour	Jennifer Nodwell	09-Feb-17	Monitor	14-Jul-17	1	1	1	1	1	1	1	1

Outage Window	Window Description
037	037 - Sec Side SG Clean & Install Access Ports

There are no Draft, Not Started, In Progress Actions associated with the risk.

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13398	Execution Quality-CWP & ITPs are in compliance with vendor's quality program	EVENT: The contractor performs execution activities without a robust CWPs and ITPs. This could lead to damage to the Steam Generators/Bleed Cooler, ineffective cleaning, or loss of FME controls. CAUSE: The contractor does not properly execute the work. IMPACT: Damage to the Steam Generators/Bleed Cooler, ineffective cleaning and / or loss of FME controls. This could lead to increased costs and schedule delays.		Active	Pejman Asgaripour	Mike Lutz	16-Feb-17	Monitor	20-Apr-17	1	1	1	1	1	1	1	1

Outage Window	Window Description
034	034 - Primary Side SG Layup
037	037 - Secondary Side SG Clean & Install Access Ports
062	062 - Primary Side SG Clean and Inspect
105	105 - Vault Projects After Feeder Removal

There are no Draft, Not Started, In Progress Actions associated with the risk.

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14270	High Pressure Water Pumps may not be available for NR Waterlancing Campaign [for future units]	EVENT: The Darlington High Pressure water pumps used for waterlancing are not availabe for the refurb vendor to use during the water lancing CAUSE: The Waterlancing campaign during the applicable outage is delayed IMPACT: A delay in the start of the refurb secondary side maintenance window which will have adverse cost impact to the SG project and interfacing projects Pumps may not be available for future units. See Action ID 00007745 for obtaining MOU for waterlancing pumps to use for future units.	3	Active	Pejman Asgaripour	Jennifer Nodwell	09-Feb-17	Monitor	31-Jan-18	1	1	1	1	1	1	1	1

Outage Window	Window Description
037	037 - Secondary Side SG Clean & Install Access Ports

There are no Draft, Not Started, In Progress Actions associated with the risk.

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14357	Contractor Field Staff Impact Station Operations	EVENT: Contractor field staff negatively impact station operations CAUSE: Lack of contractor awareness of impact to station operations during field execution IMPACT: Delay to the station schedule		Active	Pejman Asgaripour	Jennifer Nodwell	09-Feb-17	Monitor	11-Jan-19	1	1	1	1	1	1	1	1

Outage Window	Window Description
034	034 - Primary Side SG Layup
037	037 - Sec Side SG Clean & Install Access Ports

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
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Process Owner: L. Ren
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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14357	Contractor Field Staff Impact Station Operations	EVENT: Contractor field staff negatively impact station operations CAUSE: Lack of contractor awareness of impact to station operations during field execution IMPACT: Delay to the station schedule	062		062 - Primary Side SG Clean and Inspect												
			105		105 - Vault Projects After Feeder Removal												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14358	Contractors Field Staff Not Prepared To Perform Field Work	EVENT: Contractor field staff are not prepared (knowledge, experience) to perform field work CAUSE: Contractor field staff lack required qualifications RESULT: Delay to the execution schedule and rework Risk raised on OPEX based on the VVRS project		Active	Pejman Asgaripour	Mike Lutz	16-Feb-17	Monitor	10-Jul-18	1	1	1	1	1	1	1	1
			Outage Window		**Window Description**												
			034		034 - Primary Side SG Layup												
			037		037 - Sec Side SG Clean & Install Access Ports												
			062		062 - Primary Side SG Clean and Inspect												
			105		105 - Vault Projects After Feeder Removal												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14373	Demin Water not available for Waterlancing	EVENT: High demand on demin water supply causes delays to waterlancing CAUSE: Demand due to parallel activities from waterlancing, mod flush. Both require demin water IMPACT: Delays to the Project Schedule		Active	Pejman Asgaripour	Jennifer Nodwell	09-Feb-17	Monitor	10-Sep-17	1	1	1	1	1	1	1	1
			Outage Window		**Window Description**												
			037		037 - Sec Side SG Clean & Install Access Ports												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14510	Steam Generators Primary Side Dry Layup Cover	EVENT: The nuts holding the dry layup cover that is installed on the primary side of the steam generator for refurbishment loosen following a seismic event CAUSE: The dry layup cover was not designed to maintain a leak tight seal during a seismic event. IMPACT: Insufficient drying of the PHT system after a seismic event due to leakage through the dry layup cover.		Active	Pejman Asgaripour	Iman Afshar	27-Feb-17	Monitor	15-Dec-18	1	1	1	1	1	1	1	1
			Outage Window		**Window Description**												
			034		034 - Primary Side SG Layup												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
Project: Turbine Generator -																	
13309	TG Crane, all lifting Equipment and Tools Availability/Capability, Hoisting and material handling [All Units]	EVENT: The condition of the crane is degraded to a point where it cannot support the requirements of the TG project. Due to the condition of the crane there is a possiblity of performing standard maintenance, incremental maintenance or a modification to the crane in order to meet the TG project requirement. OPEX on similar installation has shown that the crane would require modification in order to meet the load demand required for this turbine work. Also as per WANO OPEX the performance trend in rigging, lifting and material handling activities has worsened at nuclear stations. Rigging, lifting and material handling events could have adversely affected nuclear safety systems/components and conventional safety. CAUSE: Additional aspects is the residual reliability risk of the TH Crane after refurbishment. If the TH Crane experience any break down during the critical path of the TG window, cost and schedule will be negatively impacted. Also, there is a risk related to plant integration, related to any forced outages or other station emergency requirements to use the cranes which may supersede TG Project needs, resulting in negative impact to cost and schedule. The potential to drop heavy loads in the plant areas is a matter of great concern. During the Turbine Generator refurbishment work there will be various lifting and rigging of suspended loads, and the movement of non suspended loads. A number of critical lifts will occur for weights greater than 50 tones that will cause a great deal of damage if dropped. IMPACT: This event can lead to cost and schedule impact. This risk is an extension to program risk 888, it deals with specialized lifts that the contractor will perform for Turbine Generator Work.	1	Active	Peter Moore	Mina Boghdady	22-Feb-17	Mitigate	21-Oct-21	3	3	4	12	2	3	4	8

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
8468	In Progress	Heavy lifting practicing due dilegence	As per Heavy Lift work including Main Stator lift and Crane Overhaul lesson learned, OPG to recognize the dangers present in heavy lifts by researching OPEX cases that went wrong. Practice due diligence during the planning phases leading up to the stator replacement.	Peter Moore		15-Oct-21	
8688	Not Started	TG Crane load test	Perform the 125% load test after the refurbishment of the transmission for crane 1 & 2.	Peter Moore	Mina Boghdady	28-Feb-17	[Mina B. 10/17/2016] Due to discovery work on Crane Maintenance Window #2 which scoped into window#3; the load test has been postponed to February 2017. The discovery work identified requires the replacement of all gear assembly on the main hoist for both cranes.

Outage Window	Window Description
061	061 - Turbine Generator Major Overhaul
100	100 - TG and Condenser Work Phase I

13419	Turbine and Excitation Controls Software Qualification Report (SQR) Risk to Quality/Schedule [Unit 3]	EVENT: Software Qualification Report is required prior to the FAT testing and for JV to complete all deliverables for Release 2 in March 2016. Any delay will affect the FAT testing and impact the schedule. CAUSE: There are two aspects to the risk:Technical: Due to OPG-specific criteria which drives the Turbine and Excitation Controls software to a higher level, [redacted] Commercial: Alstom has provided OPG a preliminary gap analysis identifying the Turbine and Excitation Controls software that Alstom intend to provide Software Qualification Reports (SQR). The preliminary gap analysis also identifies software which, due to contractual difference of position, Alstom does not intend on providing SQRs for. [redacted] Although software qualification is progressing on track, but there will be a residual risk until FAT testing can be completed. As per OPG project and GE correspondences, GE remains responsible for their software, in case any post-FAT modification is required and results of FAT test must be correctly interfaced with the final software qualification reports. IMPACT: This can lead to schedule and cost impact on the overall project. SCR N-2015-10744.	3	Active	Todd Josifovski	Soorena Merat	23-Feb-17	Mitigate	01-May-17	3	2	4	12	1	2	4	4

Outage Window	Window Description
000	000 – No Window Related

There are no Draft, Not Started, In Progress Actions associated with the risk.

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13575	Stator Mid Section transportation risk [Unit 3]	EVENT: As part of the TG scope of work a new generator stator mid section is being procured. CAUSE: The transportation of the stator mid section is currently in the ESES scope. However a risk is imposed that infrastructural upgrades (St. Mary's Cement Dock, Gravel road connection, etc.) are required to complete the stator transportation. IMPACT: The infrastructure upgrade will impact cost.	1	Active	Peter Moore	Arber Puci	24-Feb-17	Mitigate	30-Nov-17	3	3	1	9	3	2	1	6
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**							
			7951	In Progress	TG- Darlington Dock assesment	The TG project believes that receiving the stator via water is the most feasible solution and provides better value for money than the rail option. The project has contracted IMS to perform an assessment of the dock structure to ensure that the dock can safely withstand the weight of the stator. IMS and their diving team will obtain concrete samples and they will submit a report with the assessment of the dock.	Peter Moore	Arber Puci	10-Feb-17	As per IMS latest update, an extension till February 2017.							
			Outage Window		**Window Description**												
			000		000 – No Window Related												
11217	TG- Lack of skilled and experienced EPC Vendor Staffing [All Units]	EVENT: Lack of Skilled and experienced craft labour, QC and supervision resources in Definition, Planning and Execution phases for TG project for performing the work as per schedule with sufficent quality; avoiding any potential rework. CAUSE: Ability of vendor to hire the experienced and skilled personnel and the unavailability of experienced and skilled personnel. IMPACT: Potential rework that can impact cost and schedule.	1	Active	Peter Moore	Ron Aranha	23-Feb-17	Mitigate	31-Jan-18	2	2	4	8	2	2	3	6
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**							
			8687	In Progress	TG expectations document for OPG TFAs	Prepare a expectation document for OPG Technical Field Advisor that will support contractor during execution.		Peter Moore	Arber Puci	10-Mar-17								
			Outage Window		**Window Description**												
			061		061 - Turbine Generator Major Overhaul												
			100		100 - TG and Condenser Work Phase I												
13531	TG Risk of Schedule Delay / Cost Due to OPG and Vendor Handoffs / Dependent Activities [All Units]	EVENT: Due to multiple vendor handoffs, the TG contracting strategy has been optimized to reflect strengths of vendors and internal OPG groups involved. CAUSE: Late or incomplete handoffs, or late completed activities may result in delay or rework by other vendors or OPG groups. IMPACT: However the risk is that there will be schedule delay or additional costs due to the multiple handoffs / dependent activities between OPG / Alstom / JV / IMS.	1	Active	Peter Moore	Arber Puci	24-Feb-17	Monitor	01-Jun-18	2	3	4	8	2	3	4	8
			Outage Window		**Window Description**												
			061		061 - Turbine Generator Major Overhaul												
			100		100 - TG and Condenser Work Phase I												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13973	TG - IMS work window for TG could coincided with their blackout dates [All units]	EVENT: IMS has been hired by the refurb organization to perform inspection on the Turbine Generator and Auxiliaries. CAUSE: The Refurb execution window is posing a risk since IMS work window for TG could coincided with their blackout dates that IMS has identified for support of planned outages in PNGS and DNGS as part of generation plan initiative. IMPACT: There is significant impact on schedule that might occur. The SG bundle and TG project could fall into the same category.	1	Active	Peter Moore	Arber Puci	24-Feb-17	Monitor	01-Jun-18	2	1	4	8	2	1	4	8
			Outage Window		**Window Description**												
			061		061 - Turbine Generator Major Overhaul												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
11221	TG Risk of Schedule delay due to inefficient vendors cooperation/interface on technical information (i.e Design) [All Units]	EVENT: The selected vendor may not obtaining, or not obtaining on time, technical information from the ESES required to support the T/G work due to lack of EPCs ability to obtain required information from ESES. CAUSE: Inability to answer/excessive response time RFI's from EPC. IMPACT: There might be schedule delay and additional cost	3	Active	Todd Josifovski	Peter Moore	22-Feb-17	Mitigate	31-Dec-17	2	2	3	6	1	1	2	2
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**							
			9956	In Progress	TG-implement ITF reporting	Implement of the ITF reporting in the weekly JV meeting.		Peter Moore	Ken Lee	31-Dec-17								
			9957	In Progress	TG - tripartite meetings	Hold JV/GE/OPG tripartite meetings in 2017.		Peter Moore	Arber Puci	31-Dec-17								
			Outage Window		**Window Description**												
			000		000 – No Window Related												
11250	TG Discovery work scope caused by inspections with impact on long lead items or major repairs [All Units]	EVENT: The risk is that parts/resources for contingent (inspection based) work is not readily available when needed to support TG objectives or when major repairs are required. CAUSE: Following inspections, material lead time is evaluated against recommended contingent work and adverse schedule impact may result. (such as thyrisistor inspection but not including major items such as Stress Corrosion Cracking on the Turbine Rotor) IMPACT: It will affect greatly affect the TG window risking to make it a critical path.	1	Active	Todd Josifovski	Peter Moore	23-Feb-17	Monitor	29-Dec-17	2	3	3	6	2	3	3	6
			Outage Window		**Window Description**												
			061		061 - Turbine Generator Major Overhaul												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
11965	TG - Risk of EPSCA Costs Above Current Estimate [All Units]	EVENT: There is a large number of craft, technical or supervision labor required for this refurbishment project. CAUSE :The risk is that upon hiring craft, technical or supervision labour, a greater percentage of workers than estimated must be drawn from beyond the range that requires maximum per diems (lodging etc.). IMPACT: Resulting in greater expenditures than estimated.	1	Active	Todd Josifovski	Pejman Asgaripour	22-Feb-17	Monitor	30-Jun-25	3	2	1	6	3	2	1	6
			Outage Window		**Window Description**												
			061		061 - Turbine Generator Major Overhaul												
			100		100 - TG and Condenser Work Phase I												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
12302	TG- Unavailablity of validated procedures due to first time evolution in the maintenance scope [Unit 2]	EVENT: During the DNRU2 there is a number of maintenance activities that will represent a first of a kind evolution and have never been performed before on the DNGS such as Removal of turbine spindles and lower blade carriers. CAUSE: The unavailablity of validated procedures for first time maintenance activities presents some level of unknowns. IMPACT: This can potentially result in adverse cost/schedule/quality impact.	2	Active	Peter Moore	Arber Puci	23-Feb-17	Mitigate	30-Dec-17	2	2	3	6	1	2	3	3
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			7749	In Progress	TG- CWP package field assesment	The CWP prepared for the U2 execution will be field walk down by the foreman and OPG oversight to asses its field execution and identify and pre-reqs and materials that will be required to be completed prior to breaker open. First of a Kind in segement-1 include 1- CT and HV Bushing replacements 2- Drain and Dry of the Stator Core 3- Condenser Seal replacement 4- IPB, Air box and Terminal Box work	Peter Moore	Mina Boghdady	01-Mar-17	[MINA B. 08AUG2016] The CWP Field walkdowns will be completed for both segments (Windows 061 &100) for the TG Bundle in March 2017. Currently all CWP required for TG Segement-1 (Window 100) have been walked down and as per the developed process comments are currently being dispositioned.							
			8687	In Progress	TG expectations document for OPG TFAs	Prepare a expectation document for OPG Technical Field Advisor that will support contractor during execution.	Peter Moore	Arber Puci	10-Mar-17								
			Outage Window		**Window Description**												
			061		061 - Turbine Generator Major Overhaul												
			100		100 - TG and Condenser Work Phase I												
12401	Misunderstanding the requirements, or errors in vendor's submittals to OPG [All Units]	EVENT: Vendor is submitting a large number of documents to OPG. The requirements for this deliverables are listed in the VOIR interface requirements. CAUSE: Vendor may misunderstand VOIR interface requirements, requirements for integration, or requirements (deliverables) of the contract and there can be quality and level of errors on vendor's submittals to OPG for review. IMPACT: There is a potential delay in completing the milestone and can impact the schedule.	3	Active	Peter Moore	Ken Russell	22-Feb-17	Monitor	31-Dec-17	2	2	3	6	2	2	3	6
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13443	TG – Risk of Ability to Implement OPG Project Team Resourcing Assumptions [Unit 2]	EVENT: In support of 4D estimating in 2014, TG implemented a variable resourcing profile for OPG core project management personnel, assuming that personnel could be ramped up and down as dictated by the Refurbishment outage schedules and work profile. CAUSE: Due to considerations of maintaining project team continuity, this resourcing profile cannot be realized or can only be partially realized. IMPACT:The impact would be increased cost to the project.	1	Active	Peter Moore	Pankaj Chauhan	24-Feb-17	Monitor	31-Dec-17	3	2	1	6	3	2	1	6
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14112	TG- Potential added cost due to in-situ retaining ring inspection [all units]	EVENT: There is a high possibility of GE to implement in situ retaining ring inspection. CAUSE: Due to the unavailability of power sources in the plant to remove the retaining ring for inspection. GE, OPG and JV are discussing various method of performing the retaining ring inspection. IMPACT: This inspection has the potential to carry extra cost for OPG.	3	Active	Peter Moore	Marcel Fiterau	23-Feb-17	Accept	31-Jan-17	3	2	1	6	3	2	1	6
			Outage Window		**Window Description**												
			061		061 - Turbine Generator Major Overhaul												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14113	TG - GE to incorporate comments of stator third party review [Units 3&4]	EVENT: GE is producing a new stator mid section and producing the technical specification of this product. CAUSE: GE has already incorporated OPG's comments on the U3 Generator Stator technical documents. A generator expert has been hired by OPG to perform a third party review of the U3 Generator Stator technical documents. IMPACT: Based on the comments to be provided by the generator experts there is a risk of additional costs to GE and also a potential for a schedule delay.	4	Active	Peter Moore	Arber Puci	24-Feb-17	Monitor	31-Jan-18	2	2	3	6	2	2	3	6
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14588	TG- Inadequate/unavailable Tooling [All units]	EVENT: The Turbine Generator work requires specialty tooling. As part of the contract between JV and OPG, OPG will provide all the tooling but JV will be maintaining them for the duration of the work. CAUSE: Tooling unavailability has the potential to affect work, the specialty tooling has to be manufactured if its broken or lost. There is also a potential of a station outage to occur at the same time therefore limiting the availability of the tools. Impact: Tooling unavailability can impact schedule.	2	Active	Peter Moore	Arber Puci	24-Feb-17	Mitigate	01-Jun-18	2	1	3	6	1	1	2	2
			Outage Window		**Window Description**												
			061		061 - Turbine Generator Major Overhaul												
			100		100 - TG and Condenser Work Phase I												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14952	TG - Potential Impact due to application and modification of Work Protection/Permits	EVENT: The operation support for the TG project is schedule is on a 5 days x 10 hours Monday to Friday schedule, and, if needed can accommodate some changes to / and or delays to the implementation of the work protection requirements (operational permits) during the week end or the back shift. OPEX shows that initial application of Permits and inevitable required modifications to the permits will delay the Project Progress CAUSE: In case there is no support available for the week end or the back shift some required permit evolution will not occur therefore impacting and delaying the work downstream. IMPACT: This has the potential to impact the schedule		Active	Peter Moore		24-Feb-17	Accept	25-Dec-17	3	1	2	6	3	1	2	6
			Outage Window		**Window Description**												
			061		061 - Turbine Generator Major Overhaul												
			100		100 - TG and Condenser Work Phase I												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13552	TG - ESES Vendor Technical Field Advisor (TFA) Greater Support than Anticipated [All units]	EVENT: TG project is hiring Technical Field Advisors from the vendor to provide guidance and support execution. The ESES Vendor (Alstom/GE) provided an estimate of the expected cost based on the TG project schedule. CAUSE: The ESES Vendor (Alstom/GE) Technical Field Advisor costs can be greater than anticipated in the estimate provided. This could be due to additional technical field support required to shore up EPC vendor capability/expertise, additional support to support the schedule, or due to major discovery work extending the overall turbine window. IMPACT: This can lead to extra cost.	1	Active	Todd Josifovski	Arber Puci	24-Feb-17	Monitor	28-Mar-18	2	2	1	4	2	2	1	4
			Outage Window		**Window Description**												
			061		061 - Turbine Generator Major Overhaul												
			100		100 - TG and Condenser Work Phase I												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13553	TG - Risk of Additional Spare Parts Costs as a Result of Maintenance OPEX [All Units]	EVENT: Extended maintenace will be performed on U2 during refurb outage. The lesson learned and the findings will be used to plan subsequent units 1,3,4. Cause: For subsequent units 1,3,4, additional turbine generator spare parts would need to be procured from OEM or OPG Warehouse, will be required as a result of maintenance OPEX gained on the first unit. IMPACT: this can result in additional cost impact. No schedule impact.	1	Active	Todd Josifovski	Arber Puci	24-Feb-17	Accept	31-Dec-17	2	2	1	4	2	2	1	4
			Outage Window		**Window Description**												
			061		061 - Turbine Generator Major Overhaul												
			100		100 - TG and Condenser Work Phase I												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14905	HFE integrated validation post-DCAVR	EVENT: Based on previous OPEX, performing integrated validations on large, complex systems should be performed in a timely manner to avoid expensive engineering re-work or critical path delays to Refurbishment. CAUSE: Any discovery issues that affect the designs associated with the Turbine Generator control systems and the supporting/interfacing systems will likely be complex and require substantial time to rectify. Performance of the HFE integrated validation post-DCAVR and towards breaker open for Unit 3 increases this risk to the project. IMPACT: Part of the risk is the time necessary to design and implement any computer-based changes, as the lead time for such changes are generally long. The worst-case scenario is computer interface design changes that impact the critical path for the TG control system and HMI that threatens the Unit 3 refurbishment timeline.	1	Active	Peter Moore	Rajeev Leekha	28-Feb-17	Monitor	31-May-19	1	2	4	4	1	2	4	4
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
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Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
11242	TG FME Event Adverse Impact on Cost , Schedule and Equipment [All Units]	EVENT: There is a unique risk of FME associated with turbine generator. CAUSE: The FME controls implemented by the vendor might not be adequate, resulting in an FME event. Oversight finds FME process issues, or an FME event occurs. IMPACT: FME event adverese impact on cost , schedule and equipment.As per contract, JV will be responsible for any rework due to an FME event caused by their resources, but OPG will incurr the cost for any overall delay or any indirect impact due caused by this events.	1	Active	Todd Josifovski	Peter Moore	23-Feb-17	Monitor	31-Dec-17	1	2	3	3	1	2	3	3
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**						
			9958	Draft	TG- FME qualification check on	Perform a spot check on JV's FME qualification on the trades.		Peter Moore	Ken Lee	01-May-17							
			Outage Window		**Window Description**												
			061		061 - Turbine Generator Major Overhaul												
			100		100 - TG and Condenser Work Phase I												
14414	TG - TG window will negatively impact D1831 outage [Unit 2]	EVENT: During the U2 refurbishment outage the TG window has a set window to ensure that it will not overlap with any scheduled station outage. CAUSE: There is a potential that if there is a schedule push on the TG window it can impact the D1831 outage. IMPACT: Overlapping refurb and planned TG outages can impact have a negative impact on multiple items such as on tooling release, floor space, etc. P50 schedule contingency.	1	Active	Peter Moore		24-Feb-17	Monitor	30-Nov-17	1	2	3	3	1	2	3	3
			Outage Window		**Window Description**												
			061		061 - Turbine Generator Major Overhaul												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
11744	TG OEM's control systems may not meet IESO's requirements [Units 3,4 and 1]	EVENT: Turbine & Excitation Controls equipment replacement scope requires completion of a System Impact Assessment from the IESO. There current exceptions from IESO for the Darlington Station will be required to be meet. CAUSE: There is a chance that OEM vendor's excitation system design will not meet IESO regulatory requirements, or that late identified requirements will impact cost/schedule. Darlington IESO exceptions shall be continued to be enforced and will be addressed by design. IMPACT: By not meeting the IESO requirements, for the worst case scenario the generator will not be able to connect to the grid. The project will be required to work critical path until the control parameters of the generator have been manipulated to meet the requirements to connect to the grid. This will cost an overall refurbishment outage delay. On the best case scenario the IESO will conditionally allow the unit to connect to the grid until the next unit outage, where the project will require performing the dynamic commissioning portion again to modify the generator parameter in order to meet the IESO requirements. This will have an impact on the cost of the project.	2	Active	Peter Moore	Ken Russell	23-Feb-17	Mitigate	29-Dec-17	1	1	2	2	1	1	2	2
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**						
			9959	Draft	TG - Excitation Control FAT	Completion of the Excitation control FAT, to demonstrate performance. The process of the FAT with any open issues will be tracked to completion.		Peter Moore	Ken Russell	14-Apr-17							
			Outage Window		**Window Description**												
			000		000 – No Window Related												
13444	TG - JV may not be compliant to OPG request [All Units]	EVENT: During review cycle or oversight performed OPG can provide various request to vendors for changes. CAUSE: The JV may not be compliant with OPG requests and not seeking prior approval to making changes to engineering related work urgency. IMPACT: This has the potential to lead to re-work on JV part, which can affect the overall schedule and cost. This risk deals with quality of work issues and non-compliance to procedures issues.	3	Active	Peter Moore	Mina Boghdady	22-Feb-17	Monitor	31-Dec-17	1	1	2	2	1	1	2	2
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13730	TG - contractor may not adhere to OPG chemistry requirements [All Units]	EVENT: OPG Refurb Chemistry has prepared procedures for the cleaninlines requirements to be used in the plant by the contractors during refurbishment. CAUSE: There is a risk that the contractor may not adhere to cleanliness requirements during field execution that may adversely impact plant's system chemistry. IMPACT: This had the potential to have a cost and schedule impact on the project.	3	Active	Peter Moore	Dave Owens	24-Feb-17	Monitor	01-Jun-18	1	1	2	2	1	1	2	2
			Outage Window		**Window Description**												
			061		061 - Turbine Generator Major Overhaul												
			100		100 - TG and Condenser Work Phase I												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14030	TG - New Stator Midsection risk [Unit 3]	EVENT: The TG project is procuring a new stator to be used on U3 generator from Alstom. The new stator is specified and expected to be delivered on site as a direct replacement item. CAUSE: There is a risk that the new stator can arrive at the darlington site not with the right components and the design does not have the correct specification. Therefore the stator funclionality and operability is not similar to the original. IMPACT: This will lead to great schedule and cost impact.	3	Active	Peter Moore	Arber Puci	24-Feb-17	Monitor	31-May-21	1	1	2	2	1	1	2	2
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

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Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
Project: Turbine Generator - 73032																	
14409	TG - FOAK Generator Stator drain and dry during U2 refurbishment [Unit 2]	EVENT: The generator stator is infrequently drained, and has never been vacuum dried. This will have to be completed as part of the TG refurbishment scope. CAUSE: This is a First of a Kind Work Cost, of particular concern are: 1)The lack of skilled and experienced labour. 2)The unavailability of a validated procedure due to the task's status as FOAK work. 3)Vacuum pump details/tool and process not finalized. 4) Stator winding corrosion if inadequately dried. IMPACT: Schedule and cost impacts could result from unknown factors during the drain and dry process.	1	Active	Peter Moore	Arber Puci	28-Feb-17	Mitigate	25-Jan-17	2	3	4	8	1	2	2	2
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**							
			7749	In Progress	TG- CWP package field assesment	The CWP prepared for the U2 execution will be field walk down by the foreman and OPG oversight to asses its field execution and identify and pre-reqs and materials that will be required to be completed prior to breaker open. First of a Kind in segement-1 include 1- CT and HV Bushing replacements 2- Drain and Dry of the Stator Core 3- Condenser Seal replacement 4- IPB, Air box and Terminal Box work		Peter Moore	Mina Boghdady	01-Mar-17	[MINA B. 08AUG2016] The CWP Field walkdowns will be completed for both segments (Windows 061 &100) for the TG Bundle in March 2017. Currently all CWP required for TG Segement-1 (Window 100) have been walked down and as per the developed process comments are currently being dispositioned.				
			8687	In Progress	TG expectations document for OPG TFAs	Prepare a expectation document for OPG Technical Field Advisor that will support contractor during execution.		Peter Moore	Arber Puci	10-Mar-17							
			Outage Window		**Window Description**												
			100		100 - TG and Condenser Work Phase I												
Project: Turbine Generator - 73272																	
14407	TG - FOAK Cost and schedule impact due to high voltage bushings and current transformers replacement [Unit 2]	EVENT: The high voltage bushings and transformers haven't been replaced since installation in original turbine generator set erection. CAUSE: Due to this being a first of a kind work, particular concern are: 1. Size/Weight, tight working space and lack of experience with the required tooling 2. CT Wiring Connections correct installation and quality control 3. HV Bushing Replacement and potential damage to spare bushing used for mock-up 4. IPB Disassembly, first time evoluation (FME, control of parts, spares, mechanical joints, broken parts). IMPACT: Unknown factors in the replacement of high voltage bushings and transformers could impact the cost and schedule for the generator portion of TG refurbishment scope.	2	Active	Peter Moore	Arber Puci	24-Feb-17	Mitigate	31-Aug-17	2	2	4	8	2	1	3	6
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**							
			8687	In Progress	TG expectations document for OPG TFAs	Prepare a expectation document for OPG Technical Field Advisor that will support contractor during execution.		Peter Moore	Arber Puci	10-Mar-17							
			Outage Window		**Window Description**												
			100		100 - TG and Condenser Work Phase I												
			661		661 - TG Major Overhaul												
Project: Turbine Generator - 73273																	
13863	Turbine Controls / Excitation Controls / Hydraulics unexpected issues/delays in static or dynamic commissioning [Units 3,4 and 1]	EVENT: The modification to be implemented, the turbine controls, excitation controls and hydraulic controls are being upgraded. This new modification will be tested during static and dynamic commissioning. CAUSE: There is various unexpected issues that can occur during the static or dynamic commissioning from schedule window delay to the whole system not functioning or behaving as expected. IMPACT: This can lead to a big impact on the cost, schedule and might delay the entire refurbishment of U3.	1	Active	Peter Moore	Arber Puci	24-Feb-17	Mitigate	01-Jul-21	2	2	4	8	1	2	4	4
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**							
			8685	In Progress	TG FSMS installation	A full scope maintenance simulator will be installed to provide an opportunity to test the system before.		Peter Moore	Soorena Merat	30-Nov-17							
			Outage Window		**Window Description**												
			000		000 – No Window Related												
Project: Turbine Generator - 73277																	
14410	TG - FOAK LP Spindles Removal for U2 refurbishment [Unit 2]	EVENT: Due to the legacy strategy of maintenance in place the LP spindles have not been removed since turbine generator set erection. The scope also requires first time removal of other components such as lower Steam Inlet Casing (SIC) and complete disassembly work on the intercept valves. Of particular concern are: Tooling Uncoupling of turbines Testing/Commissioning LP spindle shift Resource Challenges Lifting Equipment Procedures Discovery Work or unexpected issues during first time removals OPG unsuccessfully attemptted to disasseble these intercept valves before. CAUSE: This is a first of a kind work conducted with a high potential for risk. IMPACT: These tasks could involve impacts to cost/schedule if not planned adequately or executed as planned.	1	Active	Peter Moore	Mina Boghdady	28-Feb-17	Mitigate	01-Jun-18	3	4	4	12	2	3	3	6
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**							
			7749	In Progress	TG- CWP package field assesment	The CWP prepared for the U2 execution will be field walk down by the foreman and OPG oversight to asses its field execution and identify and pre-reqs and materials that will be required to be completed prior to breaker open. First of a Kind in segement-1 include 1- CT and HV Bushing replacements 2- Drain and Dry of the Stator Core 3- Condenser Seal replacement 4- IPB, Air box and Terminal Box work		Peter Moore	Mina Boghdady	01-Mar-17	[MINA B. 08AUG2016] The CWP Field walkdowns will be completed for both segments (Windows 061 &100) for the TG Bundle in March 2017. Currently all CWP required for TG Segement-1 (Window 100) have been walked down and as per the developed process comments are currently being dispositioned.				
			8687	In Progress	TG expectations document for OPG TFAs	Prepare a expectation document for OPG Technical Field Advisor that will support contractor during execution.		Peter Moore	Arber Puci	10-Mar-17							

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14410	TG - FOAK LP Spindles Removal for U2 refurbishment [Unit 2]	EVENT: Due to the legacy strategy of maintenance in place the LP spindles have not been removed since turbine generator set erection. The scope also requires first time removal of other components such as lower Steam Inlet Casing (SIC) and complete disassembly work on the intercept valves. Of particular concern are: Tooling Uncoupling of turbines Testing/Commissioning LP spindle shift Resource Challenges Lifting Equipment Procedures Discovery Work or unexpected issues during first time removals OPG unsuccessfully attemptted to disasseble these intercept valves before. CAUSE:	8688	Not Started	TG Crane load test	Perform the 125% load test after the refurbishment of the transmission for crane 1 & 2.	Peter Moore	Mina Boghdady	28-Feb-17	[Mina B. 10/17/2016] Due to discovery work on Crane Maintenance Window #2 which scoped into window#3; the load test has been postponed to February 2017. The discovery work identified requires the replacement of all gear assembly on the main hoist for both cranes.							
			Outage Window		**Window Description**												
			061		061 - Turbine Generator Major Overhaul												
14407	TG - FOAK Cost and schedule impact due to high voltage bushings and current transformers replacement [Unit 2]	EVENT: The high voltage bushings and transformers haven't been replaced since installation in original turbine generator set erection. CAUSE: Due to this being a first of a kind work, particular concern are: 1. Size/Weight, tight working space and lack of experience with the required tooling 2. CT Wiring Connections correct installation and quality control 3. HV Bushing Replacement and potential damage to spare bushing used for mock-up 4. IPB Disassembly, first time evoluation (FME, control of parts, spares, mechanical joints, broken parts). IMPACT: Unknown factors in the replacement of high voltage bushings and transformers could impact the cost and schedule for the generator portion of TG refurbishment scope.	2	Active	Peter Moore	Arber Puci	24-Feb-17	Mitigate	31-Aug-17	2	2	4	8	2	1	3	6
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			8687	In Progress	TG expectations document for OPG TFAs	Prepare a expectation document for OPG Technical Field Advisor that will support contractor during execution.	Peter Moore	Arber Puci	10-Mar-17								
			Outage Window		**Window Description**												
			100		100 - TG and Condenser Work Phase I												
			661		661 - TG Major Overhaul												
14409	TG - FOAK Generator Stator drain and dry during U2 refurbishment [Unit 2]	EVENT: The generator stator is infrequently drained, and has never been vacuum dried. This will have to be completed as part of the TG refurbishment scope. CAUSE: This is a First of a Kind Work Cost, of particular concern are: 1)The lack of skilled and experienced labour. 2)The unavailability of a validated procedure due to the task's status as FOAK work. 3)Vacuum pump details/tool and process not finalized. 4) Stator winding corrosion if inadequately dried. IMPACT: Schedule and cost impacts could result from unknown factors during the drain and dry process.	1	Active	Peter Moore	Arber Puci	28-Feb-17	Mitigate	25-Jan-17	2	3	4	8	1	2	2	2
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			7749	In Progress	TG- CWP package field assesment	The CWP prepared for the U2 execution will be field walk down by the foreman and OPG oversight to asses its field execution and identify and pre-reqs and materials that will be required to be completed prior to breaker open. First of a Kind in segement-1 include 1- CT and HV Bushing replacements 2- Drain and Dry of the Stator Core 3- Condenser Seal replacement 4- IPB, Air box and Terminal Box work	Peter Moore	Mina Boghdady	01-Mar-17	[MINA B. 08AUG2016] The CWP Field walkdowns will be completed for both segments (Windows 061 &100) for the TG Bundle in March 2017. Currently all CWP required for TG Segement-1 (Window 100) have been walked down and as per the developed process comments are currently being dispositioned.				
			8687	In Progress	TG expectations document for OPG TFAs	Prepare a expectation document for OPG Technical Field Advisor that will support contractor during execution.	Peter Moore	Arber Puci	10-Mar-17								
			Outage Window		**Window Description**												
			100		100 - TG and Condenser Work Phase I												

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
Project: Unit Islanding -																	
14351	Refurb resources unavailable to support project execution [No Window Related]	Event: Station and Corporate resources supporting Islanding project execution as Refurb resources are unavailable. Several specialized resources are required to execute the Islanding scope including Safety System-qualified Control Techs to perform tie ins for the Negative Pressure Containment pre-req project. These resources may be unavailable or not duplicated in the Refurb organization. Cause: Specialized skill sets and delay in refurb functional support staffing result in the requirement to use resources from other groups in OPGN. Impact: Additional costs will be incurred to fund the support that is not available in Refurb, in addition, schedule delays may be encountered if special skill set staff is unavailable, and as gap support is obtained.	3	Active	Bert Boston	Sarah Elliott	01-Mar-17	Mitigate	15-Jun-19	4	1	2	8	3	1	2	6
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**							
			8275	In Progress	Obtain commitments for support from refurb staff	Obtain commitments for support from refurb staff prior to work execution, to identify any resource gaps. Obtain additional funding required for resources outside of refurb.		Bert Boston	Sarah Elliott	15-Jun-19								
			10105	In Progress	Obtain Committments From NR OPS & MTCE to support Window 137	There is a risk that NR OPS & MTCE may not be able to support 24x7 coverage of Window 137. Islanding will need to obtain and confirm this support to prevent delays on the critical path schedule.		Bert Boston	Sarah Elliott	15-Mar-17	10-Feb-17: OPS & MTCE currently unable to forecast their resource distribution. OPG project lad to follow up on developments 1-Mar-17: OPs support verified. Awaiting MTCE support.							
			Outage Window		**Window Description**												
			000		000 – No Window Related												
13478	A lead-in task may not be completed before islanding work is scheduled to begin. [Window 023]	Event: Lead-in tasks for Islanding work not completed as scheduled. Cause: Before Islanding work can begin, there is lead-in work which must be completed first. Current issues affecting lead-in tasks are Work Plan and field execution quality. Schedule changes and integration issues by work control could also impact Islanding scheduled work. Impact: If pre-reqs are not completed as planned, Islanding work must be delayed with potential burn rate cost increases.	1	Active	Bert Boston	Sarah Elliott	01-Mar-17	Mitigate	15-Apr-17	3	1	2	6	3	1	2	6
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**							
			9708	In Progress	Ensure materials are ready for advancing defuel schedule.	There is a risk that Islanding may not be prepared to execute with the new schedule alignment. Islanding will work with the JV and monitor progress to ensure readiness of work. Specifically, the team will monitor the progress of the materials for the following CWPs: 2124, 2126, 2127, 2128, ,2129, 2130&(A), 2135, 2137, 2185, 2187		Bert Boston	Mehri Molanaie	10-Mar-17	30-Jan: 2124-Few outstanding materials-need date is ASAP 2126-Materials Procured 2127-2130, 2185-Most materials outstanding 2135, 2137, 2130A, 2187-Several outstanding Materials 6-Feb-17: 2185, 2124, 2135 are still have outstanding material, being monitored daily. Any risks will be communicated to the scheduling team. 15-Feb-2017: Pre-Fabricate Materials for L5 in CWP 2185 have been pushed to the 23rd of Feb. TCD shifted accordingly. 21-Feb-2017: Pre-fabrication materials are still an issues. Current issues with CWP 2135, 2137, 2127, 2128, 2129 and 2185. Shielding for 2124 is also expected to arrive on the 10 of Mar. 28-Feb-17: JV has indicated that the outstanding pre-fabricated material for CWP 2135, 2137, 2127, 2128, 2129 and 2185 will be completed by the 5-Mar. Shielding is expected to arrive 10-Mar.							
			Outage Window		**Window Description**												
			023		023 - Install Bulkheads												
14036	Risk to EQ qualification/fitness for service of Unit 4 Calandria Seal [No Window Related]	[Execution Phase] Event:Risk to EQ qualification/fitness for service of Unit 4 Calandria Seal Cause: During replacement of the Unit 4 calandria seal in the VBO the outer calandria seal was damaged. Due to contact with the outer and inner seal, a piece of rubber on the inner seal became dislodged during removal of the outer seal. This is documented in JV NCR 001107-00-00-NC-0162 and SCR D-2015-22043. Impact:As a result there is a risk that the Unit 4 seal may no longer be EQ qualified or fit for service and may require replacement.	2	Active	Bert Boston	Mehri Molanaie	17-Feb-17	Mitigate	31-Mar-17	2	2	3	6	1	1	1	1
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**							

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14036	Risk to EQ qualification/fitness for service of Unit 4 Calandria Seal [No Window Related]	[Execution Phase] Event:Risk to EQ qualification/fitness for service of Unit 4 Calandria Seal Cause: During replacement of the Unit 4 calandria seal in the VBO the outer calandria seal was damaged. Due to contact with the outer and inner seal, a piece of rubber on the innter seal became dislodged during removal of the outer seal. This is documented in JV NCR 001107-00-00-NC-0162 and SCR D-2015-22043. Impact:As a result there is a risk that the Unit 4 seal may no longer be EQ qualified or fit for service and may require replacement.	5988	In Progress	JV to provide NCR to disposition Unit 4 Calandria Seal Damage	Due to damage on the Unit 4 outer calandria seal that occured the JV is to provide a disposition to NCR 001107-00-00-NC-0162 that addresses the seal design margin and EQ basis.	Bert Boston	Mehri Molanaie	31-Mar-17	7June: walkdown report and disposition still not ready. 26-Aug-15: NCR Dispositions are still with engineering TCD Oct 31st. 21-Oct-16: JV to revise NCR based on OPG comments. NCR TCD 15 Nov. 6-Jan-17: OPG still waiting on NCR, NO JV TCD at the moment. 30-Jan-17: due to resource issue, JV has asked for an extension until 28-Feb-17. 28-Feb-17: Due to resource issues, JV has still note completed the NCR. TCD 31-Mar							
			Outage Window		**Window Description**												
			000		000 – No Window Related												
15109	Risk that Pressure Test may exceed current schedule on P6 [window 024]	Event: Execution of pressure test extends beyond currently allocated schedule of 105 hrs in P6. Per LRTE review, the test would reasonably take 132 hours if we have no leaks, and a successful leakage rate at each phase. Impact: Critical Path delays and financial impacts.		Active	Bert Boston	Mehri Molanaie	17-Feb-17	Monitor	03-Apr-17	3	2	2	6	3	2	2	6
			Outage Window		**Window Description**												
			024		024 - Containment Pre Test, Achieve Dew Point & Containment Test												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14166	Possible hoisting and/or rigging failure for the bulkheads [Window 23, 88]	[Execution Phase] EVENT: While hoisting and/or rigging the bulkheads, there is a possibility that the hoisting and/or rigging will fail. Risk of occurrence is relatively low, however consequence is significant. CAUSE: This is a unique lift as a counterbalance is required. General hoisting and rigging mitigation is captured in Risk 888 however this risk will capture elements specific to this lift. IMPACT: If failure occurs while over duct significant damage could occur to the plant.		Active	Bert Boston	Mehri Molanaie	17-Feb-17	Mitigate	24-Mar-17	1	3	4	4	1	3	4	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			6316	In Progress	Review hoisting and rigging plans for bulkhead installation	Review JV's hoisting and rigging plan for installing bulkhead to prevent hoisting and/or rigging failure while installing the bulkhead.	Bert Boston	Mehri Molanaie	24-Mar-17	Reviewer to be identified. 7June: no reviewer identified yet, 7-Sept-16: OPG awaiting newly revised plan. MTL to investigate 14-Oct-16: OPG still awaiting document 14-Dec-16: OPG awaiting document, TCD pushed to 30th Dec. 20-Jan-17: Majority of plans have been review and accepted. Awaiting confirmation for completion of reviews. 6-Jan-17: Plan is currently with SME for review. 11-Jan-!7: Plan has been reviewed and sent back to JV. TCD 20 Jan. 30-Jan-17: Plans have been reviewed, signed and completed. A meeting with the CNSC has been completed regarding the plans. JV to completed resulting actions from meeting. 6-Feb-17: Lift plans for vertical bulkheads are under review. 13-Feb-17: One plan is remaining for the Seal Plugs. Currently with OPG for review, this item has a need date of 1-Mar-17							

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14166	Possible hoisting and/or rigging failure for the bulkheads [Window 23, 88]	[Execution Phase] EVENT: While hoisting and/or rigging the bulkheads, there is a possibility that the hoisting and/or rigging will fail. Risk of occurrence is relatively low, however consequence is significant. CAUSE: This is a unique lift as a counterbalance is required. General hoisting and rigging mitigation is captured in Risk 888 however this risk will capture elements specific to this lift. IMPACT: If failure occurs while over duct significant damage could occur to the plant.	6318	In Progress	Inspect hoisting and rigging equipment	To prevent hoisting and/or rigging failure while installing the bulkhead, Islanding will inspect the hoisting and rigging equipment. Inspections were completed at the factory and will be monitored and completed Just In Time (i.e. equipment to be inspected as it is needed on the field). Several trigger dates have been identified, and will be updated on a weekly basis.	Bert Boston	Mehri Molanaie	15-Mar-17	To Be completed in parallel with hoisting set-up. 11-Jan-17: FAT successfully executed for lifting beam. Inspections for remaining hoisting and rigging set-up TCD 20th Jan 20-Jan-17: Inspections for remaining equipment set up to occur closer to execution date. TCD 31-Jan 28-Feb-17: During field inspection of hoisting/rigging equipment, it was determined that the current lift plan (for the counter beam) was inadequate as the JV was not following the procedure. Work was stopped, and the plan was revised accordingly. 6-Mar-17: All bulkheads have been installed with OPG/CNSC witnessing. Action to remain open for the duration of shielding installation.								

Outage Window	Window Description
023	023 - Install Bulkheads
088	088 - Bulkhead Removal

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
14961	Risk that stored Islanding materials may become lost or damaged during refurbishment	Event: Stored materials which will be needed after refurbishment activities may become lost or damaged. Cause: Improper storage, poor turnover of item location, poor oversight of material transportation. Impact: Costs and critical path delays	1	Active	Bert Boston	Sarah Elliott	01-Mar-17	Mitigate	31-Mar-17	2	2	2	4	1	1	1	1

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
9377	In Progress	Track location of stored Islanding materials (non-Containment Isolations related) during refurbishment	Islanding team to track essential stored materials during refurbishment. By knowing the material's location, the chance of improper storage/ lost of materials decrease. This includes the following: OH180 chips for button-up modification Button-up lamacoids Spill Skid cabinet airlock restraints	Bert Boston	Sarah Elliott	31-Mar-17	16-Nov-16: Oh180 currently stored at CM shop, el 107.5. See attached email. Window lamacoids are in assessing's possession. Translucent lamacoid currently being procured. 31-Jan-17: OH180 & lamacoids still at current location. Spill Skid cabinet is currently at the mech. mtce. laydown area. 1/2 of the A/L restraints are on sight, and the other half is currently at the Whitby warehouse. 1-Mar-17: A/L restraints located U4 100 El.

Outage Window	Window Description
000	000 – No Window Related

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
15164	Risk that EPG3 installation work will be extended prevent final barriers installation [no window]	Event: EPG3 completion may run longer than expected. Currently, A small portion of the barriers work (completion of external pathway) remains outstanding as the construction work for EPG3 prevents installation activities. EPG3 is expected to be completed by April 2017, however, there still remains a risk of the work not being completed on time, thus pushing Barriers work further. Cause: Delays in construction. Impact: Schedule delays for the Construction Islanding Barriers project.	2	Active	Bert Boston	Sarah Elliott	01-Mar-17	Monitor	30-Apr-17	2	1	2	4	2	1	2	4

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
10119	Draft	Actions for Barriers CCF	Islanding Project Team to: 1.) Update p6 to accommodate revised Barriers Schedule 2.) Update AS7 to inject new WO for the remaining tasks 3.) Create risk and action on RMO tool for CCF-complete 4.) Update Ecosys	Bert Boston	Sarah Elliott	31-Mar-17	

Outage Window	Window Description
000	000 – No Window Related

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
15099	Risk that materials are not ready for installation during the post defuel windows [window 023].	Event: Materials for the Containment Isolations project may not be procured, kitted/staged (including having history dockets filed) in time for installation in the field in the post defuel islanding windows. Cause: Delays in manufacturing, errors in documentation. Impact: Critical path delays/financial costs		Active	Bert Boston	Mehri Molanaie	17-Feb-17	Monitor	10-Mar-17	1	2	3	3	1	2	3	3

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
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Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
15099	Risk that materials are not ready for installation during the post defuel windows [window 023].	Event: Materials for the Containment Isolations project may not be procured, kitted/staged (including having history dockets filed) in time for installation in the field in the post defuel islanding windows. Cause: Delays in manufacturing, errors in documentation. Impact: Critical path delays/financial costs	9708	In Progress	Ensure materials are ready for advancing defuel schedule.	There is a risk that Islanding may not be prepared to execute with the new schedule alignment. Islanding will work with the JV and monitor progress to ensure readiness of work. Specifically, the team will monitor the progress of the materials for the following CWPs: 2124, 2126, 2127, 2128, ,2129, 2130&(A), 2135, 2137, 2185, 2187	Bert Boston	Mehri Molanaie	10-Mar-17	30-Jan: 2124-Few outstanding materials-need date is ASAP 2126-Materials Procured 2127-2130, 2185-Most materials outstanding 2135, 2137, 2130A, 2187-Several outstanding Materials 6-Feb-17: 2185, 2124, 2135 are still have outstanding material, being monitored daily. Any risks will be communicated to the scheduling team. 15-Feb-2017: Pre-Fabricate Materials for L5 in CWP 2185 have been pushed to the 23rd of Feb. TCD shifted accordingly. 21-Feb-2017: Pre-fabrication materials are still an issues. Current issues with CWP 2135, 2137, 2127, 2128, 2129 and 2185. Shielding for 2124 is also expected to arrive on the 10 of Mar. 28-Feb-17: JV has indicated that the outstanding pre-fabricated material for CWP 2135, 2137, 2127, 2128, 2129 and 2185 will be completed by the 5-Mar. Shielding is expected to arrive 10-Mar.								
			Outage Window		**Window Description**												
			023		023 - Install Bulkheads												
14714	Inadequate shielding from radiaiton in Bunker areas may result in elevated vault radiation levels [window 25]	Event: Inadequate shielding in Bunker areas (located down beside the north and south of the calandria) may cause higher than expected levels of radiation in the refurbishing vault. There is a possibility that the fields shining up into the vault will be high enough to either restrict access in these areas or vacate the vault. Cause: Currently no plans in place to determine the need of radiation shielding in these areas. Impact: Possible restriction of movement/evacuation of vault if the radiation levels are deemed too high. This will result in critical path delays.		Active	Bert Boston	Mehri Molanaie	17-Feb-17	Monitor	30-Apr-17	1	2	2	2	1	2	2	2
			Outage Window		**Window Description**												
			025		025 - Install Bulkhead Shielding												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14830	Rental Compressors may not be available to perform containment pressure tests during refurbishment [Window 024]	Event: Rental compressors may not have valid CRN numbers, preventing their use for the containment pressure test. Cause: The compressors used for pressure tests are supplied by two companies located outside of Canada. The majority of their clients are located within the U.S, thus they usually do not have valid CRN numbers on their equipment. A CRN number is issued by the TSSA, and is needed in order for the compressors to operate within Canada. OPEX from the VBO tests in 2009 and 2015 show issues arising from invalid CRN numbers on rental equipment. Impact: Cost and Critical Path impacts	2	Active	Bert Boston	Mehri Molanaie	17-Feb-17	Monitor	31-Mar-17	1	2	2	2	1	2	1	2
			Outage Window		**Window Description**												
			024		024 - Containment Pre Test, Achieve Dew Point & Containment Test												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
12250	A second set of Bulkhead panels are not available should the 1st and 2nd unit outages overlap. [No Window Related]	[Execution Phase] Event: A second set of Bulkhead panels are not available should the 1st and 2nd unit outages overlap. Cause: The risk is that Unit 3 will come down early (see Risk 678) which may result in overlapping with Unit 2 outage and there will not be a second Bulkhead available. This would require expedited procurement of a second bulkhead set Based on unlapping of therefurb first and second outages, an economic decision (DRAS 539) has been made to postpone fabrication of a second bulkhead until it is required for overlapping of the 2nd and 3rdrefurb outages. Impact: Schedule delay and material cost	1	Active	Bert Boston	Mehri Molanaie	17-Feb-17	Accept	31-Jan-18	1	1	1	1	1	1	1	1
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			8265	In Progress	Review date requirements of second set of Bulkheads	Review the actual date requirements of the second set of bulkhead panels to determine when they are actually needed.	Bert Boston	Mehri Molanaie	28-Apr-17	24-Aug-16: A review for the need of a second set of bulkheads will be conducted 2 years prior Unit 1 breaker open (i.e. TCD of mid Mar 2019). 21-Oct-16: Islanding given direction to order 2nd set. Team to investigate the exact date when the order can be completed.							
			Outage Window		**Window Description**												
			000		000 – No Window Related												

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
Project: Unit Islanding - 73066																	
15060	Potential vendor delays could lead to stalled execution of TCB Pressure Test [window 024].	Event: Vendor is unprepared for execution of the Temporary Containment Boundary Pressure Test. Cause: Delays in WPL/CWP preparation, late identification of material issues due to inadequate statusing, late pre-fabrication. Impact: Critical Path delays/Financial Costs	4	Active	Bert Boston	Mehri Molanaie	17-Feb-17	Monitor	10-Mar-17	1	1	1	1	1	1	1	1

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
8889	In Progress	Complete contingency planning for pressure test failure.	Complete contingency planning for pressure test failure. This includes contingency activities in P6, tasks assessed and preapproved planning available.	Bert Boston	Mehri Molanaie	15-Mar-17	21-Oct-16: JV will be creating a contingency planning and associated WO for any repairs identified as immediately needed if there is a pressure test failure, test abortion and retesting is required. The WO instructions is to include specific instructions/support required from JV Civil Engineering and/or Resident Engineering to procedurally instruct how the repair is to be performed. JV will be procuring materials to support contingency repairs. The contingency WO will align and referenced in CWP 2187 - UNIT 2 TEMPORARY CONTAINMENT BOUNDARY COMMISSIONING PRESSURE TEST AND LEAK SEARCHING which currently provides detailed work instructions for any contingency repairs that are required. Continue to monitor to see if WO & WO tasks are correctly integrated into CWP. 21-Nov-16: Action on track. 19-Dec-16: Follow up e-mail sent to JV. JV assessing to update WO with contingency tasks. TCD to be provide by JV (Shawn Thompson). 6-Jan-17: Decision matrix created, JV to finalize and issue. 18-Jan-17: P6 scheduling remaining from JV. TCD 28th Jan 6-Feb-17: Waiting upon REV2 of WPL & CWP 2187. 22-Feb-17: Waiting upon REV2 of WPL & CWP 2187. New revised TCDs show dates of 28-Feb-2017. 28-Feb-17: TCDs for the WPLs and CWP have been moved. CWP 2187 TCD 8-Mar. NK38-WPL-34200-0596707 & NK38-WPL-34200-0596901 TCD 15-Mar.

Outage Window	Window Description
014	014 - Containment Mod Commissioning
024	024 - Containment Pre Test, Achieve Dew Point & Containment Test

Project: Unit Islanding - 73457																	
13346	Assumptions made for the Spill response strategy may become invalidated as planning progress [Window 113]	Event: The Islanding spill response strategy was developed based on assumptions in the level 1 refubishment outage plan at the time the strategy was authored. Cause: Invalidated assumptions made for the spill response strategy Impact: Major changes to the refurbishment outage planning logic (e.g. Heat Transport flush) may impact or invalidate the assumptions of the spill response strategy and contingency plans which will require rework for the project.	2	Active	Bert Boston	Sarah Elliott	01-Mar-17	Mitigate	31-Oct-17	3	1	1	3	1	1	1	1

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
8268	In Progress	Check Status of A/R and confirm status of materials	Check status of A/R 28178551. Validate all assumptions made in the spill contingency plan. Find status of materials needed for contingency plan.	Bert Boston	Sarah Elliott	31-Oct-17	7-Sept-16: Once the AR 28178551 assignments are completed, the revised procedure document NK38-OM-38000-05 is reviewed (as per TPAR NR000305), and once the pump / hose & fittings are staged, action can be completed. Several A/R assignments are against other groups, which will not be finished until 2017.

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13346	Assumptions made for the Spill response strategy may become invalidated a	Event: The Islanding spill response strategy was developed based on assumptions in the level 1 refubishment outage plan at the time the strategy was authored. Cause: Invalidated assu															
			Outage Window		**Window Description**												
			113		113 - Sever Bellows												
12436	NR project groups may be planning to execute scope on systems, structures, or components that make up the new containment boundary on the refurbishment unit. [Window 23, 85]]	Event: Because the design for the temporary containment boundary that is going to be established on the refurbishment unit is not yet finalised and other work is progressing in parallel, there is a risk that other NR project groups may unknowingly be planning to execute scope on systems, structures, or components that will make up the new containment boundary on the refurbishment unit. Cause: Design work and installation planning happening in parallel. Impact: This may lead to engineering rework to revise designs, cost increases, and schedule delays.	4	Active	Bert Boston	Sarah Elliott	01-Mar-17	Monitor	15-Jun-19	1	1	1	1	1	1	1	1
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			10209	Draft	Re-review Revision 1 of SIP to	Islanding Series lead to re-review rev001 SIPs.	Bert Boston	Chris	31-May-17								
			Outage Window		**Window Description**												
			023		023 - Install Bulkheads												
			085		085 - AL Closed & Pressure Test												
Project: Unit Islanding - 73461																	
11933	U1 calandria seal will no longer be EQ qualified if there are outage delays exceeding expected life of the seal [No Window Related]	[Execution Phase] Event: The calandria seal will no longer be EQ qualified if there are outage delays exceeding expected life of the seal Cause: If the outage of Unit 1start is delayed >6 months past Feb 2021 (Start of Unit 1) this will exceed the EQ qualification life of the calandria seal for Unit 1 Impact:Resulting in a cost and schedule impact	1	Active	Bert Boston	Mehri Molanaie	17-Feb-17	Mitigate	31-Oct-17	4	2	3	12	2	1	1	2
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			5955	In Progress	Investigate the margin on the seal for unit 1	The CVS material is qualified as per EQ governance to LOCA + LOECI dose. The required Total Integrated Dose (TID) used as input to the EQ qualification included normal dose from operations + accident dose. Currently, the Unit 1 CS is qualified for a normal dose of 228 kEFPH, as per NK38-TSQ-34200-10001 R00. Current kEFPH numbers in N-PLAN-01060-10002 R016 suggest that the seal will be within limits as listed above. This action is to track updates on the kEFPH margins annually. See attached email for more information.	Bert Boston	Mehri Molanaie	31-Oct-17	JV EQ SPOC has provided preliminary analysis indicating additional margin may be possible. By 29April16, document in ITF and put A/R in asset suite.							
			Outage Window		**Window Description**												
			000		000 – No Window Related												
12391	Critical Path extension in refurb unit due to inadequate Vault Vapour Recovery System performance. [Window 137]	Event: Delays to Containment Pressure tests to commission the Bulkhead due to high vault humidity. Cause: The pressure tests require low vault humidity which is obtained through efficient operation of the Vault Vapour Recovery System (VVRS). A pre-req project is being executed to address inadequate performance of the VVRS. This also impacts the time required to reduce tritium to allow both airlock doors open. Current unit Vault Vapour Recovery System reliability and efficiency levels are low which is currently acceptable because a common containment structure provides Vault Vapour Recovery Systemredundancy from other units. Installation of the containment Bulkhead will eliminate the redundancy for the Refurb unit and reduce the redundancy for the operating station. Impact: Inadequate performance of the refurb unit Vault Vapour Recovery System will potentially delay obtaining the required humidity levels for testing and delay critical path	3	Active	Bert Boston	Sarah Elliott	01-Mar-17	Mitigate	31-Mar-17	3	1	2	6	1	1	1	1
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			2172	In Progress	Develop plan for optimizing efficiency and reliability of Vault Vapour Recovery System in U2	Monitor station progress on Vault Vapour Recovery repairs. If repairs are not planned to be completed by then refurb will develop an action plan for assessing and taking necessary actions to ensureoptimum efficiency and reliability of Vault Vapour Recovery Systemin U2	Bert Boston	Sarah Elliott	28-Apr-17	Systems Available for refurb initiative in progress. There are currently no significant reliability issues with the VVRS system that will impact refurb. No requirement to take action at this point Continue to monitor until the start of NR -Action YCD pushed to end of March to see VVRS performance during execution of W137.							
			Outage Window		**Window Description**												
			137		137 - Final Commissioning (VVRS Ph-I, AL&TCD Logic Mods, BU Logic Mod Ph-II)												

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
11449	Failure of Containment Boundary pressure tests resulting in critical path delays [Window 024, 085]	[Execution Phase] Event: Failure of Containment Boundary pressure tests resulting in critical path delays Cause: The specified leak rates may not be achieved which would require the leak to be found, addressed, and the pressure test repeated. Possible failure mods are as follows: Portions of the U2 and U3 new Temporary Containment Boundary have never been part of the containment boundary and therefore have never been pressure tested. This includes the calandria seal, SDC room wall, and vertical BH. This new boundary may contain leak paths in the form of concrete cracks, leaks around EP's or weld cracks. There may be unusual system alignments during the pressure tests which may inadvertently introduce leak paths or damage systems which would in turn leak. Unit 2 and Unit 3 permanent bulkheads could fail the commissioning pressure test. Leaking closure plugs may cause leakage into PHT or increase humidity levels in the vault causing inaccurate readings or allow air into the PHT system which would indicate a leak. leakage of new BH panels Impact: Schedule delays	3	Active	Bert Boston	Mehri Molanaie	17-Feb-17	Monitor	14-Apr-17	2	1	2	4	2	1	2	4

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
8857	In Progress	Ensure contingency materials are ordered for concrete repairs during pressure test	Failure of the pressure test for the Temporary Containment Boundary may occur due to damage on the Concrete walls within the vault. To ensure minimal delays for the concrete wall repair, all contingency materials will be ordered and onsite ahead of the pressure test.	Bert Boston	Mehri Molanaie	07-Mar-17	21-Oct-16: Grout ordered, contingency plan being built into CWP. 21-Nov-16: Action on track 14-Dec-16: New TCD for materials. 19-Dec-16: Follow up e-mail sent to JV. PO is being placed to procure contingency materials. TCD to be provide by JV (Shawn Thompson). 6-Jan-17: OPG to follow up with JV procurement. 6-Feb-17: Material ordered but not onsite. 28-Feb-17: Material delivery has been estimated for 7-Mar-17.
8889	In Progress	Complete contingency planning for pressure test failure.	Complete contingency planning for pressure test failure. This includes contingency activities in P6, tasks assessed and preapproved planning available.	Bert Boston	Mehri Molanaie	15-Mar-17	21-Oct-16: JV will be creating a contingency planning and associated WO for any repairs identified as immediately needed if there is a pressure test failure, test abortion and retesting is required. The WO instructions is to include specific instructions/support required from JV Civil Engineering and/or Resident Engineering to procedurally instruct how the repair is to be performed. JV will be procuring materials to support contingency repairs. The contingency WO will align and referenced in CWP 2187 - UNIT 2 TEMPORARY CONTAINMENT BOUNDARY COMMISSIONING PRESSURE TEST AND LEAK SEARCHING which currently provides detailed work instructions for any contingency repairs that are required. Continue to monitor to see if WO & WO tasks are correctly integrated into CWP. 21-Nov-16: Action on track. 19-Dec-16: Follow up e-mail sent to JV. JV assessing to update WO with contingency tasks. TCD to be provide by JV (Shawn Thompson). 6-Jan-17: Decision matrix created, JV to finalize and issue. 18-Jan-17: P6 scheduling remaining from JV. TCD 28th Jan 6-Feb-17: Waiting upon REV2 of WPL & CWP 2187. 22-Feb-17: Waiting upon REV2 of WPL & CWP 2187. New revised TCDs show dates of 28-Feb-2017. 28-Feb-17: TCDs for the WPLs and CWP have been moved. CWP 2187 TCD 8-Mar. NK38-WPL-34200-0596707 & NK38-WPL-34200-0596901 TCD 15-Mar.

Outage Window	Window Description
024	024 - Containment Pre Test, Achieve Dew Point & Containment Test
085	085 - AL Closed, Shielding Removal & Pressure Test

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
11950	Containment Isolation work in the Fuel Handling duct could increase the critical path schedule and lead to cost overruns due to fueling requirements [Window 23, 88]	[Execution Phase] Event:The critical path isolation of the refurb unit from containment (bulkhead installation), and subsequent removal post fuel channel and feeder replacement, may extend beyond scheduled windows. The frequency/availability and duration of no-fueling windows is determined by operating unit zone levels, trolley reliability and required trolley maintenance. Cause: Reasons for no fueling windows not occurring as planned could include unit zone conditions and trolley reliability. The JV planning basis is that any work below the 100m elevation 87% efficient for U2 BH install and drops to 50% for U2 removal and all other work on subsequent unit. This risk documents delay above and beyond the JV planning basis. Impact:If no fueling windows are shortened or do not occur per plan, critical path schedule delays will result as well as cost overruns due to crew standby time. This risk is to identify project level impacts. Program risk #685 is to identify impact at the program level (i.e. critical path that affects all of NR)*QUAD CHART RISK*	2	Active	Bert Boston	Mehri Molanaie	17-Feb-17	Monitor	24-Mar-17	1	1	3	3	1	1	3	3
			Outage Window		**Window Description**												
			023		023 - Install Bulkheads												
			088		088 - Bulkhead Removal												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
11993	Containment boundary calandria seal may fail during interspace pressure test during NR outage	[Execution Phase] Event: Containment boundary calandria seal may fail during interspace pressure test during NR outage. Risk may not pass initial testing. Cause:Seal degradation overtime and Units 2 and 3 were exposed to a vault pressure test after initial installation. Impact: significant scheduling impact on critical path if seal needs to be replaced. Note, based on knowledge gained during seal testing during previous outages, seal would have to catastrophically fail.	2	Active	Bert Boston	Mehri Molanaie	17-Feb-17	Monitor	01-Jan-20	1	2	3	3	1	2	3	3
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
11486	Inadequate Bulkhead shielding may result in work stoppages at the vault during station fuelling operations [Window 025]	[Execution Phase] Event:Shielding may not provide adequate protection during fuelling operations resulting in work stoppages. Cause: Cause can be due to design deficiency, manufacturing deficiency, and error in modeling. Impact: Schedule delays	3	Active	Bert Boston	Mehri Molanaie	17-Feb-17	Accept	14-Apr-17	1	1	2	2	1	1	2	2
			Outage Window		**Window Description**												
			025		025 - Install Bulkhead Shielding												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

Project: Unit Islanding - 73462

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
12391	Critical Path extension in refurb unit due to inadequate Vault Vapour Recovery System performance. [Window 137]	Event: Delays to Containment Pressure tests to commission the Bulkhead due to high vault humidity. Cause: The pressure tests require low vault humidity which is obtained through efficient operation of the Vault Vapour Recovery System (VVRS). A pre-req project is being executed to address inadequate performance of the VVRS. This also impacts the time required to reduce tritium to allow both airlock doors open. Current unit Vault Vapour Recovery System reliability and efficiency levels are low which is currently acceptable because a common containment structure provides Vault Vapour Recovery Systemredundancy from other units. Installation of the containment Bulkhead will eliminate the redundancy for the Refurb unit and reduce the redundancy for the operating station. Impact: Inadequate performance of the refurb unit Vault Vapour Recovery System will potentially delay obtaining the required humidity levels for testing and delay critical path	3	Active	Bert Boston	Sarah Elliott	01-Mar-17	Mitigate	31-Mar-17	3	1	2	6	1	1	1	1

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
2172	In Progress	Develop plan for optimizing efficiency and reliability of Vault Vapour Recovery System in U2	Monitor station progress on Vault Vapour Recovery repairs. If repairs are not planned to be completed by then refurb will develop an action plan for assessing and taking necessary actions to ensureoptimum efficiency and reliability of Vault Vapour Recovery Systemin U2	Bert Boston	Sarah Elliott	28-Apr-17	Systems Available for refurb initiative in progress. There are currently no significant reliability issues with the VVRS system that will impact refurb. No requirement to take action at this point Continue to monitor until the start of NR -Action YCD pushed to end of March to see VVRS performance during execution of W137.

Outage Window	Window Description
137	137 - Final Commissioning (VVRS Ph-I, AL&TCD Logic Mods, BU Logic Mod Ph-II)

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
11449	Failure of Containment Boundary pressure tests resulting in critical path delays [Window 024, 085]	[Execution Phase] Event: Failure of Containment Boundary pressure tests resulting in critical path delays Cause: The specified leak rates may not be achieved which would require the leak to be found, addressed, and the pressure test repeated. Possible failure mods are as follows: Portions of the U2 and U3 new Temporary Containment Boundary have never been part of the containment boundary and therefore have never been pressure tested. This includes the calandria seal, SDC room wall, and vertical BH. This new boundary may contain leak paths in the form of concrete cracks, leaks around EP's or weld cracks. There may be unusual system alignments during the pressure tests which may inadvertently introduce leak paths or damage systems which would in turn leak. Unit 2 and Unit 3 permanent bulkheads could fail the commissioning pressure test. Leaking closure plugs may cause leakage into PHT or increase humidity levels in the vault causing inaccurate readings or allow air into the PHT system which would indicate a leak. leakage of new BH panels Impact: Schedule delays	3	Active	Bert Boston	Mehri Molanaie	17-Feb-17	Monitor	14-Apr-17	2	1	2	4	2	1	2	4

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
8857	In Progress	Ensure contingency materials are ordered for concrete repairs during pressure test	Failure of the pressure test for the Temporary Containment Boundary may occur due to damage on the Concrete walls within the vault. To ensure minimal delays for the concrete wall repair, all contingency materials will be ordered and onsite ahead of the pressure test.	Bert Boston	Mehri Molanaie	07-Mar-17	21-Oct-16: Grout ordered, contingency plan being built into CWP. 21-Nov-16: Action on track 14-Dec-16: New TCD for materials. 19-Dec-16: Follow up e-mail sent to JV. PO is being placed to procure contingency materials. TCD to be provide by JV (Shawn Thompson). 6-Jan-17: OPG to follow up with JV procurement. 6-Feb-17: Material ordered but not onsite. 28-Feb-17: Material delivery has been estimated for 7-Mar-17.
8889	In Progress	Complete contingency planning for pressure test failure.	Complete contingency planning for pressure test failure. This includes contingency activities in P6, tasks assessed and preapproved planning available.	Bert Boston	Mehri Molanaie	15-Mar-17	21-Oct-16: JV will be creating a contingency planning and associated WO for any repairs identified as immediately needed if there is a pressure test failure, test abortion and retesting is required. The WO instructions is to include specific instructions/support required from JV Civil Engineering and/or Resident Engineering to procedurally instruct how the repair is to be performed. JV will be procuring materials to support contingency repairs. The contingency WO will align and referenced in CWP 2187 - UNIT 2 TEMPORARY CONTAINMENT BOUNDARY COMMISSIONING PRESSURE TEST AND LEAK SEARCHING which currently provides detailed work instructions for any contingency repairs that are required. Continue to monitor to see if WO & WO tasks are correctly integrated into CWP. 21-Nov-16: Action on track. 19-Dec-16: Follow up e-mail sent to JV. JV assessing to update WO with contingency tasks. TCD to be provide by JV (Shawn Thompson). 6-Jan-17: Decision matrix created, JV to finalize and issue. 18-Jan-17: P6 scheduling remaining from JV. TCD 28th Jan 6-Feb-17: Waiting upon REV2 of WPL & CWP 2187. 22-Feb-17: Waiting upon REV2 of WPL & CWP 2187. New revised TCDs show dates of 28-Feb-2017. 28-Feb-17: TCDs for the WPLs and CWP have been moved. CWP 2187 TCD 8-Mar. NK38-WPL-34200-0596707 & NK38-WPL-34200-0596901 TCD 15-Mar.

Outage Window	Window Description
024	024 - Containment Pre Test, Achieve Dew Point & Containment Test
085	085 - AL Closed, Shielding Removal & Pressure Test

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
12400	Potential critical path schedule delay during Unit 2 bulkhead removal resulting from overlap with D1941 outage [Window 88]	[Execution Phase] Event: Potential critical path schedule delay during Unit 2 bulkhead removal resulting from overlap with D1941 outage Cause:There is a schedule risk during the removal of the bulkheads on Unit 2 due to overlap with the D1941 outage. Fueling of Unit 3 will require irradiated fuel to traverse past unit 2 or 4. Impact: Once the bulkhead shielding is removed there will be a delay to one of the outages when the vault is vacated to allow for irradiated fuel movement.	1	Active	Bert Boston	Mehri Molanaie	17-Feb-17	Mitigate	31-May-19	2	1	2	4	2	1	1	2
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**						
			8276	Not Started	Islanding scheduler to track D1941 if on track or delayed	Islanding scheduler to track D1941 if on track or delayed.		Bert Boston	Mehri Molanaie	30-Nov-18							
			Outage Window		**Window Description**												
			088		088 - Bulkhead Removal												
14417	Fuelling machine might interfere with the bulkhead panels [Window 023]	Event: Fueling machine may not have enough clearance when the temporary bulkheads panels would be installed and comes in contact when traversing under unit. Designed clearance is minimal. Cause: Configuration management issues, incorrect installation/fabrication or FME issues. Impact: Significant damage to FM.		Active	Bert Boston	Mehri Molanaie	17-Feb-17	Monitor	15-Apr-17	1	3	4	4	1	3	4	4
			Outage Window		**Window Description**												
			023		023 - Install Bulkheads												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
11950	Containment Isolation work in the Fuel Handling duct could increase the critical path schedule and lead to cost overruns due to fueling requirements [Window 23, 88]	[Execution Phase] Event:The critical path isolation of the refurb unit from containment (bulkhead installation), and subsequent removal post fuel channel and feeder replacement, may extend beyond scheduled windows. The frequency/availability and duration of no-fueling windows is determined by operating unit zone levels, trolley reliability and required trolley maintenance. Cause: Reasons for no fueling windows not occurring as planned could include unit zone conditions and trolley reliability. The JV planning basis is that any work below the 100m elevation 87% efficient for U2 BH install and drops to 50% for U2 removal and all other work on subsequent unit. This risk documents delay above and beyond the JV planning basis. Impact:If no fueling windows are shortened or do not occur per plan, critical path schedule delays will result as well as cost overruns due to crew standby time. This risk is to identify project level impacts. Program risk #685 is to identify impact at the program level (i.e. critical path that affects all of NR)*QUAD CHART RISK*	2	Active	Bert Boston	Mehri Molanaie	17-Feb-17	Monitor	24-Mar-17	1	1	3	3	1	1	3	3
			Outage Window		**Window Description**												
			023		023 - Install Bulkheads												
			088		088 - Bulkhead Removal												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
11993	Containment boundary calandria seal may fail during interspace pressure test during NR outage	[Execution Phase] Event: Containment boundary calandria seal may fail during interspace pressure test during NR outage. Risk may not pass initial testing. Cause:Seal degradation overtime and Units 2 and 3 were exposed to a vault pressure test after initial installation. Impact: significant scheduling impact on critical path if seal needs to be replaced. Note, based on knowledge gained during seal testing during previous outages, seal would have to catastrophically fail.	2	Active	Bert Boston	Mehri Molanaie	17-Feb-17	Monitor	01-Jan-20	1	2	3	3	1	2	3	3
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14946	Issues with Bulkhead installation may occur due to mis-matched dimensions/as found conidities leading to critical path delays [Window 023].	Event: Bolt holes on BH panels may not line up with support holes/ as found conditions may prevent vertical and horizontal bulkhead installation. Cause: Errors in BH machining/improper installation may lead to hole misalignment. As the work is FOAK/FIAW, there are large possibilities of discovery work that can prevent execution of work. Impact: Critical path delays.	4	Active	Bert Boston	Mehri Molanaie	17-Feb-17	Monitor	24-Mar-17	1	3	1	3	1	3	1	3
			Outage Window		**Window Description**												
			023		023 - Install Bulkheads												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14847	Bulkhead panels may be damaged during CWP execution [Window 023].	Event: The Bulkhead panels may be damaged during transportation. Cause: Improper lifting/loading of BH panels Impact: Critical path and cost impacts	1	Active	Bert Boston	Mehri Molanaie	17-Feb-17	Monitor	24-Mar-17	1	3	3	3	1	3	3	3
			Outage Window		**Window Description**												
			023		023 - Install Bulkheads												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

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11486	Inadequate Bulkhead shielding may result in work stoppages at the vault during station fuelling operations [Window 025]	[Execution Phase] Event:Shielding may not provide adequate protection during fuelling operations resulting in work stoppages. Cause: Cause can be due to design deficiency, manufacturing deficiency, and error in modeling. Impact: Schedule delays	3	Active	Bert Boston	Mehri Molanaie	17-Feb-17	Accept	14-Apr-17	1	1	2	2	1	1	2	2
			Outage Window		**Window Description**												
			025		025 - Install Bulkhead Shielding												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
Project: Unit Islanding - 73463																	
12391	Critical Path extension in refurb unit due to inadequate Vault Vapour Recovery System performance. [Window 137]	Event: Delays to Containment Pressure tests to commission the Bulkhead due to high vault humidity. Cause: The pressure tests require low vault humidity which is obtained through efficient operation of the Vault Vapour Recovery System (VVRS). A pre-req project is being executed to address inadequate performance of the VVRS. This also impacts the time required to reduce tritium to allow both airlock doors open. Current unit Vault Vapour Recovery System reliability and efficiency levels are low which is currently acceptable because a common containment structure provides Vault Vapour Recovery Systemredundancy from other units. Installation of the containment Bulkhead will eliminate the redundancy for the Refurb unit and reduce the redundancy for the operating station. Impact: Inadequate performance of the refurb unit Vault Vapour Recovery System will potentially delay obtaining the required humidity levels for testing and delay critical path	3	Active	Bert Boston	Sarah Elliott	01-Mar-17	Mitigate	31-Mar-17	3	1	2	6	1	1	1	1
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			2172	In Progress	Develop plan for optimizing efficiency and reliability of Vault Vapour Recovery System in U2	Monitor station progress on Vault Vapour Recovery repairs. If repairs are not planned to be completed by then refurb will develop an action plan for assessing and taking necessary actions to ensureoptimum efficiency and reliability of Vault Vapour Recovery Systemin U2	Bert Boston	Sarah Elliott	28-Apr-17	Systems Available for refurb initiative in progress. There are currently no significant reliability issues with the VVRS system that will impact refurb. No requirement to take action at this point Continue to monitor until the start of NR -Action YCD pushed to end of March to see VVRS performance during execution of W137.							
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11449	Failure of Containment Boundary pressure tests resulting in critical path delays [Window 024, 085]	[Execution Phase] Event: Failure of Containment Boundary pressure tests resulting in critical path delays Cause: The specified leak rates may not be achieved which would require the leak to be found, addressed, and the pressure test repeated. Possible failure mods are as follows: Portions of the U2 and U3 new Temporary Containment Boundary have never been part of the containment boundary and therefore have never been pressure tested. This includes the calandria seal, SDC room wall, and vertical BH. This new boundary may contain leak paths in the form of concrete cracks, leaks around EP's or weld cracks. There may be unusual system alignments during the pressure tests which may inadvertently introduce leak paths or damage systems which would in turn leak. Unit 2 and Unit 3 permanent bulkheads could fail the commissioning pressure test. Leaking closure plugs may cause leakage into PHT or increase humidity levels in the vault causing inaccurate readings or allow air into the PHT system which would indicate a leak. leakage of new BH panels Impact: Schedule delays	3	Active	Bert Boston	Mehri Molanaie	17-Feb-17	Monitor	14-Apr-17	2	1	2	4	2	1	2	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			8857	In Progress	Ensure contingency materials are ordered for concrete repairs during pressure test	Failure of the pressure test for the Temporary Containment Boundary may occur due to damage on the Concrete walls within the vault. To ensure minimal delays for the concrete wall repair, all contingency materials will be ordered and onsite ahead of the pressure test.	Bert Boston	Mehri Molanaie	07-Mar-17	21-Oct-16: Grout ordered, contingency plan being built into CWP. 21-Nov-16: Action on track 14-Dec-16: New TCD for materials. 19-Dec-16: Follow up e-mail sent to JV. PO is being placed to procure contingency materials. TCD to be provide by JV (Shawn Thompson). 6-Jan-17: OPG to follow up with JV procurement. 6-Feb-17: Material ordered but not onsite. 28-Feb-17: Material delivery has been estimated for 7-Mar-17.							

ONTARIO POWER GENERATION

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21-Oct-16:
JV will be creating a contingency planning and associated WO for any repairs identified as immediately needed if there is a pressure test failure, test abortion and retesting is required. The WO instructions is to include specific instructions/support required from JV Civil Engineering and/or Resident Engineering to procedurally instruct how the repair is to be performed. JV will be procuring materials to support contingency repairs.
The contingency WO will align and referenced in CWP 2187 - UNIT 2 TEMPORARY CONTAINMENT BOUNDARY COMMISSIONING PRESSURE TEST AND LEAK SEARCHING which currently provides detailed work instructions for any contingency repairs that are required.
Continue to monitor to see if WO & WO tasks are correctly integrated into CWP.
21-Nov-16: Action on track.
19-Dec-16: Follow up e-mail sent to JV. JV assessing to update WO with contingency tasks. TCD to be provide by JV (Shawn Thompson).
6-Jan-17: Decision matrix created, JV to finalize and issue.
18-Jan-17: P6 scheduling remaining from JV. TCD 28th Jan
6-Feb-17: Waiting upon REV2 of WPL & CWP 2187.
22-Feb-17: Waiting upon REV2 of WPL & CWP 2187. New revised TCDs show dates of 28-Feb-2017.
28-Feb-17: TCDs for the WPLs and CWP have been moved. CWP 2187 TCD 8-Mar. NK38-WPL-34200-0596707 & NK38-WPL-34200-0596901 TCD 15-Mar.

Outage Window	Window Description
024	024 - Containment Pre Test, Achieve Dew Point & Containment Test
085	085 - AL Closed, Shielding Removal & Pressure Test

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
11950	Containment Isolation work in the Fuel Handling duct could increase the critical path schedule and lead to cost overruns due to fueling requirements [Window 23, 88]	[Execution Phase] Event:The critical path isolation of the refurb unit from containment (bulkhead installation), and subsequent removal post fuel channel and feeder replacement, may extend beyond scheduled windows. The frequency/availability and duration of no-fueling windows is determined by operating unit zone levels, trolley reliability and required trolley maintenance. Cause: Reasons for no fueling windows not occurring as planned could include unit zone conditions and trolley reliability. The JV planning basis is that any work below the 100m elevation 87% efficient for U2 BH install and drops to 50% for U2 removal and all other work on subsequent unit. This risk documents delay above and beyond the JV planning basis. Impact:If no fueling windows are shortened or do not occur per plan, critical path schedule delays will result as well as cost overruns due to crew standby time. This risk is to identify project level impacts. Program risk #685 is to identify impact at the program level (i.e. critical path that affects all of NR)*QUAD CHART RISK*	2	Active	Bert Boston	Mehri Molanaie	17-Feb-17	Monitor	24-Mar-17	1	1	3	3	1	1	3	3

Outage Window	Window Description
023	023 - Install Bulkheads
088	088 - Bulkhead Removal

There are no Draft, Not Started, In Progress Actions associated with the risk.

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
11993	Containment boundary calandria seal may fail during interspace pressure test during NR outage	[Execution Phase] Event: Containment boundary calandria seal may fail during interspace pressure test during NR outage. Risk may not pass initial testing. Cause:Seal degradation overtime and Units 2 and 3 were exposed to a vault pressure test after initial installation. Impact: significant scheduling impact on critical path if seal needs to be replaced. Note, based on knowledge gained during seal testing during previous outages, seal would have to catastrophically fail.	2	Active	Bert Boston	Mehri Molanaie	17-Feb-17	Monitor	01-Jan-20	1	2	3	3	1	2	3	3
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
11486	Inadequate Bulkhead shielding may result in work stoppages at the vault during station fuelling operations [Window 025]	[Execution Phase] Event:Shielding may not provide adequate protection during fuelling operations resulting in work stoppages. Cause: Cause can be due to design deficiency, manufacturing deficiency, and error in modeling. Impact: Schedule delays	3	Active	Bert Boston	Mehri Molanaie	17-Feb-17	Accept	14-Apr-17	1	1	2	2	1	1	2	2
			Outage Window		**Window Description**												
			025		025 - Install Bulkhead Shielding												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
Project: Unit Islanding - 73464																	
12391	Critical Path extension in refurb unit due to inadequate Vault Vapour Recovery System performance. [Window 137]	Event: Delays to Containment Pressure tests to commission the Bulkhead due to high vault humidity. Cause: The pressure tests require low vault humidity which is obtained through efficient operation of the Vault Vapour Recovery System (VVRS). A pre-req project is being executed to address inadequate performance of the VVRS. This also impacts the time required to reduce tritium to allow both airlock doors open. Current unit Vault Vapour Recovery System reliability and efficiency levels are low which is currently acceptable because a common containment structure provides Vault Vapour Recovery Systemredundancy from other units. Installation of the containment Bulkhead will eliminate the redundancy for the Refurb unit and reduce the redundancy for the operating station. Impact: Inadequate performance of the refurb unit Vault Vapour Recovery System will potentially delay obtaining the required humidity levels for testing and delay critical path	3	Active	Bert Boston	Sarah Elliott	01-Mar-17	Mitigate	31-Mar-17	3	1	2	6	1	1	1	1
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			2172	In Progress	Develop plan for optimizing efficiency and reliability of Vault Vapour Recovery System in U2	Monitor station progress on Vault Vapour Recovery repairs. If repairs are not planned to be completed by then refurb will develop an action plan for assessing and taking necessary actions to ensureoptimum efficiency and reliability of Vault Vapour Recovery Systemin U2	Bert Boston	Sarah Elliott	28-Apr-17	Systems Available for refurb initiative in progress. There are currently no significant reliability issues with the VVRS system that will impact refurb. No requirement to take action at this point Continue to monitor until the start of NR -Action YCD pushed to end of March to see VVRS performance during execution of W137.							
			Outage Window		**Window Description**												
			137		137 - Final Commissioning (VVRS Ph-I, AL&TCD Logic Mods, BU Logic Mod Ph-II)												
11449	Failure of Containment Boundary pressure tests resulting in critical path delays [Window 024, 085]	[Execution Phase] Event: Failure of Containment Boundary pressure tests resulting in critical path delays Cause: The specified leak rates may not be achieved which would require the leak to be found, addressed, and the pressure test repeated. Possible failure mods are as follows: Portions of the U2 and U3 new Temporary Containment Boundary have never been part of the containment boundary and therefore have never been pressure tested. This includes the calandria seal, SDC room wall, and vertical BH. This new boundary may contain leak paths in the form of concrete cracks, leaks around EP's or weld cracks. There may be unusual system alignments during the pressure tests which may inadvertently introduce leak paths or damage systems which would in turn leak. Unit 2 and Unit 3 permanent bulkheads could fail the commissioning pressure test. Leaking closure plugs may cause leakage into PHT or increase humidity levels in the vault causing inaccurate readings or allow air into the PHT system which would indicate a leak. leakage of new BH panels Impact: Schedule delays	3	Active	Bert Boston	Mehri Molanaie	17-Feb-17	Monitor	14-Apr-17	2	1	2	4	2	1	2	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			8857	In Progress	Ensure contingency materials are ordered for concrete repairs during pressure test	Failure of the pressure test for the Temporary Containment Boundary may occur due to damage on the Concrete walls within the vault. To ensure minimal delays for the concrete wall repair, all contingency materials will be ordered and onsite ahead of the pressure test.	Bert Boston	Mehri Molanaie	07-Mar-17	21-Oct-16: Grout ordered, contingency plan being built into CWP. 21-Nov-16: Action on track 14-Dec-16: New TCD for materials. 19-Dec-16: Follow up e-mail sent to JV. PO is being placed to procure contingency materials. TCD to be provide by JV (Shawn Thompson). 6-Jan-17: OPG to follow up with JV procurement. 6-Feb-17: Material ordered but not onsite. 28-Feb-17: Material delivery has been estimated for 7-Mar-17.							

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
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21-Oct-16:
JV will be creating a contingency planning and associated WO for any repairs identified as immediately needed if there is a pressure test failure, test abortion and retesting is required. The WO instructions is to include specific instructions/support required from JV Civil Engineering and/or Resident Engineering to procedurally instruct how the repair is to be performed. JV will be procuring materials to support contingency repairs.
The contingency WO will align and referenced in CWP 2187 - UNIT 2 TEMPORARY CONTAINMENT BOUNDARY COMMISSIONING PRESSURE TEST AND LEAK SEARCHING which currently provides detailed work instructions for any contingency repairs that are required.
Continue to monitor to see if WO & WO tasks are correctly integrated into CWP.
21-Nov-16: Action on track.
19-Dec-16: Follow up e-mail sent to JV. JV assessing to update WO with contingency tasks. TCD to be provide by JV (Shawn Thompson).
6-Jan-17: Decision matrix created, JV to finalize and issue.
18-Jan-17: P6 scheduling remaining from JV. TCD 28th Jan
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22-Feb-17: Waiting upon REV2 of WPL & CWP 2187. New revised TCDs show dates of 28-Feb-2017.
28-Feb-17: TCDs for the WPLs and CWP have been moved. CWP 2187 TCD 8-Mar. NK38-WPL-34200-0596707 & NK38-WPL-34200-0596901 TCD 15-Mar.

Outage Window	Window Description
024	024 - Containment Pre Test, Achieve Dew Point & Containment Test
085	085 - AL Closed, Shielding Removal & Pressure Test

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
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11950	Containment Isolation work in the Fuel Handling duct could increase the critical path schedule and lead to cost overruns due to fueling requirements [Window 23, 88]	[Execution Phase] Event:The critical path isolation of the refurb unit from containment (bulkhead installation), and subsequent removal post fuel channel and feeder replacement, may extend beyond scheduled windows. The frequency/availability and duration of no-fueling windows is determined by operating unit zone levels, trolley reliability and required trolley maintenance. Cause: Reasons for no fueling windows not occurring as planned could include unit zone conditions and trolley reliability. The JV planning basis is that any work below the 100m elevation 87% efficient for U2 BH install and drops to 50% for U2 removal and all other work on subsequent unit. This risk documents delay above and beyond the JV planning basis. Impact:If no fueling windows are shortened or do not occur per plan, critical path schedule delays will result as well as cost overruns due to crew standby time. This risk is to identify project level impacts. Program risk #685 is to identify impact at the program level (i.e. critical path that affects all of NR)*QUAD CHART RISK*	2	Active	Bert Boston	Mehri Molanaie	17-Feb-17	Monitor	24-Mar-17	1	1	3	3	1	1	3	3

Outage Window	Window Description
023	023 - Install Bulkheads
088	088 - Bulkhead Removal

There are no Draft, Not Started, In Progress Actions associated with the risk.

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current Probability	Current Financial	Current Schedule	Current Score	Post Probability	Post Financial	Post Schedule	Post Score
11993	Containment boundary calandria seal may fail during interspace pressure test during NR outage	[Execution Phase] Event: Containment boundary calandria seal may fail during interspace pressure test during NR outage. Risk may not pass initial testing. Cause:Seal degradation overtime and Units 2 and 3 were exposed to a vault pressure test after initial installation. Impact: significant scheduling impact on critical path if seal needs to be replaced. Note, based on knowledge gained during seal testing during previous outages, seal would have to catastrophically fail.	2	Active	Bert Boston	Mehri Molanaie	17-Feb-17	Monitor	01-Jan-20	1	2	3	3	1	2	3	3
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
11486	Inadequate Bulkhead shielding may result in work stoppages at the vault during station fuelling operations [Window 025]	[Execution Phase] Event:Shielding may not provide adequate protection during fuelling operations resulting in work stoppages. Cause: Cause can be due to design deficiency, manufacturing deficiency, and error in modeling. Impact: Schedule delays	3	Active	Bert Boston	Mehri Molanaie	17-Feb-17	Accept	14-Apr-17	1	1	2	2	1	1	2	2
			Outage Window		**Window Description**												
			025		025 - Install Bulkhead Shielding												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

Project: Unit Islanding - 73466

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current Probability	Current Financial	Current Schedule	Current Score	Post Probability	Post Financial	Post Schedule	Post Score
13501	Risk that Barriers may not be able to be reused for subsequent outages. [No Window Related]	Event: Risk that Barriers may not be able to be reused for subsequent outages. Cause: More barriers than planned may be worn out, or damaged, and need to be replaced. Impact: This will lead to increased material cost and possibly schedule delay.	1	Active	Bert Boston	Sarah Elliott	01-Mar-17	Mitigate	31-Jan-20	4	1	2	8	4	1	1	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			8514	Not Started	Review of barriers material usage for Unit 1.	A specific review of barriers materials usage is needed once Unit 1 refurbishment is well under way/complete.	Bert Boston	Sarah Elliott	31-Jan-20								
			Outage Window		**Window Description**												
			000		000 – No Window Related												
11623	The construction island barriers may need to be adjusted for individual projects [Window 500]	Event:The Refurb Island barriers (which typically reside along the unit boundaries) have been designed to accommodate many lay down areas and work areas. Cause: Late identification of new areas may mean the barriers need to be adjusted. Impact: This will result in costs associated with Engineering Change revisions. If barriers can't be moved quickly, then EPC delay claims may also result.	2	Active	Bert Boston	Sarah Elliott	01-Mar-17	Monitor	15-Jun-19	2	1	1	2	2	1	1	2
			Outage Window		**Window Description**												
			500		500 - Installation of Barrier and Fencing												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13502	Risk that we may have to switch back to more robust fencing leading to engineering rework, higher material cost, and schedule delays. [No Window Related]	Event: During Refurb, it may be determined that more robust barriers are needed to separate the construction Island from the operating units. Cause: Regulator requirements or internal project requirements. Impact: This will lead to engineering rework, additional material costs, and schedule delays.	1	Active	Bert Boston	Sarah Elliott	01-Mar-17	Mitigate	31-Aug-17	1	2	2	2	1	2	1	2
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			8273	In Progress	Evaluate human performance events	Evaluate human performance events where wrong unit identification was a factor. Determine if more robust fencing is needed.	Bert Boston	Sarah Elliott	31-Jul-17								
			Outage Window		**Window Description**												
			000		000 – No Window Related												

Project: Unit Islanding - 73467

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current Probability	Current Financial	Current Schedule	Current Score	Post Probability	Post Financial	Post Schedule	Post Score
13501	Risk that Barriers may not be able to be reused for subsequent outages. [No Window Related]	Event: Risk that Barriers may not be able to be reused for subsequent outages. Cause: More barriers than planned may be worn out, or damaged, and need to be replaced. Impact: This will lead to increased material cost and possibly schedule delay.	1	Active	Bert Boston	Sarah Elliott	01-Mar-17	Mitigate	31-Jan-20	4	1	2	8	4	1	1	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			8514	Not Started	Review of barriers material usage for Unit 1.	A specific review of barriers materials usage is needed once Unit 1 refurbishment is well under way/complete.	Bert Boston	Sarah Elliott	31-Jan-20								
			Outage Window		**Window Description**												
			000		000 – No Window Related												
11623	The construction island barriers may need to be adjusted for individual projects [Window 500]	Event:The Refurb Island barriers (which typically reside along the unit boundaries) have been designed to accommodate many lay down areas and work areas. Cause: Late identification of new areas may mean the barriers need to be adjusted. Impact: This will result in costs associated with Engineering Change revisions. If barriers can't be moved quickly, then EPC delay claims may also result.	2	Active	Bert Boston	Sarah Elliott	01-Mar-17	Monitor	15-Jun-19	2	1	1	2	2	1	1	2
			Outage Window		**Window Description**												
			500		500 - Installation of Barrier and Fencing												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13502	Risk that we may have to switch back to more robust fencing leading to engineering rework, higher material cost, and schedule delays. [No Window Related]	Event: During Refurb, it may be determined that more robust barriers are needed to separate the construction Island from the operating units. Cause: Regulator requirements or internal project requirements. Impact: This will lead to engineering rework, additional material costs, and schedule delays.	1	Active	Bert Boston	Sarah Elliott	01-Mar-17	Mitigate	31-Aug-17	1	2	2	2	1	2	1	2
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**							
			8273	In Progress	Evaluate human performance events	Evaluate human performance events where wrong unit identification was a factor. Determine if more robust fencing is needed.		Bert Boston	Sarah Elliott	31-Jul-17							
			Outage Window		**Window Description**												
			000		000 – No Window Related												
Project: Unit Islanding - 73468																	
13501	Risk that Barriers may not be able to be reused for subsequent outages. [No Window Related]	Event: Risk that Barriers may not be able to be reused for subsequent outages. Cause: More barriers than planned may be worn out, or damaged, and need to be replaced. Impact: This will lead to increased material cost and possibly schedule delay.	1	Active	Bert Boston	Sarah Elliott	01-Mar-17	Mitigate	31-Jan-20	4	1	2	8	4	1	1	4
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**							
			8514	Not Started	Review of barriers material usage for Unit 1.	A specific review of barriers materials usage is needed once Unit 1 refurbishment is well under way/complete.		Bert Boston	Sarah Elliott	31-Jan-20							
			Outage Window		**Window Description**												
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11623	The construction island barriers may need to be adjusted for individual projects [Window 500]	Event:The Refurb Island barriers (which typically reside along the unit boundaries) have been designed to accommodate many lay down areas and work areas. Cause: Late identification of new areas may mean the barriers need to be adjusted. Impact: This will result in costs associated with Engineering Change revisions. If barriers can't be moved quickly, then EPC delay claims may also result.	2	Active	Bert Boston	Sarah Elliott	01-Mar-17	Monitor	15-Jun-19	2	1	1	2	2	1	1	2
			Outage Window		**Window Description**												
			500		500 - Installation of Barrier and Fencing												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13500	Risk that design assumptions for barrier configurations are different when two units are overlapped for refurbishment [No Window Related]	Event: Design assessments performed for the design of the NR barrier projects may be impacted by the configuration with two units overlapped in refurb. E.g. fire safety assessments, NS assessments, etc. Cause: Improper assessment and assumptions made when the two units are overlapped. Impact: This will lead to additional engineering work and schedule delays.	2	Active	Bert Boston	Sarah Elliott	01-Mar-17	Mitigate	30-Jun-22	2	1	1	2	1	1	1	1
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**							
			8271	Not Started	Create contingency plan for unit overlap	Create a contingency plan for possible issues, or conduct an assessment.		Bert Boston	Sarah Elliott	01-Jan-18							
			8280	Not Started	Review transitions report	Review transitions report and Unit 1 design prior to the start of Unit 3 work.		Bert Boston	Sarah Elliott	22-Jun-22							
			Outage Window		**Window Description**												
			000		000 – No Window Related												
13502	Risk that we may have to switch back to more robust fencing leading to engineering rework, higher material cost, and schedule delays. [No Window Related]	Event: During Refurb, it may be determined that more robust barriers are needed to separate the construction Island from the operating units. Cause: Regulator requirements or internal project requirements. Impact: This will lead to engineering rework, additional material costs, and schedule delays.	1	Active	Bert Boston	Sarah Elliott	01-Mar-17	Mitigate	31-Aug-17	1	2	2	2	1	2	1	2
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**							
			8273	In Progress	Evaluate human performance events	Evaluate human performance events where wrong unit identification was a factor. Determine if more robust fencing is needed.		Bert Boston	Sarah Elliott	31-Jul-17							
			Outage Window		**Window Description**												
			000		000 – No Window Related												
Project: Unit Islanding - 73469																	
13501	Risk that Barriers may not be able to be reused for subsequent outages. [No Window Related]	Event: Risk that Barriers may not be able to be reused for subsequent outages. Cause: More barriers than planned may be worn out, or damaged, and need to be replaced. Impact: This will lead to increased material cost and possibly schedule delay.	1	Active	Bert Boston	Sarah Elliott	01-Mar-17	Mitigate	31-Jan-20	4	1	2	8	4	1	1	4
			Action#	**Status**	**Action Title**	**Action Description**		**Owner**	**Delegate**	**Due Date**	**Comments**							
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			Outage Window		**Window Description**												
			000		000 – No Window Related												

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
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			Outage Window		**Window Description**												
			500		500 - Installation of Barrier and Fencing												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13500	Risk that design assumptions for barrier configurations are different when two units are overlapped for refurbishment [No Window Related]	Event: Design assessments performed for the design of the NR barrier projects may be impacted by the configuration with two units overlapped in refurb. E.g. fire safety assessments, NS assessments, etc. Cause: Improper assessment and assumptions made when the two units are overlapped. Impact: This will lead to additional engineering work and schedule delays.	2	Active	Bert Boston	Sarah Elliott	01-Mar-17	Mitigate	30-Jun-22	2	1	1	2	1	1	1	1
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
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13502	Risk that we may have to switch back to more robust fencing leading to engineering rework, higher material cost, and schedule delays. [No Window Related]	Event: During Refurb, it may be determined that more robust barriers are needed to separate the construction Island from the operating units. Cause: Regulator requirements or internal project requirements. Impact: This will lead to engineering rework, additional material costs, and schedule delays.	1	Active	Bert Boston	Sarah Elliott	01-Mar-17	Mitigate	31-Aug-17	1	2	2	2	1	2	1	2
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			8273	In Progress	Evaluate human performance events	Evaluate human performance events where wrong unit identification was a factor. Determine if more robust fencing is needed.	Bert Boston	Sarah Elliott	31-Jul-17								
			Outage Window		**Window Description**												
			000		000 – No Window Related												
Project: Unit Islanding - 73490																	
13528	While anchoring the airlock restraint into the floor a bolt may hit burried piping or cable [Window 137]	Event: While anchoring the airlock restraint into the floor a bolt may hit burried piping or cable. Cause: Floor scans didn't pick up piping and/or cables. Impact: When the bolts to restrain the airlock are drilled into the concrete they may hit cables or piping that are embedded in the concrete which will lead to schedule delays and cost impacts as the work will be stood down and damage assessed.	2	Active	Bert Boston	Sarah Elliott	01-Mar-17	Mitigate	31-Mar-17	1	1	3	3	1	1	2	2
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			8274	In Progress	Have drill cards ready	Airlocks restraints will be anchored down. Get field engineering to perform floor scans to see if any possible interferences. Design engineering to re-evaluate if interferences are identified.	Bert Boston	Sarah Elliott	31-Mar-17	Proactively have drill card. Nov 2 2016: OPG MTL to get WO TSK ready & conduct walkdowns of drill areas. 6-Jan-17: Drill cards are with FLM. TCD 15-Feb. 6-Feb-17: Drill Cards ready. Walkdowns to be performed EOW. 1-Mar-17: Scans to be completed next week.								
			Outage Window		**Window Description**												
			137		137 - Final Commissioning (VVRS Ph-I, AL&TCD Logic Mods, BU Logic Mod Ph-II)												
Project: Unit Islanding - 73492																	
13528	While anchoring the airlock restraint into the floor a bolt may hit burried piping or cable [Window 137]	Event: While anchoring the airlock restraint into the floor a bolt may hit burried piping or cable. Cause: Floor scans didn't pick up piping and/or cables. Impact: When the bolts to restrain the airlock are drilled into the concrete they may hit cables or piping that are embedded in the concrete which will lead to schedule delays and cost impacts as the work will be stood down and damage assessed.	2	Active	Bert Boston	Sarah Elliott	01-Mar-17	Mitigate	31-Mar-17	1	1	3	3	1	1	2	2
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			8274	In Progress	Have drill cards ready	Airlocks restraints will be anchored down. Get field engineering to perform floor scans to see if any possible interferences. Design engineering to re-evaluate if interferences are identified.	Bert Boston	Sarah Elliott	31-Mar-17	Proactively have drill card. Nov 2 2016: OPG MTL to get WO TSK ready & conduct walkdowns of drill areas. 6-Jan-17: Drill cards are with FLM. TCD 15-Feb. 6-Feb-17: Drill Cards ready. Walkdowns to be performed EOW. 1-Mar-17: Scans to be completed next week.								

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13528	While anchoring the airlock restraint into the floor a bolt may hit burried	Event: While anchoring the airlock restraint into the floor a bolt may hit burried piping or cable. Cause: Floor scans didn't pick up piping and/or cables. Impact: When the bolts to restrain th	**Outage Window**	**Window Description**													
			137	137 - Final Commissioning (VVRS Ph-I, AL&TCD Logic Mods, BU Logic Mod Ph-II)													

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
715	Funding for Unexpected Legal Costs	Event: Over the duration of refurbishment, additional legal support may be required to support disputes and/or change management Cause: Insufficient funding to deal with additional and/or emergent legal support Impacts: May lead to delays in legal clarifications, resolution of items and unnecessary litigation	1	Active	Riyaz Habib	Garry Lam	13-Feb-17	Monitor	31-Dec-25	3	2	1	6	3	2	1	6
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
714	Potential Contract Management Function Resources Required for future Master Services Contract(s) or Replacement Contracts	Event: Limited contract management support for future MSA's (OSS replacement contracts, DESA, NSASA, Construction, etc). Cause: Insufficient contract management resources have been budgeted beyond 2016. Impact: There may be a lack of alignment during the initial phase of future MSA contracts, and significant savings will not be achieved through the identification and correction of inefficiencies and implementation of issue resolution processes.	1	Active	Riyaz Habib	Garry Lam	13-Feb-17	Monitor	31-Dec-27	3	1	1	3	3	1	1	3
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
496	CNSC does not grant timely approval for unit return to service post refurbishment	The risk is that CNSC does not grant the necessary approvals for clearing of restart regulatory hold points in a timely manner thus impacting the return to service schedule.	1	Active	David Train	Paul Dunn	22-Feb-17	Avoid	31-Oct-19	1	3	1	3	1	3	1	3
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
673	Licensing Fees Higher than Release 4c Budget Estimate	The risk is that the licensing fees are expected to be higher than projected in the 4c release estimate. The release estimate uses the 2014 CNSC projected costs for Darlington, and for Refurbishment, and assumes future increases over the life of the project remain constant at the 1.5% year over year increase projected for CNSC fiscal 2015/2016 and 2016/2017. The 2015 CNSC projected costs for Darlington and for refurbishment are due in early May. This risk will be updated at that time as required. April	1	Active	David Train	Paul Dunn	22-Feb-17	Accept	30-Jun-15	2	1	1	2	2	1	1	2
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
750	The risk is that OPG may not be able to complete a number of IIP commitments as per schedule	The risk is that OPG may not be able to complete a number of IIP commitments by the IIP committed date A missed IIP date is a violation of the Darlington Operating License Which may result in negative regulatory interface. the IIP commitments are reviewed on a regular basis with each of the IIP task owners. Metrics are in place to track completion and the IIP Change Control Process is implemented if an IIP can not meet its TCS (i.e change requests were submitted for EPG3 and CFVS modification and approved by CNSC). Note that CFVS modification installation milestone for IIP-EA-009 was missed and new extension request has been submitted to CNSC.	1	Active	Nienke Smith		27-Feb-17	Mitigate	31-Mar-26	4	1	3	12	3	2	3	9
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
797	Vendor technical proficiency and less than adequate adherence to design governance may lead to unforeseen issues during design implementation/execution, leading to rework, cost overruns and schedule delays.	Event: Failure to follow processes as written in design governance and failure to rigorously complete all required steps may not allow the full benefit of the robustness of the ECC design process to be realized. Cause: The many steps in the process are typically built upon previously identified process short-comings, and failure to rigorously execute each step may lead to re-work, for example failure to rigorously complete system heath/component health report research, failure to complete an effective COMs meeting, failure to complete a meaningful OPEX search, and failure to identify and address issues in the Issue Tracking file (ITF) may lead to an inadequate design. Impact: The inadequate design may not be fully released until the point of installation/execution, at which time rework, cost overruns or schedule delays may occur.	4	Active	Emily Tarle	Rajeev Leekha	27-Feb-17	Mitigate	31-Mar-17	2	2	4	8	2	1	2	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			6754	In Progress	INPO Design Engineer Desk Top Guide – Develop NR similar document.	INPO Design Engineer Desk Top Guide – Develop NR similar document.	Emily Tarle	Nienke Smith	31-Mar-17	24MAY2016 - Review held as planned, transitioned ownership to Emily Tarle and extended to July 20th. 11MAY2016 - Guide in progress with Quality Engineering. Review of the product scheduled for 17MAY2016. 21JUL2016 - Much of this guidance is already available in Nuclear or Refurbishment processes and instructions, however this will be reviewed with Fleet Design Engineering for generation of a separate guide or to address gaps (E. Tarle) 01DEC2016 - It is determined that a separate guide for NR Engineering is not required, however the action will be left open and considered in conjunction with other actions supporting overall risk item 797 "Vendor Technical Proficiency".				
			6759	In Progress	Propose and develop a gated challenge process for the replicated design process.	Propose and develop a gated challenge process for the replicated design process. This action will produce an updated guide document for Nuclear Refurbishment.	Raza Zaidi	Joshua Guin	31-Mar-17	25JAN2017 - Additional organizational reviews identified. TCD updated. 17JAN2017 - Design Replication Guide D-GUID-09701-10043 R000 has been drafted to facilitate a consistent approach to replication for subsequent unit designs. It has been recommended by the NP-MSRB and is undergoing final review and signoff by stakeholders. Date updated to align with RMO Action #6768 (also note that N-2016-25397 due 31-Mar-2017 is also associated with the issuance of this guide). 16AUG2016 - This work is currently being contracted out to a vendor and is expected to be completed by 31 December 2016. 29JUL2016 - Tabletop review has been done with OSS and improvement identified will be incorporated into the updated guide. 04Jul2016 - expectations will be finalized in July and captured in a briefing card/governance updates (as required) 24May2016 - owner transition to Emily Tarle, TCD extended to June 30, 2016. 11MAY2016 - Work is underway with Quality Engineering for a replication instruction and gates. To be reviewed by May 17th.				

792	Vendor technical proficiency and less than adequate adherence to design governance may lead to unforeseen issues during design implementation/execution, leading to rework, cost overruns and schedule delays.	Event: Failure to follow processes as written in design governance and failure to rigorously complete all required steps may not allow the full benefit of the robustness of the ECC design process to be realized. Cause: The many steps in the process are typically built upon previously identified process short-comings, and failure to rigorously execute each step may lead to re-work, for example failure to rigorously complete system heath/component health report research, failure to complete an effective COMs meeting, failure to complete a meaningful OPEX search, and failure to identify and address issues in the Issue Tracking file (ITF) may lead to an inadequate design. Impact: The inadequate design may not be fully released until the point of installation/execution, at which time rework, cost overruns or schedule delays may occur.	6766	In Progress	Conduct a self assessment across all organizational boundaries including contractor agencies to determine what improvements are needed to achieve a true collaborative engineering approach.	Conduct a self assessment across all organizational boundaries including contractor agencies to determine what improvements are needed to achieve a true collaborative engineering approach.	Emily Tarle	Nienke Smith	31-Mar-17	11may2016 - Work has begun with Quality Engineering to assist on the SA. 21JUL2016 - Self assessment to be conducted in Q3 2016 and include input from working level staff (Design Engineers, Section Managers). Timing is to ensure lessons learned and opportunities for improvement are applied to replication efforts (E. Tarle)
			6768	In Progress	Develop rollout and deliver use of the full spectrum of risk levels afforded by the risk-based ECC process.	Develop rollout and deliver use of the full spectrum of risk levels afforded by the risk-based ECC process.	Emily Tarle	Raza Zaidi	31-Mar-17	21JUL2016 - This will be included in the Replication Guide for Refurbishment (E. Tarle) 1NOV2016 - Replication Guide will be issued by January 20, 2017 (N.Smith) 25JAN2017 - Final Draft of Replication Guide is completed. Undergoing further organizational reviews. TCD updated.
			6782	In Progress	Proficiency	Proficiency The action is to formalize the requirement for monitoring and managing OPG and Vendor proficiencies by developing and implementing a report card. Reference AR 28184215-04, 5, 6.	Nienke Smith	Saad Malakhail	13-Mar-17	Proficiency report cards have been created to measures INPO's proficiency building blocks (list below). Gaps in proficiency will be determined by evaluating vendors and OPG personnel against the scorecards. Mitigating action 6748 (references AR 28184215-04) is to develop and implement the report card for OPG and each of OPG's primary vendor: General Electric, SNC, Sargent Lundy, RCMT, AMEC NSS, Tetra Tech, Worley Parsons and Areva. INPO Proficiency Building Blocks 1) Education 2) Skills Training 3) Repetition with feedback 4) Experience in a variety of situations 5) Timeliness or currency of performance
			6784	In Progress	Follow up from COMS repast	Follow up from COMS REPAST. Reference: RF16-000663-SA - NR Engineering COMS Performance Analysis (REPAST)	Nienke Smith	Rahul Nandi	31-Mar-17	AR#28188301 – 01,02,03,04 has been created to track to completion the actions from the COMS Repast. AR 28188301-01/02 - Briefing card and Directive from SVP, Nuclear Projects has been issued and rolled out to all Project teams part of NR Engineering, NR Execution, P&M outlining COMS expectations - ACTION COMPLETE AR 28188301-04 - New COMS qualifications were developed by NR Training for all NR COMS Participants (QUAL 40263) and NR COMS Leaders (QUAL 40264). Communications sent out. Compliance date is March 31, 2017 - ACTION COMPLETE Other COMS Improvement Initiatives: 23 interactive COMS workshops were delivered successfully to folks all across Refurb and DNG station. 'COMS Champion' assigned to provide oversight on all NR COMS. Effectiveness reviews to be conducted by end of Q1, 2017 (tracked by A/R 28189981).
			9765	In Progress	Implement Oversight on Vendor Procurement of Material	Implement Oversight on Vendor Procurement of Material : Refurbishment Design Engineering performing in process and strategic oversight on vendor's material and service procurement.	Rajeev Leekha	Mahtab Khondaker	30-Jun-17	1. Strategic Oversight Completed at BWXT on Oct on Procurement of Spare Parts for Valve Program (BOP) 2. Self assessment # RF16-001900-SA in progress to monitor the Quality of MEL and BOM records done by EPC/ESMSA Vendor

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792	Vendor technical proficiency and less than adequate adherence to design governance may lead to unforeseen issues during design implementation/execution, leading to rework, cost overruns and schedule delays.	Event: Failure to follow processes as written in design governance and failure to rigorously complete all required steps may not allow the full benefit of the robustness of the ECC design process to be realized. Cause: The many steps in the process are typically built upon previously identified process short-comings, and failure to rigorously execute each step may lead to re-work, for example failure to rigorously complete system heath/component health report research, failure to complete an effective COMs meeting, failure to complete a meaningful OPEX search, and failure to identify and address issues in the Issue Tracking file (ITF) may lead to an inadequate design. Impact: The inadequate design may not be fully released until the point of installation/execution, at which time rework, cost overruns or schedule delays may occur.	9785	In Progress	Oversight of software qualifications and documentations	Implement Oversight of vendor compliance to software qualifications and documentations.	Rajeev Leekha	Bhaskar Pillarisetty	30-Jun-17	· Majority of refurbishment designs are mature and have had the benefit of OPG oversight and questioning attitude wrt to SQA. This approach has discovered SQA issues such as in AHS and the Fire system. Risks of additional findings are low. · Software audits have occurred on select projects to review software governance adherence. · CCD spoc has been involved in most of the large projects involving software, eg EPG3, T/G, SDC, PSVS, RFR, HWMB, which are following proper SQA processes. · ECC Design scoping checklist has been improved in section 2.7 – Software.
			Outage Window		**Window Description**					
			000		000 – No Window Related					
770	Discovery and Emergent work impacting Engineering	Event: It is expected that discovery work will be found during refurbishment outage and other IIP related work. During planning, inspections or detailed reviews of tasks it is possible that new work will be identified and will require Engineering support, including late identified temporary modifications for power, air and water supplies. Cause: The causes may be varied but centred around either inspections or re evaluation based on OPEX, failure of COMS or extent of condition, or new analysis. Impact: The impact of such emergent work could be further Engineering and Project support beyond what has been included in the budget.	1	Active	Emily Tarle	Rajeev Leekha	23-Feb-17	Mitigate	31-Mar-17	3 1 2 6 2 1 1 2
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**
			6776	In Progress	Engineering Work Management	Excellence in Engineering Work Management	Paul Ross	Alberto Castellanos	29-Sep-17	The following initiatives are under development: 1. Engineering Work Requests (EWR): Draft has been updated. See attached copy. To be issued after result from Pilot Project [attachment 2] 2. Confirm Source of Funding: CCF are being prepared. Example is the CCF-3352 New Scope Steam Door Modification In-House [Attachment 4] 3. Detailed Engineering Resource Histograms: Engineering Work Templates are going live. See attached Engineering Histogram by engineering crew codes [Attachment 5] 4. Engineering Visual Management Board (VMB): Engineering VMB is on draft. See attached picture of the mock-up [Attachment 3]. A meeting with the Sponsor was held and a plan forward was developed: Finalize Format & Data Hierarchy - November 04, 2016 to January 9, 2017. Pilot Project and Lessons Learned [System & Component] - January 09, 2017 to March 31, 2017. Rollout Final Process - June 30, 2017. Full Implementation - September 29, 2017.
			Outage Window		**Window Description**					
			000		000 – No Window Related					
937	Potential Cost Variance for Engineering Support to RFR/TG U3 Modifications	Event: There is not enough budget to support Engineering Oversight for RFR and TG for Unit 3 Cause: Budget under Engineering Oversight has been allocated to Seed Funds for In-House Replication Unit 3. At the time of the RQE, NR Engineering did not estimate for Seed Budget for Conceptual In-House Replication Unit 3 and RQE Submission is for Engineering Oversight only in the Engineering Change Control (ECC) Process done by EPC vendors and OPG Design. Replication for subsequent units was considered and budgeted by project bundles. Funds from Functional Engineering Support to Modifications would be utilized to pay for Conceptual Design. Impact: RFR and TG may not have Oversight Engineering Support as required which could lead to Execution delays.		Active	Emily Tarle	Rajeev Leekha	13-Feb-17	Monitor	29-Sep-17	3 1 2 6 3 1 2 6
			Outage Window		**Window Description**					
			000		000 – No Window Related					
			There are no Draft, Not Started, In Progress Actions associated with the risk.							

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952	Conduct Engineering Replication for U3_1_4 with OPG In-House Resources vs EPC	Event: Potential responsibility handoff issues regarding liability between Engineering, Procurement and Construction, and potential warranty issue for the defective work. Cause: Switch to OPG In House Engineering design and replication for U3_1_4, rather than using EPC model Impact: Cost and Schedule impact due to the extra handoff between OPG and Vendor comparing to EPC model, also OPG has to allocate contingency $ for defective work warranty.	2	Active	Emily Tarle	Raza Zaidi	24-Feb-17	Mitigate	30-Jun-17	2	1	3	6	1	1	2	2

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
9847	In Progress	Define the handoff process between OPG In House Engineering and Vendor Procurment_Construction	Work with vendors to define a working process between Engineering and Procurement at vendor house. Also, ensure vendors are clear about the R&R related to Procurement and Construction in this OPG In-House design/engineering model.	Emily Tarle	Raza Zaidi	30-Jun-17	
9848	In Progress	Evlaute the cost impact assoicated with warrenty for def	Evaluate the extent and cost/schedule impact of potential impact due to defective design based on OPEX.	Emily Tarle	Raza Zaidi	30-Jun-17	

Outage Window	Window Description
000	000 – No Window Related

702	No enough engineering resources to support unit RTS, Commissioning and Close-Out	Event The risk is that there are not enough Systems and Components Engineering resources to support Execution readiness preparations, Commissioning, specialized areas, Physics, Fuel Handling and RTS Cause Inadequacy of appropriately trained staff in terms of numbers or money available to add FTES major milestone/delivery and the changes, in addition to incrementally higher resource demands during the overlap of subsequent outages Impact Delay the project execution.	1	Active	Paul Ross		23-Feb-17	Monitor	15-Oct-19	2	1	2	4	2	1	2	4

Outage Window	Window Description
000	000 – No Window Related

There are no Draft, Not Started, In Progress Actions associated with the risk.

938	Continuity of the DNR HFE Program	Event: Potential lack of continuity of the DARLINGTON NUCLEAR REFURBISHMENT - INTEGRATED HUMA N FACTORS ENGINEERING PROGRAM PLAN (Ref. NK38-PLAN-06700-10001) which is a DN Refurbishment Project commitment to the CNSC. Cause: The OSS contract is scheduled to end without provision of continuity of HFE services under a new/alternate contract. Furthermore the scope of work document for the NOSS contract which is intended to provide continuity of DN Refurb Design Engineering oversight services in general, did not reference the applicable OPGN HFE governance describing the Human Factors Engineering process and required skill set (e.g. N-MAN-06700-10002). The NOSS selection criteria does not include specific consideration of, or credit for contractor HFE capabilities. Impact: Impact will be a lack of sufficient HFE resources to support the HFE activities identified in NK38-PLAN-06700-10001 Darlington Nuclear Refurbishment Integrated Human Factors Engineering Program Plan Section 2.5.2.2. See the reference document for the detailed role and list of tasks performed by the support services provider. In summary 2.5.2.2 states, " Under the direction of the OPG HFE Technical Expert integrated program SPOC, contractors will provide HFE services under OPGN's QA program in in accordance with OPG governance."		Active	Emily Tarle	Rajeev Leekha	16-Feb-17	Mitigate	31-Mar-17	3	1	1	3	1	1	1	1

Outage Window	Window Description
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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
Program: Managed Systems Oversight - 10000																	
764	Vendor Performance and Inexperience Managing their CA Programs	EVENT: Vendor or OPG Poor Performance or poor vendor performance of the CA programs requiring additional oversight and OBU Resources CAUSE: Lack of capability, experience or time pressure or increased number of SCRs would be due to vendor's inability or inexperience in managing their corrective action programs to OPGs expectations IMPACT: Conduct additional oversight surveillances to identify and correct the problems and potential delays to field work. Also may be required to include all vendor adverse conditions in the OPG SCR database result in increase OPG administration cost. Further, poor vendor performance of the CA programs would result in recurring field issues and potential cost impacts and schedule delays to NR.	2	Active	Art Maki	Frank Dias	22-Feb-17	Monitor	31-Mar-17	3	1	2	6	3	1	2	6
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
564	Large Potential Worker Doses due to Inadequete Internal (Alpha etc.) Hazard Characterization and Management	Event: There is a risk that Nuclear Refurbishment employees or Contractors may be exposed to unexpected radionuclide(s) which may lead to significant dose assignment. Cause: Inadequate source term characterization leading to radiological work planning, protective actions and dosimetry requirements not properly identified to protect workers from the hazards present. Impact: This may potentially result in high doses that could exceed OPG dose limits or CNSC Dose limits, as well as a disruption to Nuclear Refurbishment work. Regulatory, public and union relations issues would be very problematic and would be amplified by the fact that Bruce Power had the same type of event during their refurbishment.	3	Active	Johnathon Hash	Jeff Johansson	01-Feb-17	Mitigate	30-Dec-17	3	2	2	6	2	2	2	4

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments

564	Large Potential Worker Doses due to Inadequete Internal (Alpha etc.) Hazard Characterization and Management	Event: There is a risk that Nuclear Refurbishment employees or Contractors may be exposed to unexpected radionuclide(s) which may lead to significant dose assignment. Cause: Inadequate source term characterization leading to radiological work planning, protective actions and dosimetry requirements not properly identified to protect workers from the hazards present. Impact: This may potentially result in high doses that could exceed OPG dose limits or CNSC Dose limits, as well as a disruption to Nuclear Refurbishment work. Regulatory, public and union relations issues would be very problematic and would be amplified by the fact that Bruce Power had the same type of event during their refurbishment.	5876	In Progress	Strategy for smear samples to determine radionuclide characterization for U2	a) Source Term Characterization · Section 2.2: Develop a strategy for taking smear samples for the purpose of source term characterization of Unit 2 when radioactive systems are opened up for refurbishment. Samples locations should include radioactive systems in Unit 2, RWPB, and Fuel Handling. Once samples are taken, they should be analyzed radio-chemically and the conclusions with respect to dose contributions from the AMEC report should be validated. Also calculate the beta-gamma: alpha ratio to confirm capability of WBM to indicate the presence of alpha emitting radionuclides in the body and continued use of pancake for both beta-gamma measurement and, by inference, alpha presence (as per N-INS-09071-10013).	Johnathon Hash	Joe Cicchini	01-Apr-17	(7 June Johansson): Initiate a search of the smears that were taken during 2015 VBO on Unit 2 and, if found, perform count on the smears and document results. (18 July; JJ) A search for the smears that were apparently taken on Unit 2 during the 2015 VBO was unsuccessful. Decision to initiate a new set of smears on Unit 4 during D1641 was made and smears were taken. Some of the areas/systems include in this smear program are (see attachment #1 below for more details): Floor under pressurizer x2 Floor near ball screw pit. 1 x east, 1 x west. Base of the boilers (around manway, bolts etc) 1 x east, 1 x west Mod room (051 or 052 on the valving) ESC (scrap pipe on platform) Reach inside (do not enter) feeder cabinet on 100 elev and smear walkway Top of Bleed condenser 107.5 elev SDC The smears were sent to the Chemistry lab for initial analysis. Lab results have been received, along with the smears. Additional alpha counting of the smears will be arranged with Kinectrics. (10 Aug; JJ) See email attachment #2 below for results of initial counts of the smears performed at the DN Chem Lab. Preparation in progress to send the smears to Kinectrics for alpha analysis. 25AUG2016 JC Smears being processed for shipment 14OCT2016 - Several smears have been processed and analyzed in previous outages this data will be used to anticipate and Unit 2 specific smears will be collected. (22 Nov; JJ) Additional smears were taken by DN RP in Unit 3 and Unit 4 in 2015/2016 outages respectively (see attachment #4 email). Together with similar legacy data (see attachment #3), attachment #4 data from U3 and 4 will be reviewed and analyzed to confirm the beta-gamma to alpha ratio to confirm that capability of WBMs to indicate the presence of Alpha emitting radionuclides, and the continued use of pancake meters for inference of alpha activity. (29 Dec; JJ) The above mentioned U3 & U4 smear analysis results will be reviewed by NRRP HPs to confirm beta-

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			5883	In Progress	Darlington Routine Radiation Surveys Instruction Modified to include Unit 2 Refurbishment	· Sect 4.1.1: Modify D-INS-09071-10012, Darlington Routine Radiation Surveys, to expand the routine alpha monitoring program for Unit 2 refurbishment. Moving due date to June 30 in order to capture recommendations from an external report for Hard to Detect Nuclide Monitoring. (7 June, JOHANSSON): moved due date to Aug 31, 2016.	Johnathon Hash	Jeff Johansson	03-Apr-17	(7 June, JOHANSSON): moved due date to Aug 31, 2016. (09 Nov; JJ) The highest potential for alpha presence may occur during RFR series work (EF cutting, PT cut, etc...). NRRP ALARA are preparing RFR series specific RPEGs that will include requirements for routine and non-routine alpha surveys/smears. The Darlington Routine Survey instruction will not be revised to incorporate such requirements as it is tracked under the RPEGS. (01 Feb; JJ) DRAFT Routine Survey RPEG has been issued for RP review (see attachment #1). This RPEG was discussed with the Field Section and an action was assigned to the Field Section to determine the level of effort/resources that will take to execute the proposed RPEG surveys.

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			5886	In Progress	Confirm Alpha Counting room for Refurbishment	· Sect 4.1.1: Confirm the availability of a facility for counting alpha contamination samples.	Johnathon Hash	Joe Cicchini	17-Mar-17	(7 June, JOHANSSON): moved due date to Aug 31, 2016. Explore Ryan's suggestion for NR-RP to own and operate the Darlington iSolo counting room, and offer to perform any Darlington RP smears and train their personnel as well. (July 14; JJ): In addition to securing a dedicated alpha counting room for Refurbishment work, it was suggested that HPD perform a QA program for the results by analyzing a fixed percentage of the smears collected and counted, and documenting the results in a QA report for audit purposes. This will be include in the PAS Sampling Policy that is tracked under Action #5880. 25AUG2016 JC - Refurb RP will be working with station RP to develop a smear counting strategy that will benefit both organizations. ***Initiator name changed from BurkeJ to CicchinJ due to Lan ID of burkej not being recognized.
			5887	In Progress	Confirm Monitoring Compliance with Alpha Contamination Limits	· Sect 4.2.1/4.3.1: Confirm through ongoing source term/alpha characterization of Unit 2 that the beta-gamma: alpha activity ratio is greater than 5. This will confirm that pancake and WBM are sufficient to confirm compliance with alpha contamination limits.	Johnathon Hash	Jeff Johansson	30-Sep-17	(7 June; JJ): Consider integrating this requirement into the NR-RP Routine Survey program. If appropriate, close this action to action # 5883. (18 July; JJ): Post June 13 meeting with HPD, a recommendation was made for NR-RP to explore other instruments for Alpha counting (other than iSolos). It was also suggested to have HPD Instrument group involved in this search. (03 Oct; JJ) The recommendation is to confirm through on-going source term and/or alpha characterization studies during refurbishment activities that the beta-gamma: alpha ratio activity is still > 5. Once RFR work commences in unit 2, smears of open system piping/equipment will be performed and analyzed to confirm the ratios are > 5. As per current DNRU2 level 1 schedule, this work will start around July 2017 with window #42 Feeder Removal. Due date for this action has been set to Nov 2017 to confirm the ratios.

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			5890	In Progress	Shielding for WBM at U2 and RWPB	· Sect 4.4.1: Shielding for WBMs at Unit 2 and RWPB should be considered and implemented if the background levels are too high for the monitors to operate effectively. TCD: October 1, 2016	Johnathon Hash	Jeff Johansson	01-Apr-17	(7 June, JJ): This work has started with the shielding considerations for the WBMs/HFFs at the RWPB. The background dose rates in the RWPB are much higher than the required background dose rates for efficient operation of the WBMs/HFFs of <50 micro-Rem/h. Some of the normal operating dose rates in the building are pegged at values > 200 micro-rem/h at locations where the monitors will be located. The Joint-Venture team are performing shielding analysis to determine the required shielding to shield the monitors with (shielding huts and/or walls) to achieve <50 micro-rem/h rates. Various locations within Unit 2 are also being investigated for shielding of the WBMs, like the south wall of the RAB side and close to where the flasks will be lowered from the RMD containing adjusters and vertical flux detectors. It is anticipated that the dose rates from the flask will take the monitors out of service during the craning time of the flasks from elevation 115m down to 100m. (22 Aug; JJ) Shielding requirements for the RWPB monitors (WBM/HFF) are being defined and designed by the JV (see attachments #1,2 & 3 for some emails on the subject). Shielding requirements for Unit 2 monitors are based on local/nearby work that may affect the local background for the monitors. To date, initial discussions have been held with the AA/VFD/HFD Replacement project team (ES Fox) and a walk down of the flask transfer route will be schedule with the project in early Sept. (03 Oct; JJ) Walk down with the ES Fox team working on the AA/VFD/HFD Replacement project was scheduled in Sept but was cancelled due to other priorities. A new walk down meeting needs to be established to walk down the path of flask transfer. RP (Jeff J) is set up a new meeting with ES Fox. (TCD: 31 Oct) (09 Nov; JJ) Walk down of the area has identified that the craning/staging area for the AA/VFD flasks is located at column line K16 - L16. The south bank of whole body monitors is located at column line A16 - B1

5694	Large Potential Worker Doses due to Inadequete Internal (Alpha etc.) Hazard Characterization and Management	Event: There is a risk that Nuclear Refurbishment employees or Contractors may be exposed to unexpected radionuclide(s) which may lead to significant dose assignment. Cause: Inadequate source term characterization leading to radiological work planning, protective actions and dosimetry requirements not properly identified to protect workers from the hazards present. Impact: This may potentially result in high doses that could exceed OPG dose limits or CNSC Dose limits, as well as a disruption to Nuclear Refurbishment work. Regulatory, public and union relations issues would be very problematic and would be amplified by the fact that Bruce Power had the same type of event during their refurbishment.	5891	In Progress	Contamination Control Intiatives for RFR, RWPD and SGs	· Sect 5.1: RP should review in detail the refurbishment work (e.g., CWPs for RFR in vault and RWPB, and SG work) for opportunities to reduce and control contamination spread and protection of workers against internal hazards. The outcome of this review should be documented and communicated to the Field group, HP assessors, project leaders, and REP preparers. The output from this review should be incorporated in the CWPs.	Johnathon Hash	Joe Cicchini	17-Mar-17	(June 7, JOHANSSON) Action assigned to the Field Support Section. 25AUG2016 - Initiator name changed from burkej to cicchinj due to burkej not be recognized as a lan ID
			5892	In Progress	Contamination Control Equipment	· Sect 5.1: Confirm who is procuring/deploying/controlling contamination control equipment (e.g., vacuum cleaners with HEPA filters) for all refurbishment projects (e.g., RFR, SG, and BOP work). Met with external vendor to confirm scope of purchased services regarding Munter. External review commissioned for review of recommendations for HEPA use on the project.	Johnathon Hash	Joe Cicchini	17-Mar-17	23 Feb. 16 A list of contamination control equipment and the TCD for arrival of the equipment on site has been requested of RFR. A list of contamination control equipment for Balance of Plant and SG work has been requested. All other information remains unchanged. The ownership for procurement/deployment and control of contamination control equipment among the Projects is under investigation. RFR has indicated that they are responsible for procurement of five (5) smooth bore hose Hepa vacuum cleaners; 2 - for the reactor vault, 1 for the reactor auxilliary bay and 2 for the RWPB. Arrangements will be made to assist RFR with the deployment and control of the vacuums as per the Radiation Protection Coordinator assigned to the specific task. Ownership of contamination control equipment for Balance of Plant and SG work is currently in progress and an update will be provided before 23 Feb. 2106. It has been determined that the Radiation Protection work group does not have ownership for procurement of additional contamination control equipment. The Radiation Protection department will assist with the deployment and control of "contaminated" equipment used on the projects under the guidance of the Radiation Protection Coordinators. RP may consider purchase of some equipment. Currently no CCF has been initiated however it is under review. (09 Aug; JJ) Due date changed to Sept 30, 2016. 25AUG2016 JC - A comparison between OPG sites has been initiated to develop a fleet approach to CATS devices. This exercise will produce a program that will enhance our contamination control strategy

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			5894	In Progress	Procedure Review and Update as Required for Refurbishment	· Sect 7.1: RP procedures (and associated forms, guides, instructions) should be reviewed and modified as necessary to ensure they are compatible with the Refurbishment RP organizational structure, work activities, and radiological conditions. A review of RP procedures will also identify readiness issues that need to be addressed by the RP refurbishment organization.	Johnathon Hash	Jeff Johansson	01-Apr-17	(03 Oct; JJ) N-PROC-RA-0020 "Preliminary Event Notification", was recently revised to accommodate a Notification Protocol for Nuclear Refurbishment Incidents at Nuclear Facilities (under a new section 1.2.5 of the procedure). RMO Action 5894 was derived from Recommendation (e) of NK38-REP-09701-0570560 Appendix I. The recommendation is to review RP Procedures to flag areas where certain references to RP organization and to the Shift Manager to ensure that Refurbishment workers know who to contact in the event of RP events. This review has been performed and the new revision of N-PROC-RA-0020 with the added notification protocol addresses this action. Furthermore, RP has created a Gap Assessment spreadsheet documenting the results of the RP Procedural reviews that was performed internally. This Gap Assessment needs to be assessed to determine what (if any) procedural changes are required. If required, then the changes must be requested via the current process of initiating a DCR in AS7. Programs Section Manager to initiate a review of the Gap Assessment with a target date of 31 Dec 2016 to create any required DCRs. (Nov 9; JJ) Work has started with respect to the review of the gap assessment to identify required changes. (29 Dec; JJ) Gap assessment review I/P. Due date changed to Apr 01, 2017 to accommodate additional time for review.

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			Outage Window		**Window Description**															
			000		000 – No Window Related															
951	Risk to document potential cost for units 3, 1 & 4. - Teledose Infrastructure Mod	EVENT: As a result of the recent CCF 1912 (CCF 1912 - REPLACE BLANK MODULES WITH FIBRE-OPTIC: 2-21130-EP2282) presentation to the CCB, there is a risk that no funding will be available for required AVTS insert modifications for Units 1,3 & 4. CAUSE: CCB only approved modifications funding for Unit 2. IMPACT: No AVTS available for Units 1,3 & 4.	1	Active	Johnathon Hash	Matthew Lai	16-Jan-17	Accept	01-Jul-18	2	2	2	4	1	1	1	1			
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**										
			9682	In Progress	Send CCF to CCB for RQE increase for U1/3/4 EP2282 Modification	Send CCF to CCB for RQE increase for U1/3/4 EP2282 Modification	Johnathon Hash	Matthew Lai	08-Nov-17	Send CCF to CCB for RQE increase for U1/3/4 EP2282 Modification (14 Dec; JJ) Revised "Status = Not Started" to "In Progress".										
			Outage Window		**Window Description**															
			000		000 – No Window Related															
934	Modification Delay of Penetration 2-21130-EP2282 for Radiation Protection Teledosimetry Services	EVENT: There is a risk that penetration 2-21130-EP2282 modification under MEC131147 will not be installed in time to support RFR activities. CAUSE: Associated work order WO# 4740182 has yet to receive scope acceptance and carries a level 1 modification risk category. IMPACT: Without 2-21130-EP2282 modification, RPC coverage of workers will have to commence via direct protection and running off older capacity-limited cables (Co-Ax system). The adversely impact labor costs and cause potential unplanned exposure risk increase.	3	Active	Johnathon Hash	Matthew Lai	06-Mar-17	Mitigate	01-Mar-17	5	2	2	10	1	1	1	1			
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**										

934	Modification Delay of Penetration 2-21130-EP2282 for Radiation Protection Teledosimetry Services	EVENT: There is a risk that penetration 2-21130-EP2282 modification under MEC131147 will not be installed in time to support RFR activities. CAUSE: Associated work order WO# 4740182 has yet to receive scope acceptance and carries a level 1 modification risk category. IMPACT: Without 2-21130-EP2282 modification, RPC coverage of workers will have to commence via direct protection and running off older capacity-limited cables (Co-Ax system). The adversely impact labor costs and cause potential unplanned exposure risk increase.	**9352**	In Progress	Use of Isolation Flask "tophat" to modify EP2282 prior to TCB	PO# 264750 line item #2 for CatID 1000424, Pressure Boundary Isolation flask tool runs risk of being delivered after March 2017. Vendor has informed OPG that manufacturing of product cannot begin until technical specification from 1997 (NK38-REP-57184-10001) has been updated with current codes and standards. EP2282 modification project requires tool in order to do PB modification prior to TCB in place, as per modification outline.	Matthew Lai	Sam Miao	31-Mar-17	(14-Oct-2016) NK38-DS-57100-10001 has been drafted and is being reviewed for approval to supersede NK38-REP-57184-10001. (26-Oct-2016) WO# 5079888 created to have contingency plan of using existing co-axial feed through to provide limited Teledosimetry coverage in-containment to support RFR activities. Limited teledosimetry can be provided using existing co-axial feed through for communications only. Will not be able to support Telemetry capabilities under modification to penetration is complete. (29-Nov-2016: ML) Requires CNSC Code Classification approval, because work is N285 Class 4. (29-Nov-2016; ML) CatID 1000424 Tool # DOT1000424-00001, has been confirmed by vendor that it carriers a 14-16 week delivery time. Therefore tool "tophat" will not arrive in-time to be used prior to TCB in-place. New installation strategy will be to perform modification (WO# 4740182) after TCB - no impairment to NPCS.
			9353	In Progress	2-21130-EP2282 Modification requires scope acceptance	WO# 4740182 "Replacement Blank Modules with Fiber Optic Penetrations" needs scope acceptance into DNRU2 in order to be scheduled and assessed.	Johnathon Hash	Matthew Lai	17-Apr-17	(21-OCt-2016) ML: Scope change# 30887 has been created for DNRU2 scope approval. CCF needs to be submitted for scope acceptance. (29 Dec; JJ) Latest update as summarized by Michael Carter (see attachment #1 below): · The MEC 131147 is on track to be submitted to the Station DA for approval by TCD December 9, 2016 - [Likely actual DA approval TCD is Dec 16] · Code classification letters are in review by Reg Affairs . These need to be sent off to CNSC by Dec 16 – on track · The tophat tool is due after April 1 (post TCB) . This delivery was constrained by the OEM development process plus release of OPG PO & T/S · Pre-TCB contingencies have been confirmed to support AVTS communication in the vault which mitigates any adverse impact on the RFR schedule · The CPAA decision for the work group classification is expected on Dec 12 · Design EC draft will be used to obtain budgetary execution estimates, OLW package, execution ownership, P6 scheduling, work planning , etc. This draft EC information will be available on Dec 9. · COMS to support EC release will be executed after construction work group is engaged/assigned - TCD = Early Jan 2017 · No funding deficit anticipated at this time (to be confirmed when execution estimates are in)

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

934	Modification Delay of Penetration 2-21130-EP2282 for Radiation Protection Teledosimetry	EVENT: There is a risk that penetration 2-21130-EP2282 modification under MEC131147 will not be installed in time to support RFR activities. CAUSE: Associated work order WO# 4740182 has yet to receive scope acceptance and carries a level	**Outage Window**	**Window Description**															
			023	023 - Install Bulkheads															
			024	024 - Containment Pre Test, Achieve Dew Point & Containment Test															
779	Shielding required to access vault via Airlock AL2 and associated west stairs to upper elevations.	EVENT: There is a risk that access into the vault proper via airlock AL2 will be restricted and/or restrictive due to the presence of high radiation beams emanating from RFR reactor face work, specifically open channel work. CAUSE: Due to the nature of the RFR open channel work during reactor core component removal and installation phases, high unshielded radiation beams from the face will be present in accessible areas of the vault. IMPACT: As a result, the scheduling of several vault tasks and activities (ex: vault projects windows #104/105, SG primary side clean window #62) will be limited to the a few RFR windows where the presence of high radiation beams are not generated and prominent (ex: sever bellows portion of Window 104).	3	Active	Johnathon Hash	Joe Cicchini	29-Dec-16	Mitigate	01-Apr-17	3	1	3	9	1	1	1	1
			Outage Window	**Window Description**															
			000	000 – No Window Related															
			There are no Draft, Not Started, In Progress Actions associated with the risk.																
865	Acquisition, management, deployment and Storage of Contamination Control Equipment	EVENT: Ownership and Control of HEPA units, Vacuums, and Munter Tritium scrubbers during refurbishment is not clear. At present, there is a risk that RP will not have a program established for the procurement and management of a sufficient inventory of HEPA units, Vacuums, and Munter Tritium scrubbers. CAUSE: There is no program which describes the purchase, management, storage and use of semi-portable equipment required to ensure effective contamination control will be available and maintained on the project. IMPACT: The above risk may include components of the plan to install the large Munter units in the vault however, the risk is raised to account for the other equipment expected to be needed during refurbishment activities. This will impact RP's ability to manage its' accountability and responsibility to main contamination control during refurbishment work.	2	Active	Johnathon Hash	Scott Stafford	29-Dec-16	Mitigate	01-Jul-17	3	1	3	9	1	1	1	1
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**									

865	Acquisition, management, deployment and Storage of Contamination Control Equipment	EVENT: Ownership and Control of HEPA units, Vacuums, and Munter Tritium scrubbers during refurbishment is not clear. At present, there is a risk that RP will not have a program established for the procurement and management of a sufficient inventory of HEPA units, Vacuums, and Munter Tritium scrubbers. CAUSE: There is no program which describes the purchase, management, storage and use of semi-portable equipment required to ensure effective contamination control will be available and maintained on the project. IMPACT: The above risk may include components of the plan to install the large Munter units in the vault however, the risk is raised to account for the other equipment expected to be needed during refurbishment activities. This will impact RP's ability to manage its' accountability and responsibility to main contamination control during refurbishment work.	7845	In Progress	Develop and issue a Plan that documents a Program associated with the use of Specialized Equipment for Effective Contamination Control	This action is for BHI to review existing plans, DNRU2 scope of work, and current procedures and identify gaps. If required, develop and issue a Plan that documents a Program associated with the use of Specialized Equipment for Effective Contamination Control to address the gaps. Ownership and Control of HEPA units, Vacuums, and Munter Tritium scrubbers during refurbishment is not clear. At present, there is no program which describes the purchase, management, storage and use of semi-portable equipment required to ensure effective contamination control will be available and maintained on the project. This risk may include components of the plan to install the large Munter units in the vault however, the risk is raised to account for the other equipment expected to be needed during refurbishment activities.	Johnathon Hash	Jeff Johansson	28-Apr-17	Supply Chain hold for contract PO award in negotiation. (03 Oct; JJ) RP cannot move forward on this action as the PO for BHI for the review and assessment of our current readiness/capability on the subject of Specialized Equipment for Effective Contamination Control is still outstanding. Initiate follow up with Supply Chain to determine what the hold up is and what we can do to move forward on this. (19 Oct; JJ) RFP process in progress. Latest communications attached (#1) below. Project Schedule: Kickoff meeting at OPG and gather OPG material/ information/ perspectives 11/07/2016 Completion of review of OPG material (onsite) 11/07/2016 – 11/22/2016 RP Staffing Management Plan review (onsite) 11/14/2016 – 11/22/2016 Decontamination Program & Equipment review (onsite) 11/14/2016 – 11/22/2016 Training Program Review (onsite) 11/14/2016 – 11/22/2016 Consolidate onsite assessment notes and compile draft report for OPG comment (RP Staffing Management Plan, Decontamination Program & Equipment, and Training Program) 11/28/2016 – 12/8/2016 OPG to issue comments on draft report (RP Staffing Management Plan, Decontamination Program & Equipment, and Training Program) 12/12/2016 Final Assessment Report issued to OPG 12/19/2016 (13 Feb; JJ) BHI completed their assessment of our Decon and Decon Specialized Equipment, including our Hard-to-Detect Radionuclide program in Dec 2016. The final report is attached below as attachment #2. Refurb RP is currently reviewing the report and will initiate actions to track and execute the report recommendations and to address identified gaps. Meanwhile, RP is engaged in ordering HEPAs, Vacuums, and Munters to supplement Vendor provided decon equipment.

865	Acquisition, management, deployment and Storage of Contamination Control Equipment	EVENT: Ownership and Control of HEPA units, Vacuums, and Munter Tritium scrubbers during refurbishment is not clear. At present, there is a risk that RP will not have a program established for the procurement and management of a sufficient inventory of HEPA units, Vacuums, and Munter Tritium scrubbers. CAUSE: There is no program which describes the purchase, management, storage and use of semi-portable equipment required to ensure effective contamination control will be available and maintained on the project. IMPACT: The above risk may include components of the plan to install the large Munter units in the vault however, the risk is raised to account for the other equipment expected to be needed during refurbishment activities. This will impact RP's ability to manage its' accountability and responsibility to main contamination control during refurbishment work.	7846	In Progress	Review, develop and issue a Plan that documents a Program associated with the use of Specialized Equipment/Techniques for an Effective Decontamination Program	This action is for NUVIA to review existing plans, DNRU2 scope of work, and current procedures and identify gaps. If required, develop and issue a Plan that documents a Program associated with the use of Specialized Equipment/Techniques for an Effective Decontamination Program to address any gaps. At present, there is no program which describes the purchase, management, storage and use of specialized equipment, and training required to ensure an effective decon control will be available and maintained on the project. The risk is raised to account for the a potentially large amount of equipment expected to be decontaminated during refurbishment activities, either for future re-use or on-site transfers or offsite shipments.	Johnathon Hash	Jeff Johansson	28-Apr-17	(June 7/2016, Johansson): NUVIA Canada rep (Franz Dambo) met with NR-RP on 30 May 2016 for kick-off meeting on the scope of work. (18 July; JJ) NUVIA submitted the DRAFT report on July 18, 2016 for OPG review (see attachment #1 below). (9 Aug; JJ) NUVIA and OPG NR-RP staff met to go over OPG comments and feedback on the report. NUVIA was receptive to the feedback and will be incorporating OPG comments and feedback into the final revision of the report TCD: 31 Aug. (03 Oct; JJ) OPG NR-RP and NUVIA Canada (Franz Dambo) met on Sep 30 to discuss the latest version of the report. Additional feedback and comments were fed back to NUVIA and NUVIA has agreed to incorporating the latest round of feedback and comments and finalize the report. TCD: 15 Nov. Nuvia has not submitted final report. Coninued attempts to secure. Date adjusted to January 17/2017. (13 Feb; JJ) Previous attempts to contact Nuvia for the final report have not been successful. Contacted Franz Dambo of Nuvia Canada on Feb 13 and was able to track him down in Sweden. Franz has promised to forward a copy of the final report to OPG on Feb 14-15 followed up with a face to face meeting to be scheduled early March 2017 for the final presentation of the report.
			9855	In Progress	Develop a Maintenance Strategy	Maintenance of the Munter units on the project will need to have standard approach. 1 - Work with Munter vendor to establish a service contract for project needs. 2 - Develop a spare parts strategy for internal repair and maintenance of various Munter Units. Radiation Protection is working with Maintenance to establish our long term Munter program for storage, use and maintenance.	Val Bevacqua	Johnathon Hash	31-Mar-17	RP has initiated purchase of smaller units to support just in time needs on the project. This action needs to include the large units deployed within the vault as well as smaller just in time units.
			Outage Window		**Window Description**					
			000		000 – No Window Related					

866	Reconfiguration of U2 Zone 2 Coffee Shop for use as Instrument and Dosimetry Issuing Area (RaPID Center)	EVENT: The Radiation Protection Field Support Unit requires a central location to distribute dosimetry (EPDs, PASs, H&T TLDs, etc) and organize daily work activities for the Radiation Protection Co-ordinators (RPC) providing Service Protection coverage to Orange qualified RFR workers and non-RFR personnel during the Refurbishment of Unit 2. RP has been granted the old Unit 2 Coffee Shop area located on the 107.5m elevation for this purpose. There is a risk that the required renovations and conversion of the coffee shop to a dosimetry and instrument issuing center will be delayed. CAUSE: The NR RP work group had an approved SATM D-15-0310 for use of the space on U2 107.5 elevation R-203. This area was later revoked and provided to RFR as an equipment laydown area as per ECC modifications. IMPACT: The NR RP BTU Field Unit will have a trailer available in which to perform limited administrative duties, however there will not be sufficient room for all required RPCs to perform the administrative duties required to get work/PJBs performed in a timely manner to support critical path. The location of the trailer in the Unzoned area south of U2 and does not provide easy access for RFR and non-RFR projects to contact NR RP BTU. The U2 Zone 2 coffee shop is directly adjacent to the RFR PJB area and would provide excellent access to the area. Failure to provide a central location in which to issue EPDs to RFR and Project staff as well as dealing with RP related issues could cause a delay to critical path activities and extend outage windows. Additionally, the unit 2 zone 2 coffee shop has been provided to NR RP, however funding, engineering support and project lead is required to get the area ready for service by 15 Dec 2016.	4	Active	Johnathon Hash	Jeff Johansson	01-Feb-17	Mitigate	01-May-17	3	1	3	9	1	1	1	1

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
10048	In Progress	Install IT Infrastructure within the RaPID Center (LAN and Telephone)	(1) Initiate IT infrastructure request via email to DNGD: Telecom. Action complete. See attachment #1. (2) Setup a kick-off meeting with CIO representatives to discuss path forward on the IT infrastructure for the RaPID center. Action Complete. See Attachment #2. (3) Perform field walk down (RP and CIO) of the area of interest to gauge the current status of LAN availability/capability within the local vicinity of the RaPID center. Action: In-Progress. TCD for walk down is Friday, Feb 3. (CIO rep attending: Al Dharshi. (see attachment #3)	Johnathon Hash	Jeff Johansson	01-Apr-17	(01 Feb; JJ) Action initiation.

Outage Window	Window Description
000	000 – No Window Related

564	Large Potential Worker Doses due to Inadequete Internal (Alpha etc.) Hazard Characterization and Management	Event: There is a risk that Nuclear Refurbishment employees or Contractors may be exposed to unexpected radionuclide(s) which may lead to significant dose assignment. Cause: Inadequate source term characterization leading to radiological work planning, protective actions and dosimetry requirements not properly identified to protect workers from the hazards present. Impact: This may potentially result in high doses that could exceed OPG dose limits or CNSC Dose limits, as well as a disruption to Nuclear Refurbishment work. Regulatory, public and union relations issues would be very problematic and would be amplified by the fact that Bruce Power had the same type of event during their refurbishment.	3	Active	Johnathon Hash	Jeff Johansson	01-Feb-17	Mitigate	30-Dec-17	3	2	2	6	2	2	2	4

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments

564	Large Potential Worker Doses due to Inadequete Internal (Alpha etc.) Hazard Characterization and Management	Event: There is a risk that Nuclear Refurbishment employees or Contractors may be exposed to unexpected radionuclide(s) which may lead to significant dose assignment. Cause: Inadequate source term characterization leading to radiological work planning, protective actions and dosimetry requirements not properly identified to protect workers from the hazards present. Impact: This may potentially result in high doses that could exceed OPG dose limits or CNSC Dose limits, as well as a disruption to Nuclear Refurbishment work. Regulatory, public and union relations issues would be very problematic and would be amplified by the fact that Bruce Power had the same type of event during their refurbishment.	5876	In Progress	Strategy for smear samples to determine radionuclide characterization for U2	a) Source Term Characterization · Section 2.2: Develop a strategy for taking smear samples for the purpose of source term characterization of Unit 2 when radioactive systems are opened up for refurbishment. Samples locations should include radioactive systems in Unit 2, RWPB, and Fuel Handling. Once samples are taken, they should be analyzed radio-chemically and the conclusions with respect to dose contributions from the AMEC report should be validated. Also calculate the beta-gamma: alpha ratio to confirm capability of WBM to indicate the presence of alpha emitting radionuclides in the body and continued use of pancake for both beta-gamma measurement and, by inference, alpha presence (as per N-INS-09071-10013).	Johnathon Hash	Joe Cicchini	01-Apr-17	(7 June Johansson): Initiate a search of the smears that were taken during 2015 VBO on Unit 2 and, if found, perform count on the smears and document results. (18 July; JJ) A search for the smears that were apparently taken on Unit 2 during the 2015 VBO was unsuccessful. Decision to initiate a new set of smears on Unit 4 during D1641 was made and smears were taken. Some of the areas/systems include in this smear program are (see attachment #1 below for more details): Floor under pressurizer x2 Floor near ball screw pit. 1 x east, 1 x west. Base of the boilers (around manway, bolts etc) 1 x east, 1 x west Mod room (051 or 052 on the valving) ESC (scrap pipe on platform) Reach inside (do not enter) feeder cabinet on 100 elev and smear walkway Top of Bleed condenser 107.5 elev SDC The smears were sent to the Chemistry lab for initial analysis. Lab results have been received, along with the smears. Additional alpha counting of the smears will be arranged with Kinectrics. (10 Aug; JJ) See email attachment #2 below for results of initial counts of the smears performed at the DN Chem Lab. Preparation in progress to send the smears to Kinectrics for alpha analysis. 25AUG2016 JC Smears being processed for shipment 14OCT2016 - Several smears have been processed and analyzed in previous outages this data will be used to anticipate and Unit 2 specific smears will be collected. (22 Nov; JJ) Additional smears were taken by DN RP in Unit 3 and Unit 4 in 2015/2016 outages respectively (see attachment #4 email). Together with similar legacy data (see attachment #3), attachment #4 data from U3 and 4 will be reviewed and analyzed to confirm the beta-gamma to alpha ratio to confirm that capability of WBMs to indicate the presence of Alpha emitting radionuclides, and the continued use of pancake meters for inference of alpha activity. (29 Dec; JJ) The above mentioned U3 & U4 smear analysis results will be reviewed by NRRP HPs to confirm beta-

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			5883	In Progress	Darlington Routine Radiation Surveys Instruction Modified to include Unit 2 Refurbishment	· Sect 4.1.1: Modify D-INS-09071-10012, Darlington Routine Radiation Surveys, to expand the routine alpha monitoring program for Unit 2 refurbishment. Moving due date to June 30 in order to capture recommendations from an external report for Hard to Detect Nuclide Monitoring. (7 June, JOHANSSON): moved due date to Aug 31, 2016.	Johnathon Hash	Jeff Johansson	03-Apr-17	(7 June, JOHANSSON): moved due date to Aug 31, 2016. (09 Nov; JJ) The highest potential for alpha presence may occur during RFR series work (EF cutting, PT cut, etc...). NRRP ALARA are preparing RFR series specific RPEGs that will include requirements for routine and non-routine alpha surveys/smears. The Darlington Routine Survey instruction will not be revised to incorporate such requirements as it is tracked under the RPEGS. (01 Feb; JJ) DRAFT Routine Survey RPEG has been issued for RP review (see attachment #1). This RPEG was discussed with the Field Section and an action was assigned to the Field Section to determine the level of effort/resources that will take to execute the proposed RPEG surveys.

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			5886	In Progress	Confirm Alpha Counting room for Refurbishment	· Sect 4.1.1: Confirm the availability of a facility for counting alpha contamination samples.	Johnathon Hash	Joe Cicchini	17-Mar-17	(7 June, JOHANSSON): moved due date to Aug 31, 2016. Explore Ryan's suggestion for NR-RP to own and operate the Darlington iSolo counting room, and offer to perform any Darlington RP smears and train their personnel as well. (July 14; JJ): In addition to securing a dedicated alpha counting room for Refurbishment work, it was suggested that HPD perform a QA program for the results by analyzing a fixed percentage of the smears collected and counted, and documenting the results in a QA report for audit purposes. This will be include in the PAS Sampling Policy that is tracked under Action #5880. 25AUG2016 JC - Refurb RP will be working with station RP to develop a smear counting strategy that will benefit both organizations. ***Initiator name changed from BurkeJ to CicchinJ due to Lan ID of burkej not being recognized.
			5887	In Progress	Confirm Monitoring Compliance with Alpha Contamination Limits	· Sect 4.2.1/4.3.1: Confirm through ongoing source term/alpha characterization of Unit 2 that the beta-gamma: alpha activity ratio is greater than 5. This will confirm that pancake and WBM are sufficient to confirm compliance with alpha contamination limits.	Johnathon Hash	Jeff Johansson	30-Sep-17	(7 June; JJ): Consider integrating this requirement into the NR-RP Routine Survey program. If appropriate, close this action to action # 5883. (18 July; JJ): Post June 13 meeting with HPD, a recommendation was made for NR-RP to explore other instruments for Alpha counting (other than iSolos). It was also suggested to have HPD Instrument group involved in this search. (03 Oct; JJ) The recommendation is to confirm through on-going source term and/or alpha characterization studies during refurbishment activities that the beta-gamma: alpha ratio activity is still > 5. Once RFR work commences in unit 2, smears of open system piping/equipment will be performed and analyzed to confirm the ratios are > 5. As per current DNRU2 level 1 schedule, this work will start around July 2017 with window #42 Feeder Removal. Due date for this action has been set to Nov 2017 to confirm the ratios.

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			5890	In Progress	Shielding for WBM at U2 and RWPB	· Sect 4.4.1: Shielding for WBMs at Unit 2 and RWPB should be considered and implemented if the background levels are too high for the monitors to operate effectively. TCD: October 1, 2016	Johnathon Hash	Jeff Johansson	01-Apr-17	(7 June, JJ): This work has started with the shielding considerations for the WBMs/HFFs at the RWPB. The background dose rates in the RWPB are much higher than the required background dose rates for efficient operation of the WBMs/HFFs of <50 micro-Rem/h. Some of the normal operating dose rates in the building are pegged at values > 200 micro-rem/h at locations where the monitors will be located. The Joint-Venture team are performing shielding analysis to determine the required shielding to shield the monitors with (shielding huts and/or walls) to achieve <50 micro-rem/h rates. Various locations within Unit 2 are also being investigated for shielding of the WBMs, like the south wall of the RAB side and close to where the flasks will be lowered from the RMD containing adjusters and vertical flux detectors. It is anticipated that the dose rates from the flask will take the monitors out of service during the craning time of the flasks from elevation 115m down to 100m. (22 Aug; JJ) Shielding requirements for the RWPB monitors (WBM/HFF) are being defined and designed by the JV (see attachments #1,2 & 3 for some emails on the subject). Shielding requirements for Unit 2 monitors are based on local/nearby work that may affect the local background for the monitors. To date, initial discussions have been held with the AA/VFD/HFD Replacement project team (ES Fox) and a walk down of the flask transfer route will be schedule with the project in early Sept. (03 Oct; JJ) Walk down with the ES Fox team working on the AA/VFD/HFD Replacement project was scheduled in Sept but was cancelled due to other priorities. A new walk down meeting needs to be established to walk down the path of flask transfer. RP (Jeff J) is set up a new meeting with ES Fox. (TCD: 31 Oct) (09 Nov; JJ) Walk down of the area has identified that the craning/staging area for the AA/VFD flasks is located at column line K16 - L16. The south bank of whole body monitors is located at column line A16 - B1

5694	Large Potential Worker Doses due to Inadequete Internal (Alpha etc.) Hazard Characterization and Management	Event: There is a risk that Nuclear Refurbishment employees or Contractors may be exposed to unexpected radionuclide(s) which may lead to significant dose assignment. Cause: Inadequate source term characterization leading to radiological work planning, protective actions and dosimetry requirements not properly identified to protect workers from the hazards present. Impact: This may potentially result in high doses that could exceed OPG dose limits or CNSC Dose limits, as well as a disruption to Nuclear Refurbishment work. Regulatory, public and union relations issues would be very problematic and would be amplified by the fact that Bruce Power had the same type of event during their refurbishment.	5891	In Progress	Contamination Control Intiatives for RFR, RWPD and SGs	· Sect 5.1: RP should review in detail the refurbishment work (e.g., CWPs for RFR in vault and RWPB, and SG work) for opportunities to reduce and control contamination spread and protection of workers against internal hazards. The outcome of this review should be documented and communicated to the Field group, HP assessors, project leaders, and REP preparers. The output from this review should be incorporated in the CWPs.	Johnathon Hash	Joe Cicchini	17-Mar-17	(June 7, JOHANSSON) Action assigned to the Field Support Section. 25AUG2016 - Initiator name changed from burkej to cicchinj due to burkej not be recognized as a lan ID
			5892	In Progress	Contamination Control Equipment	· Sect 5.1: Confirm who is procuring/deploying/controlling contamination control equipment (e.g., vacuum cleaners with HEPA filters) for all refurbishment projects (e.g., RFR, SG, and BOP work). Met with external vendor to confirm scope of purchased services regarding Munter. External review commissioned for review of recommendations for HEPA use on the project.	Johnathon Hash	Joe Cicchini	17-Mar-17	23 Feb. 16 A list of contamination control equipment and the TCD for arrival of the equipment on site has been requested of RFR. A list of contamination control equipment for Balance of Plant and SG work has been requested. All other information remains unchanged. The ownership for procurement/deployment and control of contamination control equipment among the Projects is under investigation. RFR has indicated that they are responsible for procurement of five (5) smooth bore hose Hepa vacuum cleaners; 2 - for the reactor vault, 1 for the reactor auxilliary bay and 2 for the RWPB. Arrangements will be made to assist RFR with the deployment and control of the vacuums as per the Radiation Protection Coordinator assigned to the specific task. Ownership of contamination control equipment for Balance of Plant and SG work is currently in progress and an update will be provided before 23 Feb. 2106. It has been determined that the Radiation Protection work group does not have ownership for procurement of additional contamination control equipment. The Radiation Protection department will assist with the deployment and control of "contaminated" equipment used on the projects under the guidance of the Radiation Protection Coordinators. RP may consider purchase of some equipment. Currently no CCF has been initiated however it is under review. (09 Aug; JJ) Due date changed to Sept 30, 2016. 25AUG2016 JC - A comparison between OPG sites has been initiated to develop a fleet approach to CATS devices. This exercise will produce a program that will enhance our contamination control strategy

564	Large Potential Worker Doses due to Inadequete Internal (Alpha etc.) Hazard Characterization and Management	Event: There is a risk that Nuclear Refurbishment employees or Contractors may be exposed to unexpected radionuclide(s) which may lead to significant dose assignment. Cause: Inadequate source term characterization leading to radiological work planning, protective actions and dosimetry requirements not properly identified to protect workers from the hazards present. Impact: This may potentially result in high doses that could exceed OPG dose limits or CNSC Dose limits, as well as a disruption to Nuclear Refurbishment work. Regulatory, public and union relations issues would be very problematic and would be amplified by the fact that Bruce Power had the same type of event during their refurbishment.	5893	In Progress	Contamination Control - Ventilated Tents	· Sect 5.1: RP should consider the requirements for ventilated tents and exhaust HEPA filters. This will include the design and integrity testing.	Johnathon Hash	Joe Cicchini	17-Mar-17	RP for Refurbishment has considered the use of ventilated tents and exhaust HEPA units with filters. RP will utilize N-INS-03420-10005 on Use and Maintenance of Portable HEPA filter ventilation units for all hepa units used in association with vented tents. RP Refurbishment has agreed to perform the HEPA filter changes required for effective operation of the unit(s). RP Refurbishment will not purchase the HEPA units,nor does RP have budget to procure the HEPA units as this part of the "consumable" budget was given to Maintnenance Refurbishment. Ventilated tents are used to control contamination, however, there is no integrity testing procedure to date, other than the use of a smoke bomb to check the tent for air flow. An alternate source of testing tent integrity would be to use a Magnehelic guage to determine air flow. A process/procedure to perform integrity testing of tented material needs to be generated. (22 Aug; JJ) Consulted with Refurb Maintenance as to an RQE budget for RP HEPAs, Vacuums, and Munters. Tom Carvin will follow up with Mtce Manager. (15OCT2016) - Updated last reviewed date. BHI assessment procurement is in early stages. (09 Nov;JJ) BHI consultants arrived at Darlington on Nov 9. Assessment I/P.
			5894	In Progress	Procedure Review and Update as Required for Refurbishment	· Sect 7.1: RP procedures (and associated forms, guides, instructions) should be reviewed and modified as necessary to ensure they are compatible with the Refurbishment RP organizational structure, work activities, and radiological conditions. A review of RP procedures will also identify readiness issues that need to be addressed by the RP refurbishment organization.	Johnathon Hash	Jeff Johansson	01-Apr-17	(03 Oct; JJ) N-PROC-RA-0020 "Preliminary Event Notification", was recently revised to accommodate a Notification Protocol for Nuclear Refurbishment Incidents at Nuclear Facilities (under a new section 1.2.5 of the procedure). RMO Action 5894 was derived from Recommendation (e) of NK38-REP-09701-0570560 Appendix I. The recommendation is to review RP Procedures to flag areas where certain references to RP organization and to the Shift Manager to ensure that Refurbishment workers know who to contact in the event of RP events. This review has been performed and the new revision of N-PROC-RA-0020 with the added notification protocol addresses this action. Furthermore, RP has created a Gap Assessment spreadsheet documenting the results of the RP Procedural reviews that was performed internally. This Gap Assessment needs to be assessed to determine what (if any) procedural changes are required. If required, then the changes must be requested via the current process of initiating a DCR in AS7. Programs Section Manager to initiate a review of the Gap Assessment with a target date of 31 Dec 2016 to create any required DCRs. (Nov 9; JJ) Work has started with respect to the review of the gap assessment to identify required changes. (29 Dec; JJ) Gap assessment review I/P. Due date changed to Apr 01, 2017 to accommodate additional time for review.

564	Large Potential Worker Doses due to Inadequete Internal (Alpha etc.) Hazard Characterization and Management	Event: There is a risk that Nuclear Refurbishment employees or Contractors may be exposed to unexpected radionuclide(s) which may lead to significant dose assignment. Cause: Inadequate source term characterization leading to radiological work planning, protective actions and dosimetry requirements not properly identified to protect workers from the hazards present. Impact: This may potentially result in high doses that could exceed OPG dose limits or CNSC Dose limits, as well as a disruption to Nuclear Refurbishment work. Regulatory, public and union relations issues would be very problematic and would be amplified by the fact that Bruce Power had the same type of event during their refurbishment.	**5895**	In Progress	Readiness Assessment for Hard to Detect Radionulcides	· Sect 8.1: An assessment of the RP's readiness to manage hard to detect hazards should be completed prior to breaker open as well as a follow-up assessment at an appropriate time during the refurbishment.	Johnathon Hash	Jeff Johansson	31-Mar-17	(June 7, JOHANSSON): Explore and plan for a self-assessment (SA) to be performed by an Internal Team (of RP personnel). Ensure an SA entry is initiated in the Self-Assessment database for this deliverable. (Sept 13/2016: JJ) Changed due date from Sept 16 to Oct 15 as additional time is required to schedule and complete the assessment. (19 Oct: JJ) Due date extended to accommodate planning and execution of the assessment. NR RP will plan to have this assessment scheduled to be completed by end of Dec 2016. (23 Nov; JJ) A recent snapshot assessment scope of work performed by BHI (Nov 8-22) was expanded to include the subject of readiness to manage hard to detect radionuclides. This assessment report is currently being prepared and finalized and will be attached herein once completed and issued. Any gaps identified from the assessment will be tracked as actions under Risk #0564. (29 Dec; JJ) BHI draft report was submitted to OPG NRRP for review. Comments were sent back to BHI for disposition and issuance of the final report. (13 Feb; JJ) BHI Final Report has been submitted to OPG follow successful C&D process (see attachment #1 below). OPG is currently reviewing the final report with a view to initiate follow up actions to address the identified gaps and recommendations from the report.																
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864	Identifying priority for staff within our BTU Project ranks and staff assigned to BTU Refurbishment	EVENT: There is a risk that RP may not have documented direction and planning for staff who are assigned to Refurb when non routine events occur. The risk identified includes (but is not limited to) response to IPG events, response to events within the refurb project but outside of our U2 island, various facility events and work priorities during significant competing projects (such as an outage). CAUSE: As part of RP resource planning and identification, the need for emergency response role(s) was not clearly identified and defined. IMPACT: The risk may impact RP's ability to respond to non-routine events such as those events requiring RP participation from a Radiological perspective.	2	Active	Johnathon Hash	Joe Cicchini	22-Feb-17	Mitigate	16-Jun-17	2	2	3	6	1	2	1	2					
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**															
			7837	In Progress	RP Field Support Section - RP Field Execution Handbook	This action is to research, prepare and issue a Field Execution Handbook for use by members of the NR-RP Department, especially the Field Support Section RPCs to assist the RPCs with a working reference of expectations. The handbook is a guide to the expectations for OPG Radiation Protection personnel. The guide is not intended to be all inclusive or to supersede approved procedures given that it may be published yearly and therefore not consistent with current revision of the procedures referenced in the handbook. Proposed steps: - prepare Task Request (N-FORM-11551) and RFP forms, and initiate/approve MR - Route above paperwork for approval - Submit to OSS Contract Management group. - Follow process to select vendor of choice. - Work with Supply Chain to issue PO - Start the work. Note: will require funding as there is no remaining OSS funds for this work.	Johnathon Hash	Joe Cicchini	17-May-17	(21 June; JJ): This action has been assigned to Mike Armstrong to execute. (Aug 10; JJ) Field Execution Guide I/P, with 10% progress to completion. 25AUG2016 JC Guide in progress, 15% complete. (14 Sep; JJ) Guide is 25% complete. JC- Guide is 35% complete. (Maps concept is complete) JC - Guide is 60% complete. Critical maps are complete. 14OCT JC - (29DEC2016) Draft guide is complete. JH - Draft guide is being reviewed for additional content. Additional content to be provided by end of Feb 2017.													
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867	Additional cost for remote RP training capability in the classroom and Mock-up facility	EVENT: RP has identified the need to have some RP Simulator training administered at the Mock-Up during just-in-time RFR series training activities. There is a risk that the procurement, installation, testing, and commissioning of required RP training tools (ex: Q-Track, Teletrix) will be delayed. CAUSE: Delay in obtaining quotes and procurement of the relevant software. IMPACT: The Mock-up facility technology can replicate beam hazards which would be very beneficial to series testing and practical mock-up exposure, as well as in the training of the RPCs for RP. Delay in getting the simulators in place will impact the ability to fully integrate radiological training simulation into the RFR JIT program, and the RP Yellow/Green training of RPCs.	3	Active	Johnathon Hash	Jeff Johansson	01-Feb-17	Mitigate	01-Apr-17	3	1	2	6	1	1	1	1

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
8816	In Progress	Initiate process to obtain quote from Q-Track Vendor with goal to purchase Q-track and commisioned for use at the DEC Mock-up facility	HPD Remote Monitoring section to initiate process to obtain a quote from the Q-track vendor. Q-Track has a Dosimulation™ Radiation Worker Training System which uses patented technology, the system automatically and instantaneously correlates a worker's actual location with a trainer-controlled, simulated-radiation environment. The dosimeter: displays cumulative radiation exposure has internal-alarms when radiation limits are exceeded The system also has a mapping tool allowing a trainer to review an exercise and empowering him to streamline any operation procedure proposals to minimize manpower and radiation exposure.	Johnathon Hash	Jeff Johansson	28-Apr-17	(09 Aug; JJ) Action initiation. Aug 29th update. Met with supply chain mid august to review intended SOW and working with Supply Chain to complete SOW for quotes. (Sep 13/2016: JJ) Ryan McConnell has prepared the Scope of Work (SOW) to support the RFP. Submitted the SOW to Supply Chain (SC) for review. Comments/feedback from Supply Chain received and are currently being incorporated. Next steps: re-submit to SC for processing of the RFP (19 Oct; JJ) Reassigned the action to Johansson, and added interested parties (Ryan McC and Joe C). Action will be delegated to Ryan to prepare the SOW and initiate MR to purchase. (28 Dec; JJ) Ryan McConnell has prepared a draft SOW for the RFP. Currently being reviewed. (01 Feb; JJ) Training Simulation Equipment - received the RFQ's from Supply Chain for the training simulation equipment (Teletrix from Teletrix, Q-Track from IIS/Gamble, and Sim-Teq from Mirion). RP is currently reviewing the quotes from the proponents, and to provide Finance with recommendations on which to purchase. (13 Feb; JJ) Additional information is being requested of the proponents. Supply Chain has been informed and they have made contact with the proponents for the additional information. See attachments #1 and 2 for email details and information being requested.

867	Additional cost for remote RP training capability in the classroom and Mock-up facility	EVENT: RP has identified the need to have some RP Simulator training administered at the Mock-Up during just-in-time RFR series training activities. There is a risk that the procurement, installation, testing, and commissioning of required RP training tools (ex: Q-Track, Teletrix) will be delayed. CAUSE: Delay in obtaining quotes and procurement of the relevant software. IMPACT: The Mock-up facility technology can replicate beam hazards which would be very beneficial to series testing and practical mock-up exposure, as well as in the training of the RPCs for RP. Delay in getting the simulators in place will impact the ability to fully integrate radiological training simulation into the RFR JIT program, and the RP Yellow/Green training of RPCs.	**8817**	In Progress	Initiate process to obtain quote from Teletrix Vendor with goal to purchase Teletrix and commissioned for use with the BTU RPC Training facility	HPD Remote Monitoring section to initiate process to obtain a quote from the Teletrix vendor. Teletrix Radiation Training Simulator is a training tool providing true to life meter readings without exposure to radiation sources. it utilizes RF remote control rather than ionizing radiation as a source, trainees experience a radiation meter's entire indicating range while learning in a safe environment that mimics real life operations. Teletrix will be a tool that can supplement the Yellow/Green badge training practical exercises.	Johnathon Hash	Jeff Johansson	30-Apr-17	(09 Aug; JJ) Action initiation. Aug 29 - met with Supply Chain. Assistance and support for SOW to address both remote classroom capabilities (DEC Mock up included). (Sep 13/2016: JJ) Ryan McConnell has prepared the Scope of Work (SOW) to support the RFP. Submitted the SOW to Supply Chain (SC) for review. Comments/feedback from Supply Chain received and are currently being incorporated. Next steps: re-submit to SC for processing of the RFP (19 Oct; JJ) Reassigned the action to Johansson, and added interested parties (Ryan McC and Joe C). Action will be delegated to Ryan to prepare the SOW and initiate MR to purchase. MR Approved Dec 16th. J-Hash (28 Dec; JJ) Ryan McConnell has prepared a draft SOW for the RFP. Currently being reviewed. (01 Feb; JJ) Training Simulation Equipment - received the RFQ's from Supply Chain for the training simulation equipment (Teletrix from Teletrix, Q-Track from IIS/Gamble, and Sim-Teq from Mirion). RP is currently reviewing the quotes from the proponents, and to provide Finance with recommendations on which to purchase.										
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871	RP Staffing for PCC and High Hazard Oversight support risk	EVENT: Refurbishment PCC Support and High Hazard Oversight (HHO) requirements may be 24/7 or close to 24/7 operations/activities. There is a risk that RP staffing may not be sufficient to provide complete support for these activities. CAUSE: Lack of qualified RP staff to provide the required coverage. IMPACT: This may impact the requirement to staff PCC/HHO operations at the required rate, thus impacting project schedules and activities.	3	Active	Johnathon Hash	Scott Stafford	01-Feb-17	Mitigate	31-Mar-17	3	1	2	6	1	1	2	2							
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**													
			8240	In Progress	High Hazard Oversight / PCC Plan	Structure a plan for High Radiological work oversight as well as PCC staffing will be defined. Next steps would then be determining an effective schedule for staff to support as required. This specific support was initially in the RQE however budget compression removed this cost from our 24 / 7 critical path schedule.	Johnathon Hash	Scott Stafford	31-Mar-17	(09 Aug; JJ) A plan is being developed to review various schedules and shifts to accommodate 24/7 service for HHW oversight, as well as the required RP qualifications for such resources to staff these shifts. 23 Aug SS: Updated HHW oversight schedule and Oversight demand needs developed. 22 Sept SS: HHW oversight schedule/demand schedule updated. Temporary staff positions for Org I/P 11 Oct SS: HHW oversight schedule attached. Temp Staff positions for org I/P 23Nov SS: Org change I/P. Date moved to Dec 15 to allow org change to be completed for HHW oversight. PCC coverage being performed on weekends by Duty ALARA HP. 14-Dec SS: Date moved to January 16th to allow org change to be completed for HHW oversight. Approvals received to create a shift for Duty ALARA HP 24/7 coverage.										
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868	Non RQE identified cost for wireless integration of RP survey, shipment and Inventory data	EVENT: There is a risk that some specific RP Field Support services (such as radioactive shipping, inventory tracking/control of radioactive storage areas, close to instant reporting of online survey results, to name a few) will not be as expedient as some Projects/Vendors may expect to maintain critical/near-critical path work. CAUSE: Lack of an electronic/high tech process for the input and communication of RP related information to all parties of interest. IMPACT: This will impact the ability for field update to shipping paperwork, site inventory control of radioactive storage areas, and up to the minute survey results updates on all media forums. We have a bounding vendor quote and we are working through that at present. The RFP process as well as CCF are in progress. June 30, 2016 - J. Hash - Met with Executive VP and DOM for Project. Discussed the use of a third party vendor for this service. Was challenged to seek assistance from DataGlance. This is the Vendor who secured the Electronic work Package contract through Fleet Maintenance. Engaged maintenance for contact information and support towards seeking our deliverables through DataGlance. In Progress.		Active	Johnathon Hash	Joe Cicchini	01-Feb-17	Mitigate	28-Apr-17	5	1	1	5	1	1	1	1
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**								
			8237	In Progress	Seek support for wireless applications within the RP project organization	This action will track our engagement with DataGlance to assist / provide technical support for using and integrating some wireless applications for the project within RP.	Johnathon Hash	Joe Cicchini	31-Mar-17	(09 Aug; JJ) Initiated discussions with DataGlance CFAM (see attachment 31 below). Next step is to setup a meeting with the CFAM to share NR-RP needs with the DataGlance team. (03 Oct; JJ) Need to re-establish contact with the CFAM (Ed Lei) to discuss potential application of DataGlance for RP field work coordination/management. Email sent to Ed Lei (see attachment #2) for a meeting to discuss opportunities to use DataGlance. 15OCT2016 JC - JC/JJ attended a demonstration on 06OCT. This initiative as many applications applicable to RP. Specifically the availability of the CITRIX network wirelessly, allowing RPC to access the computer system from the job site. (01 Feb; JJ) Further discussions with IT CIO on this and it was recommended that DataGlance network will provide limited to no advantages for RP as it is specifically written for Maintenance electronic work packages, and interfaces with Asset Suite. RP applications (such as VSDS, RIS, etc...) interfaces with non Asset Suite software which DataGlance will not be able to provide. RP should consider using OPG Citrix to access OPG business LAN software by networking with the Refurbishment Unit 2 WiFi. RP is taking these recommendations under consideration.				
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565	Insufficient Qualified Radiation Protection Coordinators (BTU RPCs) to support Execution	EVENT: There is a risk that an insufficient number of qualified Radiation Protection Coordinators (RPCs) will be available to successfully provide service protection oversight for Fleet and Refurbishment radiological work that is being performed by EPC contractors. CAUSE: Due to low numbers of currently qualified BTU Trades RPC's plus attrition and insufficient training and qualification of new BTU Trades RPCs prior to execution of Refurbishment activities and opportunities with other industrial project in the province. IMPACT: May lead to schedule delays and cost overruns or could cause RP events due to lack of oversight or lack of properly experienced oversight.	3	Active	Johnathon Hash	Joe Cicchini	22-Feb-17	Mitigate	13-Oct-17	2	1	2	4	2	1	2	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**								

565	Insufficient Qualified Radiation Protection Coordinators (BTU RPCs) to support Execution	EVENT: There is a risk that an insufficient number of qualified Radiation Protection Coordinators (RPCs) will be available to successfully provide service protection oversight for Fleet and Refurbishment radiological work that is being performed by EPC contractors. CAUSE: Due to low numbers of currently qualified BTU Trades RPC's plus attrition and insufficient training and qualification of new BTU Trades RPCs prior to execution of Refurbishment activities and opportunities with other industrial project in the province. IMPACT: May lead to schedule delays and cost overruns or could cause RP events due to lack of oversight or lack of properly experienced oversight.	7672	In Progress	Periodic Assessment of Factors and Conditions that may impact RPC Supply for Unit 2 Refurbishment.	Periodically assess the following factors/conditions to determine what impact, if any, on the BTU RPC supply: - Training schedule (i.e., BTU RPC Yellow/Green RP qualification training) - Attrition associated with existing pool of BTU RPCs. - Bruce Power Main Component Replacement (MCR) campaign impact on OPG BTU RPC supply and training. - other related factors/conditions that may impact the supply/demand. 14JUN2016 JC: Refurb Prerequisites OPEX has identified the practice of adjusting the work schedule to address production schedules. If this approach is going to be used for Refurb Execution, the Radiation Protection's current staffing model will be challenged to support all work. Specific changes that would affect how we provide protection could include things like changing to a 24/7 model instead of the current understood 20hrs/day schedule. Staggered lunches, and resultant the need to have continuous RP support throughout everyday will also have to be considered against our current proposed support system. (JC)02AUG2016:CCF to be presented for the installation of a shield wall inside Airlock #2 to allow access to the stairs to the 111m elevation. This CCF is inclusive of all aspects of the wall procurement and subsequent installation. Having a shield wall will open up work windows for other groups, creating more demand for Radiation Protection Support. (JC) 30SEPT2016 Training I/p. RPCs in place and ready. (JC) 29DEC Class 8 training to begin 23JAN2017, this will bring the number of RPCs up to 166 techs available.	Johnathon Hash	Joe Cicchini	15-Sep-17	This is an on-going periodic assessment action so the due and completed dates are set to the end of the Unit 2 refurbishment window. If needed, a new action can be generated for future units. (JC)08SEPT2016 4on - 4off schedule is being used to increase RPC numbers per shift and provide 24/7 coverage. This model will provide for more depth to crew sizes and the availability of workers to supplement crews (Overtime) if required. (JC)14OCT2016 Class 7 is in progress and Classes 8 and 9 are scheduled for early 2017.
			8110	In Progress	Review and Revisit BTU RPC Demand/Supply for Additional Yellow Badge Classes	Review and revisit BTU RPC demand/supply to determine need for additional classes.	Johnathon Hash	Joe Cicchini	31-Mar-17	25AUG2016 JC Currently, our model supports our plan. 15OCT2016 JC - Two classes are currently scheduled for 2017 (Class 8&9) the requirement for additional classes are to be determined. 16JAN2017 JH - Third class added to 2017. Currently a Q4 course is being considered by not committed at this time. Decision by end of Q1.

Outage Window	Window Description
161	161 - RFR-Containment Isolation and Islanding
163	163 - RFR-Remove FM Bridge and Install RTP

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			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							

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			5883	In Progress	Darlington Routine Radiation Surveys Instruction Modified to include Unit 2 Refurbishment	· Sect 4.1.1: Modify D-INS-09071-10012, Darlington Routine Radiation Surveys, to expand the routine alpha monitoring program for Unit 2 refurbishment. Moving due date to June 30 in order to capture recommendations from an external report for Hard to Detect Nuclide Monitoring. (7 June, JOHANSSON): moved due date to Aug 31, 2016.	Johnathon Hash	Jeff Johansson	03-Apr-17	(7 June, JOHANSSON): moved due date to Aug 31, 2016. (09 Nov; JJ) The highest potential for alpha presence may occur during RFR series work (EF cutting, PT cut, etc...). NRRP ALARA are preparing RFR series specific RPEGs that will include requirements for routine and non-routine alpha surveys/smears. The Darlington Routine Survey instruction will not be revised to incorporate such requirements as it is tracked under the RPEGS. (01 Feb; JJ) DRAFT Routine Survey RPEG has been issued for RP review (see attachment #1). This RPEG was discussed with the Field Section and an action was assigned to the Field Section to determine the level of effort/resources that will take to execute the proposed RPEG surveys.

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			5886	In Progress	Confirm Alpha Counting room for Refurbishment	· Sect 4.1.1: Confirm the availability of a facility for counting alpha contamination samples.	Johnathon Hash	Joe Cicchini	17-Mar-17	(7 June, JOHANSSON): moved due date to Aug 31, 2016. Explore Ryan's suggestion for NR-RP to own and operate the Darlington iSolo counting room, and offer to perform any Darlington RP smears and train their personnel as well. (July 14; JJ): In addition to securing a dedicated alpha counting room for Refurbishment work, it was suggested that HPD perform a QA program for the results by analyzing a fixed percentage of the smears collected and counted, and documenting the results in a QA report for audit purposes. This will be include in the PAS Sampling Policy that is tracked under Action #5880. 25AUG2016 JC - Refurb RP will be working with station RP to develop a smear counting strategy that will benefit both organizations. ***Initiator name changed from BurkeJ to CicchinJ due to Lan ID of burkej not being recognized.
			5887	In Progress	Confirm Monitoring Compliance with Alpha Contamination Limits	· Sect 4.2.1/4.3.1: Confirm through ongoing source term/alpha characterization of Unit 2 that the beta-gamma: alpha activity ratio is greater than 5. This will confirm that pancake and WBM are sufficient to confirm compliance with alpha contamination limits.	Johnathon Hash	Jeff Johansson	30-Sep-17	(7 June; JJ): Consider integrating this requirement into the NR-RP Routine Survey program. If appropriate, close this action to action # 5883. (18 July; JJ): Post June 13 meeting with HPD, a recommendation was made for NR-RP to explore other instruments for Alpha counting (other than iSolos). It was also suggested to have HPD Instrument group involved in this search. (03 Oct; JJ) The recommendation is to confirm through on-going source term and/or alpha characterization studies during refurbishment activities that the beta-gamma: alpha ratio activity is still > 5. Once RFR work commences in unit 2, smears of open system piping/equipment will be performed and analyzed to confirm the ratios are > 5. As per current DNRU2 level 1 schedule, this work will start around July 2017 with window #42 Feeder Removal. Due date for this action has been set to Nov 2017 to confirm the ratios.

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			5890	In Progress	Shielding for WBM at U2 and RWPB	· Sect 4.4.1: Shielding for WBMs at Unit 2 and RWPB should be considered and implemented if the background levels are too high for the monitors to operate effectively. TCD: October 1, 2016	Johnathon Hash	Jeff Johansson	01-Apr-17	(7 June, JJ): This work has started with the shielding considerations for the WBMs/HFFs at the RWPB. The background dose rates in the RWPB are much higher than the required background dose rates for efficient operation of the WBMs/HFFs of <50 micro-Rem/h. Some of the normal operating dose rates in the building are pegged at values > 200 micro-rem/h at locations where the monitors will be located. The Joint-Venture team are performing shielding analysis to determine the required shielding to shield the monitors with (shielding huts and/or walls) to achieve <50 micro-rem/h rates. Various locations within Unit 2 are also being investigated for shielding of the WBMs, like the south wall of the RAB side and close to where the flasks will be lowered from the RMD containing adjusters and vertical flux detectors. It is anticipated that the dose rates from the flask will take the monitors out of service during the craning time of the flasks from elevation 115m down to 100m. (22 Aug; JJ) Shielding requirements for the RWPB monitors (WBM/HFF) are being defined and designed by the JV (see attachments #1,2 & 3 for some emails on the subject). Shielding requirements for Unit 2 monitors are based on local/nearby work that may affect the local background for the monitors. To date, initial discussions have been held with the AA/VFD/HFD Replacement project team (ES Fox) and a walk down of the flask transfer route will be schedule with the project in early Sept. (03 Oct; JJ) Walk down with the ES Fox team working on the AA/VFD/HFD Replacement project was scheduled in Sept but was cancelled due to other priorities. A new walk down meeting needs to be established to walk down the path of flask transfer. RP (Jeff J) is set up a new meeting with ES Fox. (TCD: 31 Oct) (09 Nov; JJ) Walk down of the area has identified that the craning/staging area for the AA/VFD flasks is located at column line K16 - L16. The south bank of whole body monitors is located at column line A16 - B1

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			5892	In Progress	Contamination Control Equipment	· Sect 5.1: Confirm who is procuring/deploying/controlling contamination control equipment (e.g., vacuum cleaners with HEPA filters) for all refurbishment projects (e.g., RFR, SG, and BOP work). Met with external vendor to confirm scope of purchased services regarding Munter. External review commissioned for review of recommendations for HEPA use on the project.	Johnathon Hash	Joe Cicchini	17-Mar-17	23 Feb. 16 A list of contamination control equipment and the TCD for arrival of the equipment on site has been requested of RFR. A list of contamination control equipment for Balance of Plant and SG work has been requested. All other information remains unchanged. The ownership for procurement/deployment and control of contamination control equipment among the Projects is under investigation. RFR has indicated that they are responsible for procurement of five (5) smooth bore hose Hepa vacuum cleaners; 2 - for the reactor vault, 1 for the reactor auxilliary bay and 2 for the RWPB. Arrangements will be made to assist RFR with the deployment and control of the vacuums as per the Radiation Protection Coordinator assigned to the specific task. Ownership of contamination control equipment for Balance of Plant and SG work is currently in progress and an update will be provided before 23 Feb. 2106. It has been determined that the Radiation Protection work group does not have ownership for procurement of additional contamination control equipment. The Radiation Protection department will assist with the deployment and control of "contaminated" equipment used on the projects under the guidance of the Radiation Protection Coordinators. RP may consider purchase of some equipment. Currently no CCF has been initiated however it is under review. (09 Aug; JJ) Due date changed to Sept 30, 2016. 25AUG2016 JC - A comparison between OPG sites has been initiated to develop a fleet approach to CATS devices. This exercise will produce a program that will enhance our contamination control strategy

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			5894	In Progress	Procedure Review and Update as Required for Refurbishment	· Sect 7.1: RP procedures (and associated forms, guides, instructions) should be reviewed and modified as necessary to ensure they are compatible with the Refurbishment RP organizational structure, work activities, and radiological conditions. A review of RP procedures will also identify readiness issues that need to be addressed by the RP refurbishment organization.	Johnathon Hash	Jeff Johansson	01-Apr-17	(03 Oct; JJ) N-PROC-RA-0020 "Preliminary Event Notification", was recently revised to accommodate a Notification Protocol for Nuclear Refurbishment Incidents at Nuclear Facilities (under a new section 1.2.5 of the procedure). RMO Action 5894 was derived from Recommendation (e) of NK38-REP-09701-0570560 Appendix I. The recommendation is to review RP Procedures to flag areas where certain references to RP organization and to the Shift Manager to ensure that Refurbishment workers know who to contact in the event of RP events. This review has been performed and the new revision of N-PROC-RA-0020 with the added notification protocol addresses this action. Furthermore, RP has created a Gap Assessment spreadsheet documenting the results of the RP Procedural reviews that was performed internally. This Gap Assessment needs to be assessed to determine what (if any) procedural changes are required. If required, then the changes must be requested via the current process of initiating a DCR in AS7. Programs Section Manager to initiate a review of the Gap Assessment with a target date of 31 Dec 2016 to create any required DCRs. (Nov 9; JJ) Work has started with respect to the review of the gap assessment to identify required changes. (29 Dec; JJ) Gap assessment review I/P. Due date changed to Apr 01, 2017 to accommodate additional time for review.

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5895	In Progress	Readiness Assessment for Hard to Detect Radionulcides	· Sect 8.1: An assessment of the RP's readiness to manage hard to detect hazards should be completed prior to breaker open as well as a follow-up assessment at an appropriate time during the refurbishment.	Johnathon Hash	Jeff Johansson	31-Mar-17	(June 7, JOHANSSON): Explore and plan for a self-assessment (SA) to be performed by an Internal Team (of RP personnel). Ensure an SA entry is initiated in the Self-Assessment database for this deliverable. (Sept 13/2016: JJ) Changed due date from Sept 16 to Oct 15 as additional time is required to schedule and complete the assessment. (19 Oct: JJ) Due date extended to accommodate planning and execution of the assessment. NR RP will plan to have this assessment scheduled to be completed by end of Dec 2016. (23 Nov; JJ) A recent snapshot assessment scope of work performed by BHI (Nov 8-22) was expanded to include the subject of readiness to manage hard to detect radionuclides. This assessment report is currently being prepared and finalized and will be attached herein once completed and issued. Any gaps identified from the assessment will be tracked as actions under Risk #0564. (29 Dec; JJ) BHI draft report was submitted to OPG NRRP for review. Comments were sent back to BHI for disposition and issuance of the final report. (13 Feb; JJ) BHI Final Report has been submitted to OPG follow successful C&D process (see attachment #1 below). OPG is currently reviewing the final report with a view to initiate follow up actions to address the identified gaps and recommendations from the report.

Outage Window	Window Description
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951

Risk to document potential cost for units 3, 1 & 4. - Teledose Infrastructure Mod

EVENT: As a result of the recent CCF 1912 (CCF 1912 - REPLACE BLANK MODULES WITH FIBRE-OPTIC: 2-21130-EP2282) presentation to the CCB, there is a risk that no funding will be available for required AVTS insert modifications for Units 1,3 & 4. CAUSE: CCB only approved modifications funding for Unit 2. IMPACT: No AVTS available for Units 1,3 & 4.

1	Active	Johnathon Hash	Matthew Lai	16-Jan-17	Accept	01-Jul-18	2	2	2	4	1	1	1	1

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
9682	In Progress	Send CCF to CCB for RQE increase for U1/3/4 EP2282 Modification	Send CCF to CCB for RQE increase for U1/3/4 EP2282 Modification	Johnathon Hash	Matthew Lai	08-Nov-17	Send CCF to CCB for RQE increase for U1/3/4 EP2282 Modification (14 Dec; JJ) Revised "Status = Not Started" to "In Progress".

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3	Active	Johnathon Hash	Jeff Johansson	01-Feb-17	Mitigate	30-Dec-17	3	2	2	6	2	2	2	4

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			5883	In Progress	Darlington Routine Radiation Surveys Instruction Modified to include Unit 2 Refurbishment	· Sect 4.1.1: Modify D-INS-09071-10012, Darlington Routine Radiation Surveys, to expand the routine alpha monitoring program for Unit 2 refurbishment. Moving due date to June 30 in order to capture recommendations from an external report for Hard to Detect Nuclide Monitoring. (7 June, JOHANSSON): moved due date to Aug 31, 2016.	Johnathon Hash	Jeff Johansson	03-Apr-17	(7 June, JOHANSSON): moved due date to Aug 31, 2016. (09 Nov; JJ) The highest potential for alpha presence may occur during RFR series work (EF cutting, PT cut, etc...). NRRP ALARA are preparing RFR series specific RPEGs that will include requirements for routine and non-routine alpha surveys/smears. The Darlington Routine Survey instruction will not be revised to incorporate such requirements as it is tracked under the RPEGS. (01 Feb; JJ) DRAFT Routine Survey RPEG has been issued for RP review (see attachment #1). This RPEG was discussed with the Field Section and an action was assigned to the Field Section to determine the level of effort/resources that will take to execute the proposed RPEG surveys.

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			5886	In Progress	Confirm Alpha Counting room for Refurbishment	· Sect 4.1.1: Confirm the availability of a facility for counting alpha contamination samples.	Johnathon Hash	Joe Cicchini	17-Mar-17	(7 June, JOHANSSON): moved due date to Aug 31, 2016. Explore Ryan's suggestion for NR-RP to own and operate the Darlington iSolo counting room, and offer to perform any Darlington RP smears and train their personnel as well. (July 14; JJ): In addition to securing a dedicated alpha counting room for Refurbishment work, it was suggested that HPD perform a QA program for the results by analyzing a fixed percentage of the smears collected and counted, and documenting the results in a QA report for audit purposes. This will be include in the PAS Sampling Policy that is tracked under Action #5880. 25AUG2016 JC - Refurb RP will be working with station RP to develop a smear counting strategy that will benefit both organizations. ***Initiator name changed from BurkeJ to CicchinJ due to Lan ID of burkej not being recognized.
			5887	In Progress	Confirm Monitoring Compliance with Alpha Contamination Limits	· Sect 4.2.1/4.3.1: Confirm through ongoing source term/alpha characterization of Unit 2 that the beta-gamma: alpha activity ratio is greater than 5. This will confirm that pancake and WBM are sufficient to confirm compliance with alpha contamination limits.	Johnathon Hash	Jeff Johansson	30-Sep-17	(7 June; JJ): Consider integrating this requirement into the NR-RP Routine Survey program. If appropriate, close this action to action # 5883. (18 July; JJ): Post June 13 meeting with HPD, a recommendation was made for NR-RP to explore other instruments for Alpha counting (other than iSolos). It was also suggested to have HPD Instrument group involved in this search. (03 Oct; JJ) The recommendation is to confirm through on-going source term and/or alpha characterization studies during refurbishment activities that the beta-gamma: alpha ratio activity is still > 5. Once RFR work commences in unit 2, smears of open system piping/equipment will be performed and analyzed to confirm the ratios are > 5. As per current DNRU2 level 1 schedule, this work will start around July 2017 with window #42 Feeder Removal. Due date for this action has been set to Nov 2017 to confirm the ratios.

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			5890	In Progress	Shielding for WBM at U2 and RWPB	· Sect 4.4.1: Shielding for WBMs at Unit 2 and RWPB should be considered and implemented if the background levels are too high for the monitors to operate effectively. TCD: October 1, 2016	Johnathon Hash	Jeff Johansson	01-Apr-17	(7 June, JJ): This work has started with the shielding considerations for the WBMs/HFFs at the RWPB. The background dose rates in the RWPB are much higher than the required background dose rates for efficient operation of the WBMs/HFFs of <50 micro-Rem/h. Some of the normal operating dose rates in the building are pegged at values > 200 micro-rem/h at locations where the monitors will be located. The Joint-Venture team are performing shielding analysis to determine the required shielding to shield the monitors with (shielding huts and/or walls) to achieve <50 micro-rem/h rates. Various locations within Unit 2 are also being investigated for shielding of the WBMs, like the south wall of the RAB side and close to where the flasks will be lowered from the RMD containing adjusters and vertical flux detectors. It is anticipated that the dose rates from the flask will take the monitors out of service during the craning time of the flasks from elevation 115m down to 100m. (22 Aug; JJ) Shielding requirements for the RWPB monitors (WBM/HFF) are being defined and designed by the JV (see attachments #1,2 & 3 for some emails on the subject). Shielding requirements for Unit 2 monitors are based on local/nearby work that may affect the local background for the monitors. To date, initial discussions have been held with the AA/VFD/HFD Replacement project team (ES Fox) and a walk down of the flask transfer route will be schedule with the project in early Sept. (03 Oct; JJ) Walk down with the ES Fox team working on the AA/VFD/HFD Replacement project was scheduled in Sept but was cancelled due to other priorities. A new walk down meeting needs to be established to walk down the path of flask transfer. RP (Jeff J) is set up a new meeting with ES Fox. (TCD: 31 Oct) (09 Nov; JJ) Walk down of the area has identified that the craning/staging area for the AA/VFD flasks is located at column line K16 - L16. The south bank of whole body monitors is located at column line A16 - B1

5694	Large Potential Worker Doses due to Inadequete Internal (Alpha etc.) Hazard Characterization and Management	Event: There is a risk that Nuclear Refurbishment employees or Contractors may be exposed to unexpected radionuclide(s) which may lead to significant dose assignment. Cause: Inadequate source term characterization leading to radiological work planning, protective actions and dosimetry requirements not properly identified to protect workers from the hazards present. Impact: This may potentially result in high doses that could exceed OPG dose limits or CNSC Dose limits, as well as a disruption to Nuclear Refurbishment work. Regulatory, public and union relations issues would be very problematic and would be amplified by the fact that Bruce Power had the same type of event during their refurbishment.	5891	In Progress	Contamination Control Intiatives for RFR, RWPD and SGs	· Sect 5.1: RP should review in detail the refurbishment work (e.g., CWPs for RFR in vault and RWPB, and SG work) for opportunities to reduce and control contamination spread and protection of workers against internal hazards. The outcome of this review should be documented and communicated to the Field group, HP assessors, project leaders, and REP preparers. The output from this review should be incorporated in the CWPs.	Johnathon Hash	Joe Cicchini	17-Mar-17	(June 7, JOHANSSON) Action assigned to the Field Support Section. 25AUG2016 - Initiator name changed from burkej to cicchinj due to burkej not be recognized as a lan ID
			5892	In Progress	Contamination Control Equipment	· Sect 5.1: Confirm who is procuring/deploying/controlling contamination control equipment (e.g., vacuum cleaners with HEPA filters) for all refurbishment projects (e.g., RFR, SG, and BOP work). Met with external vendor to confirm scope of purchased services regarding Munter. External review commissioned for review of recommendations for HEPA use on the project.	Johnathon Hash	Joe Cicchini	17-Mar-17	23 Feb. 16 A list of contamination control equipment and the TCD for arrival of the equipment on site has been requested of RFR. A list of contamination control equipment for Balance of Plant and SG work has been requested. All other information remains unchanged. The ownership for procurement/deployment and control of contamination control equipment among the Projects is under investigation. RFR has indicated that they are responsible for procurement of five (5) smooth bore hose Hepa vacuum cleaners; 2 - for the reactor vault, 1 for the reactor auxilliary bay and 2 for the RWPB. Arrangements will be made to assist RFR with the deployment and control of the vacuums as per the Radiation Protection Coordinator assigned to the specific task. Ownership of contamination control equipment for Balance of Plant and SG work is currently in progress and an update will be provided before 23 Feb. 2106. It has been determined that the Radiation Protection work group does not have ownership for procurement of additional contamination control equipment. The Radiation Protection department will assist with the deployment and control of "contaminated" equipment used on the projects under the guidance of the Radiation Protection Coordinators. RP may consider purchase of some equipment. Currently no CCF has been initiated however it is under review. (09 Aug; JJ) Due date changed to Sept 30, 2016. 25AUG2016 JC - A comparison between OPG sites has been initiated to develop a fleet approach to CATS devices. This exercise will produce a program that will enhance our contamination control strategy

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			5894	In Progress	Procedure Review and Update as Required for Refurbishment	· Sect 7.1: RP procedures (and associated forms, guides, instructions) should be reviewed and modified as necessary to ensure they are compatible with the Refurbishment RP organizational structure, work activities, and radiological conditions. A review of RP procedures will also identify readiness issues that need to be addressed by the RP refurbishment organization.	Johnathon Hash	Jeff Johansson	01-Apr-17	(03 Oct; JJ) N-PROC-RA-0020 "Preliminary Event Notification", was recently revised to accommodate a Notification Protocol for Nuclear Refurbishment Incidents at Nuclear Facilities (under a new section 1.2.5 of the procedure). RMO Action 5894 was derived from Recommendation (e) of NK38-REP-09701-0570560 Appendix I. The recommendation is to review RP Procedures to flag areas where certain references to RP organization and to the Shift Manager to ensure that Refurbishment workers know who to contact in the event of RP events. This review has been performed and the new revision of N-PROC-RA-0020 with the added notification protocol addresses this action. Furthermore, RP has created a Gap Assessment spreadsheet documenting the results of the RP Procedural reviews that was performed internally. This Gap Assessment needs to be assessed to determine what (if any) procedural changes are required. If required, then the changes must be requested via the current process of initiating a DCR in AS7. Programs Section Manager to initiate a review of the Gap Assessment with a target date of 31 Dec 2016 to create any required DCRs. (Nov 9; JJ) Work has started with respect to the review of the gap assessment to identify required changes. (29 Dec; JJ) Gap assessment review I/P. Due date changed to Apr 01, 2017 to accommodate additional time for review.

564

Large Potential Worker Doses due to Inadequete Internal (Alpha etc.) Hazard Characterization and Management

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5895	In Progress	Readiness Assessment for Hard to Detect Radionulcides	· Sect 8.1: An assessment of the RP's readiness to manage hard to detect hazards should be completed prior to breaker open as well as a follow-up assessment at an appropriate time during the refurbishment.	Johnathon Hash	Jeff Johansson	31-Mar-17	(June 7, JOHANSSON): Explore and plan for a self-assessment (SA) to be performed by an Internal Team (of RP personnel). Ensure an SA entry is initiated in the Self-Assessment database for this deliverable. (Sept 13/2016: JJ) Changed due date from Sept 16 to Oct 15 as additional time is required to schedule and complete the assessment. (19 Oct: JJ) Due date extended to accommodate planning and execution of the assessment. NR RP will plan to have this assessment scheduled to be completed by end of Dec 2016. (23 Nov; JJ) A recent snapshot assessment scope of work performed by BHI (Nov 8-22) was expanded to include the subject of readiness to manage hard to detect radionuclides. This assessment report is currently being prepared and finalized and will be attached herein once completed and issued. Any gaps identified from the assessment will be tracked as actions under Risk #0564. (29 Dec; JJ) BHI draft report was submitted to OPG NRRP for review. Comments were sent back to BHI for disposition and issuance of the final report. (13 Feb; JJ) BHI Final Report has been submitted to OPG follow successful C&D process (see attachment #1 below). OPG is currently reviewing the final report with a view to initiate follow up actions to address the identified gaps and recommendations from the report.

Outage Window	Window Description
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951

Risk to document potential cost for units 3, 1 & 4. - Teledose Infrastructure Mod

EVENT: As a result of the recent CCF 1912 (CCF 1912 - REPLACE BLANK MODULES WITH FIBRE-OPTIC: 2-21130-EP2282) presentation to the CCB, there is a risk that no funding will be available for required AVTS insert modifications for Units 1,3 & 4. CAUSE: CCB only approved modifications funding for Unit 2. IMPACT: No AVTS available for Units 1,3 & 4.

1	Active	Johnathon Hash	Matthew Lai	16-Jan-17	Accept	01-Jul-18	2	2	2	4	1	1	1	1

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
9682	In Progress	Send CCF to CCB for RQE increase for U1/3/4 EP2282 Modification	Send CCF to CCB for RQE increase for U1/3/4 EP2282 Modification	Johnathon Hash	Matthew Lai	08-Nov-17	Send CCF to CCB for RQE increase for U1/3/4 EP2282 Modification (14 Dec; JJ) Revised "Status = Not Started" to "In Progress".

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718

The Cyclic Maintenance budget may not have enough funds (Labour & Materials) to cover Shutdown Maintenance Backlog

Event: An independant review of the Cyclic Maintenance Budget confirmed there will be a shortfall of funds assigned to the D1621 work Program associated with Shutdown Maintenance cyclic work orders. This work is part of the Equipment Reliability Index target that will be committed to for the return to service of Unit 2. Cause: Initial budget assigned to cyclical overflow was estimated at $78M per unit. Present budget is $34M. Estimates received to date from Vendors are totaling $51M. Potential impact: Shortfall of funds impacting RTS of unit 2. station meeting ongoing on how to divide work and budget to ensure work is completed.

3	Active	Val Bevacqua	Tom Carvin	29-Dec-16	Mitigate	15-Oct-19	5	2	3	15	3	2	3	9

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
7955	In Progress	Shortfall of funds for mtce can affect RTS of U2.	Shortfall of funds impacting RTS of unit 2. station meeting ongoing on how to divide work and budget to ensure work is completed.	Val Bevacqua	Tom Carvin	16-Aug-19	UPDATE 20SEPT2016 per Val Bevacqua This is a risk that must remain open as it deals with discovery. Place the completion date out to 2019. Val Bevacqua Updated 8/5/2016 contingency funds have been allocated to support the maintenance organization.

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ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

677	Availability of DN Authorized Staff for Station and Refurb Support	Event: Insufficient authorized staff (certified Authorized Nuclear Operator (ANO), Control Room Shift Supervisors (CRSS) and Shift Managers (SM)) staff (2013-2017) and Non-Licensed Operator (NLO) staff (2013 >2020) to support Operations (outage, On-Line work (IPG), Emergent Work (FIN), procedures, training) and Refurbishment planning and execution. Causes: 1) Attrition due to retirements of ANO, CRSS/SM, NLO and Authorized Training Staff (ATS) due to demographic pool. 2) ANO initial training program throughput has historically been lower than the 60.0% previously assumed. 3) CRSS initial training previously have not been successful in producing new candidates for two (2) consecutive groups. 4) Lack of Authorization Training program-ready candidates has resulted in 40% to 50% smaller than Business Plan class sizes causing refloat to NR OM&A budget for ANOITs. 5) Knowledge gap between NLO and ANO In Training (ANOIT) results in lower entry calibre. 6) Shortages in Authorized Training Staff (ATS) to support ANO recovery plan needs. The risk is compounded by a high reliance on augmented staff to support a recovery plan and operate the business. Impact: This has the potential to impact on refurbishment planning and execution, Unit outages and VBO durations, efficiency of FIN and IPG, support for Authorization Training and backlogs in Ops Procedure.	4	Active	Boris Vulanovic	Ross Mccord	28-Feb-17	Mitigate	02-Apr-17	5	1	2	10	2	1	2	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**									
			9964	Draft	Monitoring Transition Plan Initiatives related to Authorized Staff Resources	The latest strategies for this risk mitigation involves several initiatives being put into play that will assist in meeting short term goals in keeping the work flowing until sufficient authorized staff are available to staff the refurb. department as per the Transition Plan. these initiatives are as follows 1) Reduce ANO minimum scheduled compliment to 7 from the current 8. This will allow 3 ANO's to be transferred to the refurb project (negotiated with the station). Additionally this will focus the duty crew on completing the co piloting of the 5 new ANOIT's in a timely fashion as it creates an urgency that would not otherwise exist allowing for a protracted co pilot period. This action is to take place in the first week of Jan 2017 2) Complete the co piloting of 4 SSIT's (TCD end of March 2017). This will free up 4 CRSS's to fill the need in the refurb organization. Additionally this will allow current CRSS's to co pilot in the SM position 3) For the upcoming work load peak created by the early completion of the defuel program the station has agreed to deploy the SDQ (special duty qual) NO's from the defuel campaign to the refurb project. Effectively this augments the A-E refurb shift crew by 2 NO's per crew or 10 NO's total. 4) as a stop gap measure Refurb has obtained 2 year contract extension for 6 of it's previously authorized personnel. This will secure our ability to support the review and approval of vendor documentation. 5) DORT / NORT meetings continue on a regular basis. These meeting provide a form for assigning / dividing available resources both licensed and non licensed to ensure station and refurb priorities are met	Boris Vulanovic	Michael O'dowd	20-Mar-17								
			Outage Window		**Window Description**														
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699	Foreign Material Management in Heat Transport System Leading to fuel defect	Cause A significant fuel defect rate in the two refurbished units at Bruce has been reported, which was caused by Debris (from unknown source) Event Remove defect fuel bundles (> 25 fuel bundles based on Bruce Power and Pt. Lepreau OPEX), Impact Potential Stoppage/Delay in HTS RTS Commissioning, and may require mini-outage after NR start-up. It can potentially impact station capacity factor, and not meeting CNSC/OP&P requirements of iodine concentration.	3	Active	Val Bevacqua	Jim Robertson	29-Dec-16	Mitigate	15-Oct-15	3	1	3	9	1	1	3	3
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**									

699	Foreign Material Management in Heat Transport System Leading to fuel defect	Cause A significant fuel defect rate in the two refurbished units at Bruce has been reported, which was caused by Debris (from unknown source) Event Remove defect fuel bundles (> 25 fuel bundles based on Bruce Power and Pt. Lepreau OPEX), Impact Potential Stoppage/Delay in HTS RTS Commissioning, and may require mini-outage after NR start-up. It can potentially impact station capacity factor, and not meeting CNSC/OP&P requirements of iodine concentration.	8826	In Progress	Flush Strainer Progress	Level 1 with all the timelines of the mods is required next week. Complete Determine the need date and work backwards. Develop the plan based on backward planning. Complete Review the plan on Friday - Aug.12, 2016. Complete Next deliverable Conceptual Design is Dec 30/216. ***** Updated following Issues Meeting on 06Feb2017 ****** The conceptual design report was issued and accepted from CEI. This item is also being tracked in Issue # 342 1) Schedule SIM for team on the status of the top design options.2) Prepare for an Executive Options Review Board Meeting (March 15)	Steve Goodchild	Mario Campigotto	15-Mar-17	Heat Transport Filtration/Strainer Design: (Prepared by: Andrew Jeffery) 3 Oct 2016 A Heat Transport Filtration/Strainer Design is to be developed to mitigate risk and help protect the fuel and pressure tubes from debris. · Prepare Engineering Needs Document for Heat Transport Filter/Strainer Design (Complete, NK38-NR-REP-33000-00001 issued; ECR 24638 Approved) · Arrange Staffing Resources for HTS RTS Project (Complete) o Interim Project Manager – Ron McKibbon; MTL – Imran Malik; Interim DTL – Ali Azarbad o Additional DTL & PM interviews are on-going · Kick-Off Meeting for HTS RTS Filter/Straining Strategy – Conceptual Design (Complete as scheduled) · Preparation of Needs Document to support Chemical Addition & Monitoring Skid for Hot Conditioning (Delayed for other project support; Revised Target of Oct 10th, Owner – System Eng) · Preparation of Needs Document to support Pressurizing Skid for Operational Leak Test (Delayed for other project support; Revised Target of Oct 10th, Owner – System Eng) · Develop Design EC Level 1 for HTS RTS Modifications (30 SeptemberTBD) · Investigate waste strategy for removed debris, filters, etc (10 October) · Top Priority à Secure contract and initiate Conceptual Design phase (Contract in place: October 21; CDR complete: December 30th o Prepare Sole Source Justification for qualified vendor (MTL, Supply Chain support needed to expedite contract paperwork) o Arrange Supply Chain support (TCD: Oct 6th)

699	Foreign Material Management in Heat Transport System Leading to fuel defect	Cause A significant fuel defect rate in the two refurbished units at Bruce has been reported, which was caused by Debris (from unknown source) Event Remove defect fuel bundles (> 25 fuel bundles based on Bruce Power and Pt. Lepreau OPEX), Impact Potential Stoppage/Delay in HTS RTS Commissioning, and may require mini-outage after NR start-up. It can potentially impact station capacity factor, and not meeting CNSC/OP&P requirements of iodine concentration.	9677	In Progress	Develop and implement FME enhancements to mitiage impact on fuel and major components during Refurbishment	Develop and implement FME enhancement requirements for refurbishment work deemed to have a potential impact on fuel and pressure tube integrity. Implement refurbishment specific enhancements into FME governance. Training and gap analysis (of work packages / FME plans already approved) is required to ensure enhancements are applied.	Val Bevacqua	Brian Barclay	14-Apr-17	Enhanced Foreign Material Exclusion Program: The enhanced foreign material exclusion program has developed recommendations and specifications with respect to chemistry (NK38-SPEC-09701-10035) and foreign material (NK38-NR-REP-33100-10007) cleanliness during heat transport maintenance. This is to be incorporated into a Darlington instruction and distributed through the project bundles and vendors. - Incorporate enhanced foreign material recommendations into actionable document (FME INS) – (Rev 001 Issued – NK38-INS-09701-10010, Rev 002 to be issued 12-Dec-16 with minor clarifications) - Two memorandums (NK38-CORR-33000-0614895; NK38-CORR-33000-0614924) detailing HTS Fitness for Service Sufficiency Requirements with respect to FME and Hot Conditioning. – (TCD: Sr. Manager Approvals in Progress) - Completion of Change Management Plan (per N-STD-AS-0024; SPOC: Mike McDonald) - Discussion with Program Owner & Stakeholders – Maintenance, Engineering, Chemistry (Complete) - Gap Analysis of Current FME practices and Enhanced FME expectations for Refurb (INITIATED, TCD 23-Dec-16) - Training Needs Analysis (TCD: Nov 4, 2016) (COMPLETE) – Training Table Top session Completed – Development of Training Content IN PROGRESS. - Incorporation of Chemistry Specification and HTS FME D-Instruction into FME Program Governance (Revision of N-PROC-MA-0018 to be issued 15-Dec-16) – As per Change Management Plan (Plan approval Nov 9, 2016) - Communication of revised FME Program Expectations for Refurbishment including applicable training (Jan 15, 2017) - Implementation of enhanced FME into refurbishment work packages, vendor training, along with OPG oversight checkpoints - FME implementation plan to be developed (COMPLETE) Change notifications have been sent to all vendors as well as training bulletin. BWXT is the only vendor to formally respond as of Feb 15, 2017. Contract Manager Enhanced FME Memo Sent to Vendor (Y/N)? Response Recei

Outage Window	Window Description
084	084 - Fuel Load
093	093 - Low Power Testing & Heat-up

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

820	Discovery work arising from valve replacements	The risk is that there is a large amount of discovery work encountered in the valve replacement program resulting in cost impacts and schedule delays to the planned valve replacement schedule. This is caused by limitations in the ability to examine/inspect valves internals prior to refurbishments and OPEX from previous refurbishment projects.	1	Active	Val Bevacqua	Tom Carvin	29-Dec-16	Monitor	28-Jun-18	3	3	1	9	3	3	1	9

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
8398	In Progress	U2 Power Supply Management - Develop a Strategy	Develop a strategy to manage power supply and demand in U2 For the duration of the U2 outage and present the strategy at an ORB FOAK Challenge Meeting.	Val Bevacqua	Tom Carvin	03-Apr-17	March 06/17 Maintenance is completing update meeting with all contract partners to provide details of the Temporary power process. Maintenance has actioned engineering to review the overload trip setting on 4001 & 4002 500kVa transformers Feb 17/17 Refurb maintenance has completed a plan to manage the U2 Temporary power supply and demand. This plan calls for Status control Tags to be affixed to each 600 RE. An email box is being setup to accept request for usage of the RE's. Refurb Maintenance is scheduled to deliver and update to the Thursday Feb 23 Pillar meeting. A strategy is being developed to manage the U2 power supply and demand. Refurb maintenance is the owner. Refurb maintenance has appointed a SPOC to manage the initiative Nov 10/16 Worley Parson has been tasked with developing a strategy to manage power supplies. The strategy plan is progressing and will be turned over to OPG Refurb maintenance to execute. Dec 8/16 Refurb maintenance has met with Worley Parson to start the process of turning over the U2 Temporary power supply program to maintenance.

Outage Window	Window Description
000	000 – No Window Related

870	Augmented Staff Rules puts future refurbishment units at RISK due to lack of budget needed to compensate for additional turnovers	Event: the Augmented Staff Contract duration. Max for outside contractor is 5 yrs 3 Yrs. Max for OPG rehire is 2 years. We are supporting a 10 yr project. Each unit takes 3 years. This was undated in NOV2016 due to the new Aug staff rules on contracts having even shorter durations. Current Probability changed to 4 due to this Aug staff change. Cause: The Auditor General applied restriction for contractors working at OPG. Impact : If we cant keep contractors beyond these durations all the way through refurbishment we will be starting over with new talent constantly repeating lessons learned. We cant even finish one unit with the same people that started. Path Forward - plan over lap Augstaff contracts to ensure scope of work is turnover to the next contractor and look at opportunities to hire full time instead of contracts. Based on this new direction the RISK score has been minimized for management to plan ahead to ensure these risks don't materialize. Impact 2: This will definitely increase everyone's budget (overlap of contracts every 2 years) who is using Aug staff to fill a need for this incremental project. Example: a 3 month overlap every two years on a 12 year project, is equal to 6 turnovers needed =18 months of additional funding for each role that is needed for the life of Refurbishment. @ $100.00/hour X 18 Months = $280,000.00 additional funding for each role that lasts the life of refurbishment. NR O&M Technical Procedures has RISK 767 for additional funding.	2	Active	Boris Vulanovic	Paul Davies	11-Jan-17	Monitor	07-Dec-18	4	2	1	8	4	2	1	8

Outage Window	Window Description
000	000 – No Window Related

There are no Draft, Not Started, In Progress Actions associated with the risk.

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

812	Layup can have a significant impact on station environmental release limits delaying layup activities	EVENT: Layup can impact station environmental release limits.CAUSE: We are draining and drying more systems/volumes than normal (such as the SGs, PHT, Conventional side and Moderator system)IMPACT: Delay in schedule.		Active	Roger Daly	Ray Kissel	10-Jan-17	Monitor	30-Jun-17	2	3	3	6	2	3	3	6

Outage Window	Window Description
002	002 - Conventional Side Layup
003	003 - Secondary Side SG Layup
013	013 - PHT Bulk Drain (Includes V42 Mod)
029	029 - HTS Vac Dry
034	034 - Primary Side SG Layup
035	035 - HTS Aux Dry
038	038 - Moderator Drained & Flush
048	048 - HTS Aux Drain,Purge,Outside Vault

There are no Draft, Not Started, In Progress Actions associated with the risk.

724	Chemistry Control Procedural Review Risk	Event: Due to a short period of time from design been complete (Aug 2015) and where required documentation (Chemistry Control OM and Chemistry Lab Procedures) is needed (Aug 2016) the completed documentation being ready in time is at risk. Also, there will be required reviews on O&M documentation during the same time frame. This will be a challenge for Chemistry Department based on present resources and therefore putting deliverables been ready for breaker open at risk. Cause : NR design documentation is scheduled for issued for all projects at the same time. Potential impacts : Chemistry Control documentation preparation may be late affecting chemistry control during initial stage of layup.	2	Active	Roger Daly	Sergei Voitchenko	28-Feb-17	Mitigate	30-Nov-16	5	1	1	5	3	1	1	3

Outage Window	Window Description
000	000 – No Window Related

There are no Draft, Not Started, In Progress Actions associated with the risk.

708	Materials budget for emergent broke-fix maintenance and scope growth during Shutdown, Layup and Runup is not included in MTCE budget.	Event: Materials required for broke-fix maintenance and scope growth during Shutdown, Layup and Run up Phases is not in MTCE Budget Cause: Contingecy funds not included in business planning process Potential impacts: Unable to repair, required for start up equipment, affecting critical path duration. 1. From Scope Freeze to Breaker Open: For the purpose of calculating the contingency for this specific risk, we assume, based on station IPG scope growth history, that there will scope growth between each Unit WO scope freeze and breaker open. Based on DNGS IPG history, 1-2 work orders are added to scope per day. The added work is then scheduled in the online schedule (not necessary FIN work to be executed immediately). It is expected that much of the work added during this period would be executed by DNGS IPG, however, some scope may be added to D1621 scope and executed during the outage proper. This type of 'cyclic' backlog scope will occur over a period of 16 months for each unit. We are estimating that, of the identified work during unit operation during this time period, 1 WO per week will actually be accepted into B/O-B/C scope. That equates to 64 new work orders. We assume a cost per work order of $6,000 average per work order. In total, this calculates to $400,000 per unit. ($1.6 million for overall Program). 2. From Breaker Open to Breaker Closed: For the purpose of calculating the contingency for this specific risk, we assume, based on station outage history, that there will be an average of 4 work orders per day of the outage, reviewed and approved for new scope, from breaker open to breaker closed. At Scope Freeze for D1621 and DNRU2, the D1621 WO # was 5,498. At 4 new WO per day, at ~1100 days, equals 4,400 work orders. We assume a cost per work order of $6,000 average per work order. In total, this calculates to $26 million per unit ($104 million for overall Program).	2	Active	Boris Vulanovic	Val Bevacqua	29-Dec-16	Monitor	16-Aug-19	2	2	2	4	2	2	2	4

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
7955	In Progress	Shortfall of funds for mtce can affect RTS of U2.	Shortfall of funds impacting RTS of unit 2. station meeting ongoing on how to divide work and budget to ensure work is completed.	Val Bevacqua	Tom Carvin	16-Aug-19	UPDATE 20SEPT2016 per Val Bevacqua This is a risk that must remain open as it deals with discovery. Place the completion date out to 2019. Val Bevacqua Updated 8/5/2016 contingency funds have been allocated to support the maintenance organization.

Outage Window	Window Description
000	000 – No Window Related

767	O&M Procedure Update Program may not have sufficient Funding	Event: Budget estimate for procedure work was estimated to cost around 42 million. this was based on opex from Bruce Power and Point Lepreau. Cause: Estimate was challenged and reduced down to 32 million. Impact: Could cost an addtional 10 million dollars to complete the program.	2	Active	Boris Vulanovic	Mike Dance	11-Jan-17	Accept	03-Oct-16	3	1	1	3	3	1	1	3

Outage Window	Window Description
000	000 – No Window Related

There are no Draft, Not Started, In Progress Actions associated with the risk.

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

706	Present ERT mincomp plan does not accommodate for and Islanded Unit while meeting adequate response time to emergent events	Event: DN Refurbishment organization is oblidged to comply with fire protection regulatory standards. Darlington's present ERT mincomp plan does not accommodate for and Islanded Unit while meeting adequate response time for potential emergent issues. Cause: A safety event that required ERT to respond either on Islanded Unit or Station. Other work requiring ERT to respond in the event of an emergency will be required to stop until ERT able to respond. eg, hot work, high angle rescue, confined space Potential impact: All work requiring ERM response to safety issue will stop if ERMs are required to attend to another event	1	Active	Val Bevacqua	Tom Carvin	29-Dec-16	Monitor	15-Aug-19	1	1	2	2	1	1	2	2
			Outage Window		**Window Description**														
			083		083 - Lower Feeder Installation														
			118		118 - CT Install Series														
			119		119 - Fuel Channel Install Series														
			There are no Draft, Not Started, In Progress Actions associated with the risk.																
728	Acute Tritium releases during NR primary side drain and dry operations	Event: Potential to have an acute Tritium Emission that exceeds the Station Internal Investigation Limit (IIL) for tritium emissions during the NR Outage, particularly during Moderator and Heat Transport draining and drying steps. Cause: -High tritium inventory in Moderator System, ineffective drying capacity from skids, poor condition of Vault Vapor Recovery Dryers or insufficient focuson Spills and Leaks. Potential Impacts: - Could delay work due to driers or skids needing regeneration. -Unfavorable Public Relations if high emissions persist and if insufficient preparation done ahead of time to mitigate.	2	Active	Roger Daly	Lillian Yiu	28-Feb-17	Monitor	31-Mar-17	2	1	1	2	2	1	1	2
			Outage Window		**Window Description**														
			000		000 – No Window Related														
			There are no Draft, Not Started, In Progress Actions associated with the risk.																
859	Unit Temporary Power System	Event: Currently this is no plan in place to control the allocation of power from the newly installed temporary power distribution system. In past outages, there has been a SPOC assigned from the station to control distribution (MC). This needs to be considered. Background Information: Unit temp power distribution system being installed by Shutdown Layup has 12 power carts located across unit. Install and remove only under po. No one is coordinated usage during execution when supplies will be lost to class 4 cyclic mtce. Also no one is coordinating usage to prevent overloading and conflicts between venders on how has priority. Also no one assigned to move cables when outages occurring.	3	Active	Val Bevacqua	Tom Carvin	29-Dec-16	Monitor	15-Dec-16	1	1	1	1	1	1	1	1
			Outage Window		**Window Description**														
			041		041 - Class 3 Electrical Maintenance														
			051		051 - Class 4 Electrical Maintenance														
			There are no Draft, Not Started, In Progress Actions associated with the risk.																
874	Refurbishment Maintenance - Milestone OP2170 S2,3,4 PC1 All PC1 Prepared At risk	A review of the work list found the following tasks flagged for permit: Segment 2 : 1625, Segment 3 : 421, Segment 4 : 472 for a total 2518 tasks for permitry. For segment 1, Refurb maintenance did not meet the milestone. There were 698 tasks in segment 1 which resulted in 265 PC1's. Given this ~ 3 to 1 ratio it is predicted maintenance will need to submit ~840 PC1's to meet the milestone.	3	Active	Val Bevacqua	Tom Carvin	29-Dec-16	Monitor	15-Oct-19	1	1	1	1	1	1	1	1
			Outage Window		**Window Description**														
			000		000 – No Window Related														
			There are no Draft, Not Started, In Progress Actions associated with the risk.																

Program: Operations and Maintenance - 10000

775	Potential Shortfall for Commissioning Support	Event: There is a risk that resource requirements for the return to service and commissioning phase of the project could exceed the NR O&M support capabilities Cause: The O&M program has established support organizations based on estimated resources for the various bundles including RTS and commissioning. Impact:This would require the station DN O&M to mobilize to assist in preserving the RTS schedule.		Active	Boris Vulanovic	Gary Leach	28-Feb-17	Mitigate	31-Jul-17	3	1	4	12	2	1	2	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**									

775	Potential Shortfall for Commissioning Support	Event: There is a risk that resource requirements for the return to service and commissioning phase of the project could exceed the NR O&M support capabilities Cause: The O&M program has established support organizations based on estimated resources for the various bundles including RTS and commissioning. Impact:This would require the station DN O&M to mobilize to assist in preserving the RTS schedule.	**1308**	In Progress	Commissioning Engineer resource profile	Review commissioning engineer resource profile and mitigate through contract staff hires if required. AR#28148291-01 Review commissioning engineer resource profile TCD:2017/01/15	Gary Leach	Steve Goodchild	14-Apr-17	12-JAN-2017 *** Update provided by Steve Goodchild **** Current strategy has been to develop the Engineering RTS Section with 6 staff of which 4 have arrived. The intent being that the system responsible staff in other sections will provide the support required for the commissioning activities. This strategy, based on previous OPEX may be challenged as the RTS group will be in more of a coordination role. The action is extended to allow for the current strategy to be further developed. _____ Update Sept 14/2016: Added Steve Goodchild as delegate to support with engineering resources. An engineering team to support commissioning and return to service has been formed. This group will support planning and execution of refurbishment and projects and modification work. ********** swim lane diagragm developed to identify activities required by functional engineering, resourcing for RTS activities as per the swim lane diagragm will be compared to projected resource profiles. Given the likelihood of resource issue the probability score has increased thus increasing the risk score to 9. Owner changed from D. Somerville to G. Leach by A. Kalafatis 2015/04/30 to align with AR assignment Initiator changed to M. Stewart, review in progress and staffing plans being developed.
			7539	In Progress	Produce a L3 RTS plan	Produce a L3 schedule of RTS activities in the schedule and ensure resource requirements are tallied for operations, maintenance, chemistry, environment, radiation protection, engineering and our vendor support. This will be used to compare to our current levels of staffing during these evolutions. Any gaps will be addressed by increasing staffing levels to the required numbers through staff movements to shift, additional staff from the station and the fleet or movement of the evolutions on the schedule if applicable. These options will be reviewed and concurred to by O&M, Eng and Work Control.	Gary Leach	Aris Kalafatis	14-Jul-17	Update Sept 14/2016: S2B/3/4 assessing milestone has been moved to June of 2017. A level 3 schedule will follow this milestone. Due date moved to a month after assessing to allow quality review and analysis of resources required. Review of the approved schedule to start following REV C issuance on June 17.
			7540	Not Started	Explore the need for EFIN/FIN during RTS	During RTS the critical path is affected by break plan discovery work that is not on the schedule. The work control process is not adequate to resolve these issues and maintain schedule integrity. Use of a FIN (fix it now) and EFIN (engineering) teams needs to be explored to see if staffing and funding can be achieved.	Gary Leach		30-Sep-17	June 15/16 - meetings with engineering and maintenance to be set up following Rev C issuance to discuss the possible use of these teams. Jan 5, 2017 - date extended to after assessing complete for RTS.
			7543	In Progress	Related to RTS prerequisites - ensure that PM's are planned & completed on critical instrumentation, NV's, etc, prior to start-up	FIAW/FOAK review board requested a review of RTS planning to ensure that required PM's on critical equipment are scheduled to ensure they do not delay start up activities. As an example, does the GCR RTS have the required activities planned to ensure it is available prior to being required.	Gary Leach	Aris Kalafatis	12-Jun-17	As part of the RTS logic reviews being completed these actions are being checked. Final reviews are to be completed by June 12/2017 to allow assessing. Date changed to reflect this date.

Outage Window	**Window Description**
000	000 – No Window Related
089	089 - HTS Air Hold, Fill & Hydrostatic Test
090	090 - HTS Operational Testing
092	092 - ATC

775	Potential Shortfall for Commissioning Support	Event: There is a risk that resource requirements for the return to service and commissioning phase of the project could exceed the NR O&M support capabilities Cause: The O&M program has established support organizations based on estimated resources for the various bundles including RTS and commissioning. Impact:This would require the station DN O&M to mobilize to assist in preserving the RTS schedule.	093	093 - Low Power Testing & Heat-up
			094	094 - Power Escalation
			095	095 - Run-up & Sync
			096	096 - High Power Testing & Turbine Testing
			193	193 - Heat-up & Hot Condition

894	Managing the project with operations processes versus construction processes	There is a risk of schedule delays and cost increases resulting from not adjusting the processes used to get work done to allow for construction efficiencies when systems and components on the refurbishment units are isolated from the operating plant. Every effort should be made to bring these opportunities to light and utilize them when it's proven to ensure the safety and quality of NR projects and ensure safe return to service of unit 2.	3	Active	Ken Gilbert		29-Dec-16	Mitigate	30-Sep-16	4	3	3	12	2	2	2	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			9625	In Progress	Revise operating documents to reflect refurbishment unit OP&P	Revise operating documents to reflect refurbishment unit OP&P to remove unnecessary constraints and restrictions when in State 3A and 3B - GSS: operating procedures to eliminate unnecessary work restrictions in State 3A and 3B - Heat sinks: operating procedures to eliminate unnecessary work practices in State 3A and 3B- Airlocks: operating procedures to support opening airlock doors to allow efficient vault access	Ken Gilbert		31-Mar-17								
			9643	In Progress	Revise Nuclear Governance associated with work-site proced	Revise Nuclear Governance associated with work-site procedure markups to support Vendor procedures	Ken Gilbert		31-Jan-17								
			9644	In Progress	Relaxing constraints for Refurb	Relaxing constraints for Refurb unit steam doors	Ken Gilbert		31-Mar-17								
			9645	In Progress	Finalize work program initiatives	Finalize work program initiatives and prioritize efficiency improvements for 2017 Q1 and Q2	Ken Gilbert		31-Jan-17								
			Outage Window		**Window Description**												
			000		000 – No Window Related												

900	U2EE Assumption 882 - Scope re-classification from NR to DO	Event: Risk is that assumption 882 pertaining to reclassification of scope during U2EE from NR to DO may be not materialize. Cause: Inconclusive assumption may result in DO being over and NR being underspend. Impact: Assumption 882 re-classifies NR scope to DO, resulting in reduction of NR and increment in DO budget.	2	Active	Val Bevacqua	Tom Carvin	29-Dec-16	Monitor	15-Feb-17	3	3	3	9	3	3	3	9
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

Program: Operations and Maintenance - 73023

775	Potential Shortfall for Commissioning Support	Event: There is a risk that resource requirements for the return to service and commissioning phase of the project could exceed the NR O&M support capabilities Cause: The O&M program has established support organizations based on estimated resources for the various bundles including RTS and commissioning. Impact:This would require the station DN O&M to mobilize to assist in preserving the RTS schedule.		Active	Boris Vulanovic	Gary Leach	28-Feb-17	Mitigate	31-Jul-17	3	1	4	12	2	1	2	4
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000	000 – No Window Related
089	089 - HTS Air Hold, Fill & Hydrostatic Test
090	090 - HTS Operational Testing
092	092 - ATC

775	Potential Shortfall for Commissioning Support	Event: There is a risk that resource requirements for the return to service and commissioning phase of the project could exceed the NR O&M support capabilities Cause: The O&M program has established support organizations based on estimated resources for the various bundles including RTS and commissioning. Impact:This would require the station DN O&M to mobilize to assist in preserving the RTS schedule.	093	093 - Low Power Testing & Heat-up
			094	094 - Power Escalation
			095	095 - Run-up & Sync
			096	096 - High Power Testing & Turbine Testing
			193	193 - Heat-up & Hot Condition

Program: Operations and Maintenance - 73028

775	Potential Shortfall for Commissioning Support	Event: There is a risk that resource requirements for the return to service and commissioning phase of the project could exceed the NR O&M support capabilities Cause: The O&M program has established support organizations based on estimated resources for the various bundles including RTS and commissioning. Impact:This would require the station DN O&M to mobilize to assist in preserving the RTS schedule.		Active	Boris Vulanovic	Gary Leach	28-Feb-17	Mitigate	31-Jul-17	3	1	4	12	2	1	2	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			1308	In Progress	Commissioning Engineer resource profile	Review commissioning engineer resource profile and mitigate through contract staff hires if required. AR#28148291-01 Review commissioning engineer resource profile TCD:2017/01/15	Gary Leach	Steve Goodchild	14-Apr-17	12-JAN-2017 *** Update provided by Steve Goodchild **** Current strategy has been to develop the Engineering RTS Section with 6 staff of which 4 have arrived. The intent being that the system responsible staff in other sections will provide the support required for the commissioning activities. This strategy, based on previous OPEX may be challenged as the RTS group will be in more of a coordination role. The action is extended to allow for the current strategy to be further developed. --- Update Sept 14/2016: Added Steve Goodchild as delegate to support with engineering resources. An engineering team to support commissioning and return to service has been formed. This group will support planning and execution of refurbishment and projects and modification work. ********** swim lane diagragm developed to identify activities required by functional engineering, resourcing for RTS activities as per the swim lane diagragm will be compared to projected resource profiles. Given the likelihood of resource issue the probability score has increased thus increasing the risk score to 9. Owner changed from D. Somerville to G. Leach by A. Kalafatis 2015/04/30 to align with AR assignment Initiator changed to M. Stewart, review in progress and staffing plans being developed.							
			7539	In Progress	Produce a L3 RTS plan	Produce a L3 schedule of RTS activities in the schedule and ensure resource requirements are tallied for operations, maintenance, chemistry, environment, radiation protection, engineering and our vendor support. This will be used to compare to our current levels of staffing during these evolutions. Any gaps will be addressed by increasing staffing levels to the required numbers through staff movements to shift, additional staff from the station and the fleet or movement of the evolutions on the schedule if applicable. These options will be reviewed and concurred to by O&M, Eng and Work Control.	Gary Leach	Aris Kalafatis	14-Jul-17	Update Sept 14/2016: S2B/3/4 assessing milestone has been moved to June of 2017. A level 3 schedule will follow this milestone. Due date moved to a month after assessing to allow quality review and analysis of resources required. Review of the approved schedule to start following REV C issuance on June 17.							

775	Potential Shortfall for Commissioning Support	Event: There is a risk that resource requirements for the return to service and commissioning phase of the project could exceed the NR O&M support capabilities Cause: The O&M program has established support organizations based on estimated resources for the various bundles including RTS and commissioning. Impact:This would require the station DN O&M to mobilize to assist in preserving the RTS schedule.	7540	Not Started	Explore the need for EFIN/FIN during RTS	During RTS the critical path is affected by break plan discovery work that is not on the schedule. The work control process is not adequate to resolve these issues and maintain schedule integrity. Use of a FIN (fix it now) and EFIN (engineering) teams needs to be explored to see if staffing and funding can be achieved.	Gary Leach		30-Sep-17	June 15/16 - meetings with engineering and maintenance to be set up following Rev C issuance to discuss the possible use of these teams. Jan 5, 2017 - date extended to after assessing complete for RTS.
			7543	In Progress	Related to RTS prerequisites - ensure that PM's are planned & completed on critical instrumentation, NV's, etc, prior to start-up	FIAW/FOAK review board requested a review of RTS planning to ensure that required PM's on critical equipment are scheduled to ensure they do not delay start up activities. As an example, does the GCR RTS have the required activities planned to ensure it is available prior to being required.	Gary Leach	Aris Kalafatis	12-Jun-17	As part of the RTS logic reviews being completed these actions are being checked. Final reviews are to be completed by June 12/2017 to allow assessing. Date changed to reflect this date.

Outage Window	Window Description
000	000 – No Window Related
089	089 - HTS Air Hold, Fill & Hydrostatic Test
090	090 - HTS Operational Testing
092	092 - ATC
093	093 - Low Power Testing & Heat-up
094	094 - Power Escalation
095	095 - Run-up & Sync
096	096 - High Power Testing & Turbine Testing
193	193 - Heat-up & Hot Condition

Program: Operations and Maintenance - 73062

775	Potential Shortfall for Commissioning Support	Event: There is a risk that resource requirements for the return to service and commissioning phase of the project could exceed the NR O&M support capabilities Cause: The O&M program has established support organizations based on estimated resources for the various bundles including RTS and commissioning. Impact:This would require the station DN O&M to mobilize to assist in preserving the RTS schedule.		Active	Boris Vulanovic	Gary Leach	28-Feb-17	Mitigate	31-Jul-17	3	1	4	12	2	1	2	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							

775	Potential Shortfall for Commissioning Support	Event: There is a risk that resource requirements for the return to service and commissioning phase of the project could exceed the NR O&M support capabilities Cause: The O&M program has established support organizations based on estimated resources for the various bundles including RTS and commissioning. Impact:This would require the station DN O&M to mobilize to assist in preserving the RTS schedule.	**1308**	In Progress	Commissioning Engineer resource profile	Review commissioning engineer resource profile and mitigate through contract staff hires if required. AR#28148291-01 Review commissioning engineer resource profile TCD:2017/01/15	Gary Leach	Steve Goodchild	14-Apr-17	12-JAN-2017 *** Update provided by Steve Goodchild **** Current strategy has been to develop the Engineering RTS Section with 6 staff of which 4 have arrived. The intent being that the system responsible staff in other sections will provide the support required for the commissioning activities. This strategy, based on previous OPEX may be challenged as the RTS group will be in more of a coordination role. The action is extended to allow for the current strategy to be further developed. _____ Update Sept 14/2016: Added Steve Goodchild as delegate to support with engineering resources. An engineering team to support commissioning and return to service has been formed. This group will support planning and execution of refurbishment and projects and modification work. ********** swim lane diagragm developed to identify activities required by functional engineering, resourcing for RTS activities as per the swim lane diagragm will be compared to projected resource profiles. Given the likelihood of resource issue the probability score has increased thus increasing the risk score to 9. Owner changed from D. Somerville to G. Leach by A. Kalafatis 2015/04/30 to align with AR assignment Initiator changed to M. Stewart, review in progress and staffing plans being developed.
			7539	In Progress	Produce a L3 RTS plan	Produce a L3 schedule of RTS activities in the schedule and ensure resource requirements are tallied for operations, maintenance, chemistry, environment, radiation protection, engineering and our vendor support. This will be used to compare to our current levels of staffing during these evolutions. Any gaps will be addressed by increasing staffing levels to the required numbers through staff movements to shift, additional staff from the station and the fleet or movement of the evolutions on the schedule if applicable. These options will be reviewed and concurred to by O&M, Eng and Work Control.	Gary Leach	Aris Kalafatis	14-Jul-17	Update Sept 14/2016: S2B/3/4 assessing milestone has been moved to June of 2017. A level 3 schedule will follow this milestone. Due date moved to a month after assessing to allow quality review and analysis of resources required. Review of the approved schedule to start following REV C issuance on June 17.
			7540	Not Started	Explore the need for EFIN/FIN during RTS	During RTS the critical path is affected by break plan discovery work that is not on the schedule. The work control process is not adequate to resolve these issues and maintain schedule integrity. Use of a FIN (fix it now) and EFIN (engineering) teams needs to be explored to see if staffing and funding can be achieved.	Gary Leach		30-Sep-17	June 15/16 - meetings with engineering and maintenance to be set up following Rev C issuance to discuss the possible use of these teams. Jan 5, 2017 - date extended to after assessing complete for RTS.
			7543	In Progress	Related to RTS prerequisites - ensure that PM's are planned & completed on critical instrumentation, NV's, etc, prior to start-up	FIAW/FOAK review board requested a review of RTS planning to ensure that required PM's on critical equipment are scheduled to ensure they do not delay start up activities. As an example, does the GCR RTS have the required activities planned to ensure it is available prior to being required.	Gary Leach	Aris Kalafatis	12-Jun-17	As part of the RTS logic reviews being completed these actions are being checked. Final reviews are to be completed by June 12/2017 to allow assessing. Date changed to reflect this date.

Outage Window	**Window Description**
000	000 – No Window Related
089	089 - HTS Air Hold, Fill & Hydrostatic Test
090	090 - HTS Operational Testing
092	092 - ATC

775	Potential Shortfall for Commissioning Support	Event: There is a risk that resource requirements for the return to service and commissioning phase of the project could exceed the NR O&M support capabilities Cause: The O&M program has established support organizations based on estimated resources for the various bundles including RTS and commissioning. Impact:This would require the station DN O&M to mobilize to assist in preserving the RTS schedule.	093	093 - Low Power Testing & Heat-up
			094	094 - Power Escalation
			095	095 - Run-up & Sync
			096	096 - High Power Testing & Turbine Testing
			193	193 - Heat-up & Hot Condition

Program: Operations and Maintenance - 73440

775	Potential Shortfall for Commissioning Support	Event: There is a risk that resource requirements for the return to service and commissioning phase of the project could exceed the NR O&M support capabilities Cause: The O&M program has established support organizations based on estimated resources for the various bundles including RTS and commissioning. Impact:This would require the station DN O&M to mobilize to assist in preserving the RTS schedule.		Active	Boris Vulanovic	Gary Leach	28-Feb-17	Mitigate	31-Jul-17	3	1	4	12	2	1	2	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			1308	In Progress	Commissioning Engineer resource profile	Review commissioning engineer resource profile and mitigate through contract staff hires if required. AR#28148291-01 Review commissioning engineer resource profile TCD:2017/01/15	Gary Leach	Steve Goodchild	14-Apr-17	12-JAN-2017 *** Update provided by Steve Goodchild **** Current strategy has been to develop the Engineering RTS Section with 6 staff of which 4 have arrived. The intent being that the system responsible staff in other sections will provide the support required for the commissioning activities. This strategy, based on previous OPEX may be challenged as the RTS group will be in more of a coordination role. The action is extended to allow for the current strategy to be further developed. _____ Update Sept 14/2016: Added Steve Goodchild as delegate to support with engineering resources. An engineering team to support commissioning and return to service has been formed. This group will support planning and execution of refurbishment and projects and modification work. ********** ********** ********** ********** ********** swim lane diagragm developed to identify activities required by functional engineering, resourcing for RTS activities as per the swim lane diagragm will be compared to projected resource profiles. Given the likelihood of resource issue the probability score has increased thus increasing the risk score to 9. Owner changed from D. Somerville to G. Leach by A. Kalafatis 2015/04/30 to align with AR assignment Initiator changed to M. Stewart, review in progress and staffing plans being developed.							
			7539	In Progress	Produce a L3 RTS plan	Produce a L3 schedule of RTS activities in the schedule and ensure resource requirements are tallied for operations, maintenance, chemistry, environment, radiation protection, engineering and our vendor support. This will be used to compare to our current levels of staffing during these evolutions. Any gaps will be addressed by increasing staffing levels to the required numbers through staff movements to shift, additional staff from the station and the fleet or movement of the evolutions on the schedule if applicable. These options will be reviewed and concurred to by O&M, Eng and Work Control.	Gary Leach	Aris Kalafatis	14-Jul-17	Update Sept 14/2016: S2B/3/4 assessing milestone has been moved to June of 2017. A level 3 schedule will follow this milestone. Due date moved to a month after assessing to allow quality review and analysis of resources required. Review of the approved schedule to start following REV C issuance on June 17.							

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

775

Potential Shortfall for Commissioning Support

Event: There is a risk that resource requirements for the return to service and commissioning phase of the project could exceed the NR O&M support capabilities Cause: The O&M program has established support organizations based on estimated resources for the various bundles including RTS and commissioning. Impact:This would require the station DN O&M to mobilize to assist in preserving the RTS schedule.

7540	Not Started	Explore the need for EFIN/FIN during RTS	During RTS the critical path is affected by break plan discovery work that is not on the schedule. The work control process is not adequate to resolve these issues and maintain schedule integrity. Use of a FIN (fix it now) and EFIN (engineering) teams needs to be explored to see if staffing and funding can be achieved.	Gary Leach		30-Sep-17	June 15/16 - meetings with engineering and maintenance to be set up following Rev C issuance to discuss the possible use of these teams. Jan 5, 2017 - date extended to after assessing complete for RTS.
7543	In Progress	Related to RTS prerequisites - ensure that PM's are planned & completed on critical instrumentation, NV's, etc, prior to start-up	FIAW/FOAK review board requested a review of RTS planning to ensure that required PM's on critical equipment are scheduled to ensure they do not delay start up activities. As an example, does the GCR RTS have the required activities planned to ensure it is available prior to being required.	Gary Leach	Aris Kalafatis	12-Jun-17	As part of the RTS logic reviews being completed these actions are being checked. Final reviews are to be completed by June 12/2017 to allow assessing. Date changed to reflect this date.

Outage Window	Window Description
000	000 – No Window Related
089	089 - HTS Air Hold, Fill & Hydrostatic Test
090	090 - HTS Operational Testing
092	092 - ATC
093	093 - Low Power Testing & Heat-up
094	094 - Power Escalation
095	095 - Run-up & Sync
096	096 - High Power Testing & Turbine Testing
193	193 - Heat-up & Hot Condition

893

Additional Filter and IX Resin Waste following U2 PHTS Hot Conditioning

EVENT: Following U2 PHTS Hot Conditioning additional particulate material may be removed from the system through the purification system by means of filters and IX resin. CAUSE: Particulate material in the system resulting from overall Refurbishment and/or Hot Conditioning prior to RTS. IMPACT: Increase the frequency of filter and IX resin slurries, which would increase the amount of waste generated.

2	Active	Roger Daly	Sergei Voitchenko	28-Feb-17	Monitor	06-Sep-19	2	2	1	4	2	2	1	4

Outage Window	Window Description
089	089 - HTS Air Hold, Fill & Hydrostatic Test
090	090 - HTS Operational Testing
092	092 - ATC
093	093 - Low Power Testing & Heat-up
094	094 - Power Escalation
095	095 - Run-up & Sync
193	193 - Heat-up & Hot Condition

There are no Draft, Not Started, In Progress Actions associated with the risk.

892

Additional Filter and IX Resin Waste following U2 PHTS Hot Conditioning

EVENT: Following U2 PHTS Hot Conditioning additional particulate material may be removed from the system through the purification system by means of filters and IX resin. CAUSE: Particulate material in the system resulting from overall Refurbishment and/or Hot Conditioning prior to RTS. IMPACT: Increase the frequency of filter and IX resin slurries, which would increase the amount of waste generated.

2	Active	Roger Daly	Sergei Voitchenko	28-Feb-17	Monitor	06-Sep-19	2	2	1	4	2	2	1	4

Outage Window	Window Description
089	089 - HTS Air Hold, Fill & Hydrostatic Test
090	090 - HTS Operational Testing
092	092 - ATC
093	093 - Low Power Testing & Heat-up
094	094 - Power Escalation
095	095 - Run-up & Sync
193	193 - Heat-up & Hot Condition

There are no Draft, Not Started, In Progress Actions associated with the risk.

892

Additional Filter and IX Resin Waste following U2 PHTS Hot Conditioning

EVENT: Following U2 PHTS Hot Conditioning additional particulate material may be removed from the system through the purification system by means of filters and IX resin. CAUSE: Particulate material in the system resulting from overall Refurbishment and/or Hot Conditioning prior to RTS. IMPACT: Increase the frequency of filter and IX resin slurries, which would increase the amount of waste generated.

2	Active	Roger Daly	Sergei Voitchenko	28-Feb-17	Monitor	06-Sep-19	2	2	1	4	2	2	1	4

Outage Window	Window Description
089	089 - HTS Air Hold, Fill & Hydrostatic Test
090	090 - HTS Operational Testing
092	092 - ATC
093	093 - Low Power Testing & Heat-up
094	094 - Power Escalation
095	095 - Run-up & Sync

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

893	Additional Filter and IX Resin Waste following U2 PHTS Hot Conditioning	EVENT: Following U2 PHTS Hot Conditioning additional particulate material may be removed from the system through the purification system by means of filters and IX resin. CAUSE:	193	193 - Heat-up & Hot Condition															
			There are no Draft, Not Started, In Progress Actions associated with the risk.																
917	Ability to transfer and process downgraded D2O may impact Refur Schedule	Event: Many of the critical path items and several of the off critical path items could be negatively affected by our reduced ability to process and store downgraded D2O. Additionally there will be conflicts with U1 planned outage D1711 due to the same issue. Cause: TRF / D2O storage Capacity and Upgrader capability concerns Impact: Potential schedule impacts due to inability to process or store downgraded D2O in a timely fashion	4	Active	Boris Vulanovic	Yaro Sirota	27-Jan-17	Mitigate	31-Jan-17	2	1	1	2	1	1	1	1
			Outage Window		**Window Description**														
			134	134 - U1 Outage 2017 (D1711)															
			520	520 - D2O Storage Facility -PreReq to PHT Bulk Drain (Campus Plan)															
			There are no Draft, Not Started, In Progress Actions associated with the risk.																
917	Ability to transfer and process downgraded D2O may impact Refur Schedule	Event: Many of the critical path items and several of the off critical path items could be negatively affected by our reduced ability to process and store downgraded D2O. Additionally there will be conflicts with U1 planned outage D1711 due to the same issue. Cause: TRF / D2O storage Capacity and Upgrader capability concerns Impact: Potential schedule impacts due to inability to process or store downgraded D2O in a timely fashion	4	Active	Boris Vulanovic	Yaro Sirota	27-Jan-17	Mitigate	31-Jan-17	2	1	1	2	1	1	1	1
			Outage Window		**Window Description**														
			134	134 - U1 Outage 2017 (D1711)															
			520	520 - D2O Storage Facility -PreReq to PHT Bulk Drain (Campus Plan)															
			There are no Draft, Not Started, In Progress Actions associated with the risk.																

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
751	Foreign Exchange Rate Changes Impact NR Cost Envelope	EVENT: Risk that fluctuations in foreign exchange rates adversely impact planned costs established at RQE, resulting in cost increases to the program. CAUSE: Ongoing and adverse fluctuations in USD/CAN exchange rate which impacts major contracts IMPACT: As of Jan-17, the current going forward USD/CAN exposure is estimated at $381M CAD. The foreign exchange risk is monitored in the Major Contract Summary section of the monthly Controllership report that is distributed to the CFO and NPET members. Over the past six months the exchange rate has had minor fluctuations of ~$0.05 (currently $1.34) and is relatively aligned to the RQE analysis rate of $1.34 (more favorable).		Active	Gary Rose	Derek Kindlon	24-Feb-17	Monitor	06-Jun-26	3	3	1	9	3	3	1	9
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
768	Program Interest Rate Uncertainty	RQE Program Basis (Assumption) for Interest Rates are documented in Assumption #536. This risk is to address uncertainty to this Basis for the entire NR Program. 2016 LT interest rates monitored by Corp Finance - assumptions reviewed for U2EE. Event: Controllership working with P&C group in Oct-16 to generate bundle interest calculation re-flow for business planning purposes. Cause: Changes to project costs and in-service timing which results in changes to interest. Impact: Determining the bundle and contingency interest flows; CCF processed at beginning of Nov (2521, 2543 to 2554)	1	Active	Gary Rose	Derek Kindlon	21-Feb-17	Accept	06-Jun-26	2	3	1	6	2	3	1	6
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
674	Loss of public and community support for Refurbishment	EVENT: A loss of public and community support for Darlington Refurbishment CAUSE: The reasons support may diminish include: There is a perception that nuclear base load is not needed in Ontario or alternatives are identified (e.g. Hydro Power from Quebec);The benefits of refurbishment are not seen/realized by the hosting communities (i.e. risks outweigh benefits); Nuclear waste stores at site increase, resulting in local opposition; New environmental issues surface at site; Performance of other OPG plants impacts ability to license; A major adverse nuclear event (at any nuclear power plant) results in negative public perception; or KI pill distribution in 2015 causes undue stress and anxiety. IMPACT: Darlington Refurbishment Project delay or postponement.	3	Active	Gary Rose	Scott Berry	22-Feb-17	Monitor	04-Dec-17	1	1	1	1	1	1	1	1
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
672	Public concern re: emergency preparedness or waste management plans delays Project	EVENT: The risk is that current public concerns regarding emergency preparedness/response plans could impact Refurbishment Project. CAUSE: The failure to move forward with waste management plans (e.g. DGR, or NWMO used fuel repository) for refurbishment and continued operations. IMPACT: This could delay Refurbishment execution.	3	Active	Gary Rose	Scott Berry	22-Feb-17	Monitor	04-Dec-17	1	1	1	1	1	1	1	1
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 08-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
683	Poor EPC Vendor performance has required additional oversight during all phases, resulting in an increase in staff costs in OPG	Event: Poor Vendor Performance creates the requirement for increased Vendor Oversight. Cause: Based on the experience of the past three CANDU refurbishments and the Prerequisite work on DRNU2 the Owner has had to become significantly involved in all phases (Definition through Execution) due to the Vendor's inability to meet contractual commitments on cost, schedule and quality. This has required the Owner to build an oversight organization capable of supporting/directing the planning, execution and technical supervision of the work. Impact: Current RQE forecast of OPG oversight manpower/cost assumes the EPC contractors for DNR will have the required capabilities to meet the contractual commitments on safety, quality, cost and schedule. Should the OPEX repeat itself on DNR then significant schedule impact could occur and considerable qualified oversight resources would be required.	3	Active	Ken Hobbs	Peter Robson	21-Feb-17	Mitigate	15-Aug-19	4	3	4	16	1	2	2	2

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
1457	In Progress	Risk Action 683	Scale the Construction Oversight Group with the required quantity of specialists (Engineering/Procurement, Facilitators/coordinators, welding, NDE, Quality and safety) outside of the project teams to ensure both objectivity of oversight and provide the needed support/guidance to the vendros. These refurbishment experienced specialists and support staff may not reside within OPG. This strategy will be more cost effective and scalable than building up the individual project teams.	Ken Hobbs	Peter Robson	15-Aug-19	Construction Oversight Group has been established with resource level and organizational make up approved. Required specialists, FME, Hoisting and Rigging, Pressure Boundary, Electrical, etc. Specific Construction Oversight qualification has been developed and implemented. Current organization will be tested through the 5 RTE Projects schedule for 2016 prior to breaker open. Lessons Learned will be incorperated prior to U2 breaker open. Lessons learned and self assessments are now in progress on some of the RTE test Projects. Follow up a/r's to be identified. The Construction Organization is adding additional resources to ensure the correct level of oversight can be applied. Current staffing of Construction Oversight is 70% complete to Maximum level.

Outage Window	Window Description
000	000 – No Window Related

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
762	Key skilled craft resources not available when required for Units 3, 1, 4 Execution	Event: Resources unavailable in the Union Halls Cause: Bruce Power Refurbishment or other large mega Projects are started in Canada, the price of Oil Increases Impact: Schedule and Cost Impact to the Refurbishment Project. Refurbishment Project Contractors will be unable to secure the number of required key skilled craft resources for Units 3, 1 and 4 Execution like boilermakers, pipefitters, welders, millwrights and electricians as a result of attrition in the trades and other mega-project opportunities which may lead to schedule delays and cost overruns.	1	Active	Ken Hobbs	Andy Forsyth	21-Feb-17	Mitigate	16-Oct-26	4	3	4	16	3	3	3	9

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
1449	In Progress	Risk Action (Re Risk 0002 & 762)	Part One: Evaluation of tactics and development of an Action Plan aligned with owners strategy to minimize the risk of skilled craft shortages. The tactics evaluated will inlude both short term approaches (i.e. temporary foreign workers) and longer term solutions (i.e. outreach to schools, apprentices, targeting underrepresented groups). Part Two: Work with BuildForce Canada and other owners on strategies to address construction and maintenance workforce challenges.	Ken Hobbs	Andy Forsyth	15-Aug-19	• Ongoing assessments, of resources, planned right up to breaker open on first unit. •Overall action plan NK38-PLAN-09701-10231 issued in Asset Suite on Nov 20th,2014 • Build force refresh in 2016 • Increase apprentice number of Aug staff by min. 20% NK38-PLAN-09701-10231 to be refreshed. EPSCA Buildforce analysis will support this initiative. Update 2016-07-13. Buildforce have provided a cost estimate to EPSCA for the 2016 Analysis as of this date. EPSCA review in Progress. Robin Granger, Aug 5th. Followed up with EPSCA and they are still reviewing Estimate.

762	Key skilled craft resources not available when required for Units 3, 1, 4 Execution	Event: Resources unavailable in the Union Halls Cause: Bruce Power Refurbishment or other large mega Projects are started in Canada, the price of Oil Increases Impact: Schedule and Cost Impact to the Refurbishment Project. Refurbishment Project Contractors will be unable to secure the number of required key skilled craft resources for Units 3, 1 and 4 Execution like boilermakers, pipefitters, welders, millwrights and electricians as a result of attrition in the trades and other mega-project opportunities which may lead to schedule delays and cost overruns.	6286	In Progress	Resouce Planning for Units 3, 1, 4.	Evaluation of tactics and aligned with owners strategy to minimize the risk of skilled craft shortages. The tactics evaluated will inlude both short term approaches (i.e. temporary foreign workers) and longer term solutions (i.e. outreach to schools, apprentices, targeting underrepresented groups). Process is similar to Action 1449 but for Units 3,1,4.	Ken Hobbs	Andy Forsyth	30-Jun-23	• Ongoing assessments of resources planned right up to breaker open on last unit, Unit 4. •Overall action plan NK38-PLAN-09701-10231 issued in Asset Suite on Nov 20th,2014 Robin Granger Aug 5th. Action 1449 Updated re EPSCA reviewing Buildforce Estimate as of August 5th.
			Outage Window		**Window Description**						
			000		000 – No Window Related						
814	EHS and other Vault Projects - Radiography Cannot be Completed on Schedule Due to Critical Path Work (windows 104)	EVENT: The risk is that non-destructive examination (NDE), in the form of radiography, cannot be completed on schedule to verify nuclear class piping welds due to potential critical path impacts. Radiography is a high rad hazard and requires evacuation of the vault which may not be feasible due to critical path work completed by the JV. This will lead to schedule impacts for the Emergency Heat Sink (EHS) project, valve rehabilitation, valve PM's, and other projects to find time to complete radiography NDE. CAUSE: Using traditional methods for radiography requires vault evacuation. IMPACT: The potential impact as a result of vault evacuation is a delay to critical path work; all staff to exit the vault. The current known scope of weld to be radiographed is approximately 185 welds in the vault. Per SCR N-2016-02304 it was raised that radiography may not be allowed to be performed in the vault, to prevent impacts to critical path work being performed by the JV. Per June 21/16 CCB meeting - implementation of PAUT for non-BoP projects (such as LRVs, STOP, D2O sample lines) may require contingency funding from program contingency. Funding for BoP related PAUT will first come from BoP bundle contingency before any program funding request is made (if required).	3	Active	Michael Allen	Kristopher Probodiak	01-Mar-17	Mitigate	31-May-17	5	1	3	15	3	1	2	6
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**						

814	EHS and other Vault Projects - Radiography Cannot be Completed on Schedule Due to Critical Path Work (windows 104)	EVENT: The risk is that non-destructive examination (NDE), in the form of radiography, cannot be completed on schedule to verify nuclear class piping welds due to potential critical path impacts. Radiography is a high rad hazard and requires evacuation of the vault which may not be feasible due to critical path work completed by the JV. This will lead to schedule impacts for the Emergency Heat Sink (EHS) project, valve rehabilitation, valve PM's, and other projects to find time to complete radiography NDE. CAUSE: Using traditional methods for radiography requires vault evacuation. IMPACT: The potential impact as a result of vault evacuation is a delay to critical path work; all staff to exit the vault. The current known scope of weld to be radiographed is approximately 185 welds in the vault. Per SCR N-2016-02304 it was raised that radiography may not be allowed to be performed in the vault, to prevent impacts to critical path work being performed by the JV. Per June 21/16 CCB meeting - implementation of PAUT for non-BoP projects (such as LRVs, STOP, D2O sample lines) may require contingency funding from program contingency. Funding for BoP related PAUT will first come from BoP bundle contingency before any program funding request is made (if required).	**3436**	In Progress	Alternate NDE Required: Radiography Cannot be Performed inside the Vault	Currently identified ~82 piping welds inside the vault (excluding feeders). the balance of plant and P&M scope is listed below. The action is to develop a path forward for an alternative to conventional radiography and implement these alternatives. Note: Action due date is tied to completion of first occurrence of alternate RT methods. Project # Project Name Applicable Window Start of Welding NDE Locations 73202 NR TS0100-2: ECT INSPECT BLEED COOLER 2-33320-HX2 (Cont'g ONLY) 105 Sept 2017 2 73648 NR DSR SI0050-1 EMERGENCY HEAT SINK MECH 2-33410-L124 105 May 2017 22 73380 DR SIO Shield Tank Over Press Protection (STOP) 105 1-Aug-18 5 73763 REPLACE 2-33330-PV1 VALVE BODY 105 7-Sep-17 2 38349 Spectacle Flange Replacements TBD August, 2017 10 38933 DN PHT LRV Modifications (Waterhammer) 31 June, 2017 35 73407 Check Valve Replacements (NV23, 24, 61, 36) 105	Scott Guthrie	Kristopher Probodiak	31-May-17	March 1, 2017 Small Controlled Area Radiography and Pulsed X-Ray are currently available options and alternatives to conventional radiography. Actions are in place to enable projects. Safety, Quality, Schedule, etc. are being addressed and reported on regularly at the project issues meeting. Funding has been made available to have IMS support the initiative and provide QA oversight, RP planning, etc. Refer to issue 294 for regular updates. first occurrence of SCAR is expected in May 2017 pending any project schedule changes. ***OLD Status Updates prior to Feb 2017***** all work groups/ projects to id their vault radiography requirements to Dennis. Boyd - requested to determine other if other "non-radiography" technologies avail. Jan 15th, 2015: Did discuss this with vendors (ES Fox and AMEC) and we have a path forward to determine radiography amounts (still unknown as piping modelling is underway), I'll get you detailed drawings when the modelling is done. 4Feb2015 note: all in vault projects to strive to not have to radiograph. As JV is working 6x10h: Sunday will be "radiography day". 28Apr2015 note: unkown currently how much radiography is required...this will be known better as design progresses. Due date pushed to EHS 40% design complete date for follow up. Vendor looking into other forms of NDE for pipe welds. 4-Sept-2015 Update: Will confirm amount of NDE through assessing/work planning phase. 3-Feb-2016: it was recently raised in the vault window meeting that radiography may not be allowed. This will affect multiple projects in the vault project window that require radiography. Other means of NDE is being investigated. 5-Apr-2016: This action is going to be canceled once a new action is generated and linked to a Program Risk, instead of Project Risk. The new action will be noted before this action is closed. Updates: Contacted IMS to investigate Phased Array option as an alternative. IMS to deliver proposal to BOP. 22 June 2016 (J.Stopar): This Proj

						20-Feb-18 4 73750 Valve PMs - 2-32110-NV37 TBD 17-Jul-18 2															
			Outage Window		**Window Description**																
			104		104 - Post Feeder Vault Projects																
			105		105 - Vault Projects After Feeder Removal																
887	Vendor CWP's are late and/or of poor quality impacting field execution with delays, cost over	Event: Vendor CWPs are late and/or poor quality. Cause: Late and/or of poor quality completion of detailed engineering, lack of qualified resources to prepare and review CWP's, lack of a defined detailed managed CWP process and not adhering to the managed CWP process. Impact: CWP revisions/rework will be required, Poor quality CWP leads to potential delays during execution, impact quality of maintenance.	1	Active	Ken Hobbs	Tom Lance	22-Feb-17	Mitigate	15-Aug-19	4	3	3	12	1	1	2	2				
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**											
			1699	In Progress	Risk Action	The following mitigation actions must be implemented on each scope bundle by each of the OPG PM's:Ensure the vendor detailed design completion milestones are established taking into account the duration of preparing the CWP's while adhering to the CWP managed process.Ensure the vendors have a defined and detailed CWP managed process.Ensure the vendor adheres to the approved CWP managed process through strategic and routine OS.Ensure the vendor has both quantity and quality of resources to prepare and review the CWP'sEnsure the vendor CWP managed process incorporates field walkdowns of the work area and equipment and that this process is followed.Ensure the vendor involves BTU field supervision in the preparation and review of CWP's.	Ken Hobbs	Tom Lance	15-Aug-19	All Vendors have established CWP Program in place, OPG has issued a CWP Guideline to help Vendors develop programs. All Vendor CWPs require review and acceptance of OPG through Operational and Technical reviews as the initial look for quality of packages. Even though the assessments are late and being done in two phases with the final phase due in Sept. 2016 the quality checks are still covered through the use of the Look Ahead Teams to review CWPs/Work Instructions through , Construction Readiness Reviews and Execution Phase Challenge/Walk down. Risk action also in place to document process for CWP tear out to define what is required to be in field to support execution.										
			Outage Window		**Window Description**																
			000		000 – No Window Related																
781	TG-Turbine Generator issues during dynamic testing	EVENT:There is a chance that during the dynamic commissioning of the Turbine Generator we might encounter various issues. The timeline of the dynamic commissioning of the T/G project can also be impacted due to the plant condition, emergent issues. CAUSE: This issues might include but are not limited to various equipment performance issues such as equipment failure and maintenance related failures & software related issues such as software logic malfunctions, dynamic logic and parameter tune up issues. For this event only risks that have the most probability of occurring are considered and does not take under consideration any catastrophic scenarios. Also to complete the dynamic commissioning the plant condition will require steam and all other systems to be in clear status. If a system is unavailable or the plant condition due not allow steam it will impact the timeline of dynamic commissioning IMPACT: This will impact the critical path of the schedule and cost.	1	Active	Michael Allen	Todd Josifovski	23-Feb-17	Mitigate	01-Feb-19	3	2	4	12	2	2	3	6				
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**											
			2225	In Progress	TG Movement of Project Onto Critical Path	1) Incorporating lessons learned from the past and involvement of OEM in development of the commissioning specs.	Todd Josifovski	Peter Moore	01-Jan-18												
			3020	In Progress	Evaluate need for third party review of commissioning specs	Third party review of the commissioning plans prior to the phase; related to Risk #11208.	Peter Moore	Swaroop Puwar	01-May-17	TCD pushed to June 30 to reflect strategy for JV engineering timing/strategy. TCD pushed as per latest update (A Puci June 30, 2016)											
			3021	In Progress	Use of static comissioning to minimize the dynamic commision	Where feasible, static commissioning will be used to minimize the dynamic commission requirements, to the extent possible.	Peter Moore	Arber Puci	15-Dec-18												
			8104	Not Started	TG Perform control FAT testing	The Turbine Generator will conduct Factory Acceptance tests for the new Turbine and Generator digital controls. Factory Acceptance Test to be completed on vendor site and witnessed by OPG.	Peter Moore		28-Apr-17												
			8105	Not Started	TG Full Scope Maintenance simulator	The TG project as part of the scope will be procuring a Full Scope Maintenance simulator. This Full Scope Maintenance simulator will be installed in the MCDF and provide a chance to test the control equipment and fine tune them prior to the dynamic commissioning. This action is to complete the installation of the Full Scope Maintenance simulator	Peter Moore	Soorena Merat	07-Sep-17												

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 08-Mar-17 10:30 PM

781	TG-Turbine Generator issues during dynamic testing	EVENT:There is a chance that during the dynamic commissioning of the Turbine Generator we might encounter various issues. The timeline of the dynamic commissioning of the T/G project can also be impacted due to the plant condition, emergent issues. CAUSE: This issues might include but are not limited to various equipment performance issues such as	8106	In Progress	TG Review PFUP logic	Review the logic and comparing the current logic with the new logic proposed. Accept the vendors proposed PFUP logic and issue the documentation.	Peter Moore	Swaroop Puwar	01-Nov-17										
			Outage Window		**Window Description**														
			095		095 - Run-up & Sync														
784	Refurbishment does not retain key trades and supporting staff	Event: The risk is that refurbishment does not retain key trades and supporting staff through the low demands period between U2 and U3. Cause: Staff go onto other Projects if not able to retain key staff. Impact: will have high impact on re-hiring qualified staff when needed for U3, both Schedule and Costs.	2	Active	Ken Hobbs	William Owens	23-Feb-17	Mitigate	15-Oct-19	3	3	4	12	2	3	3	6	
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**									
			5772	In Progress	Develop contingency plan	Develop contingency plan with several option to mitigate this risk. 1. Review over lapping strategy between U2 and U3 2. Schedule trades into U2/U3 trough 3. Resources sharing with vendor capability 4. Resources sharing with OPG/ Bruce refurbishment programs 5. Training development opportunities 6. New projects that could mitigate risk i.e. marginal mega-watt project	William Owens		15-Aug-17	The next step for this action is to meet with the associated unions and discuss the need to retain critical trades through the trough period and to look ahead at the project portfolio for Darlington and Pickering to identify opportunities for trade relocation. A person will be brought into the execution organisation to assist with developing the contingency plan.								
			Outage Window		**Window Description**														
			000		000 – No Window Related														
855	Office Space Requirements OPG/Vendor in Support of Refurbishment	Event: Insufficient office space requirements to support OPG/Vendor requirements for Refurbishment. Cause: Influx of staff for OPG and Vendor as we approach breaker open. Impact: Increased costs over estimated to support purchase/rental and maintenance of trailers and/or additional office space.	3	Active	Ken Hobbs	Al Acorn	22-Feb-17	Mitigate	30-Jun-17	3	3	1	9	2	2	1	4	
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**									
			7995	In Progress	Risk 855-Insufficient Office Space to Support OPG/Vendor Requirements for Refurbishment	Insufficient Office Requirements to Support OPG/Vendor requirements. Develop a Plan for Darlington Refurbishment and Projects Accommodations.	Ken Hobbs	Al Acorn	30-Jun-17	Draft Terms of Reference has been developed. Level 1 Development in progress to be presented to Darlington Station VP July 8, 2016.									
			Outage Window		**Window Description**														
			000		000 – No Window Related														
881	Added Shift Coverage and/or Overtime Impacting Construction Oversight Availability and Cost	Event: Added Shift Coverage and/or Overtime required to Support Vendor Field Oversight. Cause: Project schedule slippage is causing the Projects to add shifts and use of overtime to recover schedule. Impact: Added Shift Coverage has potential impact to availability to support other oversight activities. Increased use of overtime has impact to cost and also will impact availability of Society Staff for Overtime worked per quarter/per year.	3	Active	Ken Hobbs	Andy Forsyth	22-Feb-17	Mitigate	15-Aug-19	3	3	1	9	2	3	1	6	
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**									
			7905	In Progress	Risk 881-Added Shift Coverage and/or Overtime Impacting Construction Oversight Availability and Cost	Added Shift Coverage and/or Overtime Potentially Impacting Construction Execution Availability and Cost.	Ken Hobbs	Andy Forsyth	15-Aug-19	Monitor Overtime usage per person to determine impact to availability due to hours worked. Added Shift Coverage and/or Overtime will have impact to budget for both Society and augmented staff.									
			Outage Window		**Window Description**														
			000		000 – No Window Related														
550	Significant contractor event occurs	Event: The risk is that project related High Maximum Reasonable Potential for Harm (High-MRPH) events. Cause: Poor execution of work practices. Impact: Negative effect on the project schedule and result in financial loss..	1	Active	Ken Hobbs	Tom Lance	23-Feb-17	Mitigate	15-Aug-19	2	1	3	6	1	1	2	2	
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**									
			1290	In Progress	Risk 550-High MRPH Event Impact	High MRPH Event causes schedule and financial impact.	Ken Hobbs	Tom Lance	15-Aug-19	Risk Response Strategy-Mitigate: Construction Execution Oversight to ensure safety and quality of Construction by monitoring behaviors and coaching Vendor Supervision in proper practices. Oversight Plans identify critical activities and oversight requirements for high risk activities and supporting by Risk Matrix to mitigate the risks. Vendor Supervisors are having additional training to understand what good looks like for Leadership Training, Pre Job Planning, bolted joint as examples.									
			Outage Window		**Window Description**														
			000		000 – No Window Related														

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 08-Mar-17 10:30 PM

783	Estimated Cost of General Services contract may be underestimated	Event: The risk is that Estimated Cost of General Services contract may be underestimated, the current estimate is based on third party estimate but vendor bids could be higher. Cause: If bids for General Services Contract exceeds the estimate which was based on third party estimate. Impact: Financial impact as budgeted amount based on estimate.	4	Active	Ken Hobbs	Al Acorn	22-Feb-17	Monitor	31-Oct-17	2	3	1	6	2	3	1	6

Outage Window	Window Description
000	000 – No Window Related

There are no Not Started, In Progress Actions associated with the risk.

888	Significant Hoisting and Rigging Event	Event: Significant Hoisting and Rigging Event. (Recent industry OPEX, such as the fatality at Arkansas One NGS, identifies a need to apply extensive rigor and detail in the critical lift program.) Cause: Improper Hoisting and Rigging techniques causes rigging failure. Impact: Rigging failure could result in personnel injury, death, or sever damage to plant structure and/or equipment. Impact Schedule and Cost.	3	Active	Ken Hobbs	Pieter Den Decker	23-Feb-17	Mitigate	15-Aug-19	1	5	5	5	1	5	5	5

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
8461	In Progress	Risk 888-Significant Hoisting and Rigging Event	Mitigation Plan: 1. All Critical Lift Plans are reviewed by Vendors Engineering and Safety and subsequently accepted by OPG Civil Engineering and Conventional Safety. The Hoisting and Rigging SME will do a final review and approval for use to ensure proper rigor built into lift plans. 2. Complex Lift Plans require Engineering Review will be reviewed by Vendors Engineering and subsequently accepted by OPG Civil Engineering. 3. Rigging from plant structures other then designated lift points or cranes will be reviewed and approved by OPG Civil Engineering. 4. Hoisting and Rigging SME will provide continues support to Vendors during development of lift plans and will assist when field circumstances require changes. 5. Construction Execution Hoisting and Rigging SME provided Desk Top exercise/training with Vendors on Lift Plan requirements. 6. Safe Work Plans reviewed by Safety Department. 7. Vendor Supervisory Training Module development in progress for Safe Work Planning. 8. Hoisting and Rigging requirements are reviewed by Look Ahead Team at T-6 to T-3 Months and T-4 Week Execution Walk down. 9. Critical lifts are identified as a critical activity during execution and is built into Construction Execution Oversight Plan for Vendors and Risk Matrix with mitigating actions. 10. Hoisting and Rigging SME has field presence during lifts.	Ken Hobbs	Pieter Den Decker	15-Aug-19	1. All Critical Lift Plans are reviewed by Vendors Engineering and Safety and subsequently accepted by OPG Civil Engineering and Conventional Safety. The Hoisting and Rigging SME will do a final review and approval for use to ensure proper rigor built into lift plans. 2. Complex Lift Plans require Engineering Review will be reviewed by Vendors Engineering and subsequently accepted by OPG Civil Engineering. 3. Rigging from plant structures other then designated lift points or cranes will be reviewed and approved by OPG Civil Engineering. 4. Hoisting and Rigging SME will provide continues support to Vendors during development of lift plans and will assist when field circumstances require changes. 5. Construction Execution Hoisting and Rigging SME provided Desk Top exercise/training with Vendors on Lift Plan requirements. 6. Safe Work Plans reviewed by Safety Department. 7. Vendor Supervisory Training Module development in progress for Safe Work Planning. 8. Hoisting and Rigging requirements are reviewed by Look Ahead Team at T-6 to T-3 Months and T-4 Week Execution Walk down. 9. Critical lifts are identified as a critical activity during execution and is built into Construction Execution Oversight Plan for Vendors and Risk Matrix with mitigating actions. 10. Hoisting and Rigging SME has field presence during lifts.

Outage Window	Window Description
000	000 – No Window Related

685	U2 Containment Isolation schedule extension due to Fuel Handling operations on operating units. [window 23]	Event: The critical path isolation of the NR unit from containment (bulkhead installation), and subsequent removal post fuel channel and feeder replacement, may extend beyond scheduled windows. Cause: Critical path containment isolation activities can only be completed during no-fueling windows. The frequency/availability and duration of no-fueling windows is determined by operating unit zone levels, trolley reliability and required trolley maintenance. Impact: If no fueling windows are shortened or do not occur per plan, critical path schedule delays will result as well as cost overruns due to crew standby time. Reasons for no fueling windows not occurring as planned could include unit zone conditions and trolley reliability.	2	Active	Michael Allen	Bert Boston	30-Nov-16	Monitor	31-Oct-16	1	1	4	4	1	1	4	4

Outage Window	Window Description
000	000 – No Window Related
014	014 - Containment Mod Commissioning
017	017 - Install ATP and End Fitting Caps - FM Carriage
023	023 - Install Bulkheads
024	024 - Containment Pre Test, Achieve Dew Point & Containment Test
025	025 - Install Bulkhead Shielding

685 — U2 Containment Isolation schedule extension due to Fuel Handling operations on operating units.

Event: The critical path isolation of the NR unit from containment (bulkhead installation), and subsequent removal post fuel channel and feeder replacement, may extend beyond scheduled windows. Cause: Critical path containment isolation

Outage Window	Window Description
085	085 - AL Closed, Shielding Removal & Pressure Test
088	088 - Bulkhead Removal

There are no Not Started, In Progress Actions associated with the risk.

782 — Vendor Default

EVENT: a major NR vendor becomes unwilling or unable to execute the work they have been contracted to perform CAUSE: may be many causes such as bankruptcy, labour issues, corporate change in direction, etc IMPACT: need to secure a new qualified vendor to perform the scope of work which will impact schedule and cost The risk is that a major NR vendor becomes unwilling or unable to execute the work they have been contracted to perform, resulting in a need to secure a new qualified vendor to perform the scope of work.

	Status											
	Active	Roy Martin	Carol Gregoris	14-Oct-16	Accept	31-Dec-19	1	4	1	4	1	4	1	4

Outage Window	Window Description
000	000 – No Window Related

There are no Not Started, In Progress Actions associated with the risk.

2 — Key skilled craft resources not available when required for Unit 2 Execution

Event: Refurbishment Project Contractors will be unable to secure the number of required key skilled craft resources for unit 2 Execution like boilermakers, pipefitters, welders, millwrights and electricians. Cause: As a result of attrition in the trades and other mega-project opportunities. Impact: Would lead to schedule delays and cost overruns.

	Status											
1	Active	Ken Hobbs	Andy Forsyth	21-Feb-17	Mitigate	15-Aug-19	1	1	2	2	1	1	2	2

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
1449	In Progress	Risk Action (Re Risk 0002 & 762)	Part One: Evaluation of tactics and development of an Action Plan aligned with owners strategy to minimize the risk of skilled craft shortages. The tactics evaluated will inlude both short term approaches (i.e. temporary foreign workers) and longer term solutions (i.e. outreach to schools, apprentices, targeting underrepresented groups). Part Two: Work with BuildForce Canada and other owners on strategies to address construction and maintenance workforce challenges.	Ken Hobbs	Andy Forsyth	15-Aug-19	• Ongoing assessments, of resources, planned right up to breaker open on first unit. •Overall action plan NK38-PLAN-09701-10231 issued in Asset Suite on Nov 20th,2014 • Build force refresh in 2016 • Increase apprentice number of Aug staff by min. 20% NK38-PLAN-09701-10231 to be refreshed. EPSCA Buildforce analysis will support this initiative. Update 2016-07-13. Buildforce have provided a cost estimate to EPSCA for the 2016 Analysis as of this date. EPSCA review in Progress. Robin Granger, Aug 5th. Followed up with EPSCA and they are still reviewing Estimate.

Outage Window	Window Description
042	042 - Feeder Removal

684 — Primary Side Clean Adverse Impact to SG Tube Integrity

EVENT: SG tube thinning beyond allowable limits. CAUST: Primary Side Clean (magnetite removal process) could potentially remove tube wall material. IMPACT (from highest to lowest probability): 1. SG tube thinningcould result in the need for additional tube plugging which would extend the PSC execution window. 2. Depending on the amount of tube plugging needed, the station may need to de-rate the unit. 3. In the unlikely event that the tube damage is so severe that de-rating the unit is not ecomincally viable, complete SG replacement may be required.

	Status											
2	Active	Michael Allen	Pejman Asgaripour	21-Feb-17	Mitigate	01-Nov-18	1	2	2	2	1	1	2	2

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
1731	In Progress	Review PSC OPEX regarding Primary Side Clean Adverse Impact to SG Tube Integrity prior to execution window (T-6month)	Review PSC OPEX regarding Primary Side Clean Adverse Impact to SG Tube Integrity prior to execution window (T-6month)	Pejman Asgaripour	Mike Lutz	23-Aug-17	As pre req to this action, optimization will include extended duration tests to ensure visible wear is produced. Visible wear will clearly identify how process parameter adjustments affect tube wear, allowing verification of future decisions that may occur(ie increase execution blast duration). future operating pressures will be within the bounds of qualification completed in 2009. Review OPEX with EPC vendor following PSC campaign in Cernavoda in Q2 2016.

Outage Window	Window Description
062	062 - Primary Side SG Clean and Inspect

755 — Vendor Purchased or Owner Supplied Materials not arriving in time to support the NR Execution Schedule

EVENT: The risk is that vendor purchased or owner supplied materials not arriving in time to support the NR execution CAUSE: This may be due to lack of vendor capability or due to invisibility on the status and progress of procurements materials for each or of the bundles IMPACT: May lead to NR projects suffering schedule delay and increased cost.

	Status											
3	Active	Michael Allen	Sean Toohey	21-Feb-17	Monitor	31-Oct-16	1	1	2	2	1	1	2	2

Outage Window	Window Description
000	000 – No Window Related

There are no Not Started, In Progress Actions associated with the risk.

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 08-Mar-17 10:30 PM

778	D2O Cost Overrun	Event: NR will not have sufficient storage space for D2O from HTS Drain and Dry, and Moderator Drain. Cause: D20 project schedule extends due to field execution issues, vendor on boarding issues, and discovery work Impact: NR has to make alternative arrangement to store Heavy Water while D2O Heavy Water storage facility unavailable, shipping containers/drums to Pickering site or even Bruce Power site.	4	Active	Michael Allen	Gary Rose	22-Feb-17	Monitor	31-Oct-17	3	1	3	9	3	1	3	9
			Outage Window		**Window Description**															
			013		013 - PHT Bulk Drain (Includes V42 Mod)															
			There are no Not Started, In Progress Actions associated with the risk.																	
825	Fresh Fuel Start up Anomalies	The risk is that anomalies associated with fresh fuel are encountered on Unit 2 startup due to discovery issues around low power testing and power monitoring component resulting in cost increase/schedule delay or safety risk during start up evolution.	1	Active	Michael Allen	Gerry Martin	17-Feb-17	Monitor	14-Jan-19	2	2	2	4	1	1	2	2
			Outage Window		**Window Description**															
			133		133 - RTS Segment PMs & Miscellaneous Work															
			There are no Not Started, In Progress Actions associated with the risk.																	
Program: Refurbishment Execution - 73113																				
890	Feeder fabrication schedule delay as a result of flow element (I690) weldability challenges. [Window 076 , 083]	[Execution Phase] JV Risk ID: 8.135 Event: There is a risk of delays to feeder fabrication schedule. Cause: Flow Element and Pressure Breakdown Orifices material has been changed to Inconel 690 from Inconel 600 per DRAS 584. Challenges associated with dissimilar metal welding procedures development and qualification for Inconel 690 using filler metal 52M are expected. Impact: Potential delay to critical path due to late arrival of upper feeders.	2	Active	Michael Allen	Roy Brown	28-Feb-17	Mitigate	01-May-17	3	1	4	12	3	1	4	12
			Outage Window		**Window Description**															
			076		076 - Upper Feeder Installation															
			083		083 - Lower Feeder Installation															
			There are no Not Started, In Progress Actions associated with the risk.																	

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
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Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
Project: Specialized Projects - 73310																	
11982	Delay In Contracting Process Impacting SDS Project Schedule [Window 7]	Event: Delay in material availability. Cause: Delay in SDS procurement contract issuance results in a delay of material availability for installation. Impact: Cost and schedule of the project would be impacted if materials were unavailable on time.	4	Active	Sorin Marinescu	Dale Schnedler	02-Mar-17	Mitigate	31-Dec-17	2	1	4	8	2	1	4	8

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
2713	In Progress	Expedite new contract process	Hold regular periodic meetings are held with Supply Chain to review the status and expedite pending contracts until all Project contracts have been issued.	Sorin Marinescu	P Sharawy	31-Dec-17	Update June 6, 2016 - Action date changed to correspond to the date currently scheduled for issuing the last production Purchase Order for the SDS Computers Replacement Project, including the operational spare parts for the SDS2 Trip Computers. This Purchase Order is scheduled after completion of the Hardware Qualification Tests of the system in order to ensure a complete list of spare parts has been compiled. Regular periodic meetings are held with Supply Chain to review the status and expedite pending contracts. As a result, a number of contracts have been issued. This level of oversight will continue as required. All the other contracts, including service and cables (regarding to 3220) We may still need to exercise and expedite hiring of resources for installation - 31-Jun-2017

Outage Window	Window Description
007	007 - SDS1 & SDS2 Mods & Rehab

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
12323	Hardware Delivery Delay Impacting SDS Software Integration [Work Window 7]	Event: Hardware delivery is late reducing the time available to integrate hardware components with avilable software. Cause: The late issuance of hardware contracts squeezes the equipment supplliers reducing their available float and their ability to handle unexpected changes. Impact: This risk would cause a significant schedule impact which would in turn impact cost.	1	Active	Sorin Marinescu	Dale Schnedler	02-Mar-17	Monitor	31-Dec-17	2	1	3	6	2	1	3	6

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
2713	In Progress	Expedite new contract process	Hold regular periodic meetings are held with Supply Chain to review the status and expedite pending contracts until all Project contracts have been issued.	Sorin Marinescu	P Sharawy	31-Dec-17	Update June 6, 2016 - Action date changed to correspond to the date currently scheduled for issuing the last production Purchase Order for the SDS Computers Replacement Project, including the operational spare parts for the SDS2 Trip Computers. This Purchase Order is scheduled after completion of the Hardware Qualification Tests of the system in order to ensure a complete list of spare parts has been compiled. Regular periodic meetings are held with Supply Chain to review the status and expedite pending contracts. As a result, a number of contracts have been issued. This level of oversight will continue as required. All the other contracts, including service and cables (regarding to 3220) We may still need to exercise and expedite hiring of resources for installation - 31-Jun-2017

Outage Window	Window Description
007	007 - SDS1 & SDS2 Mods & Rehab

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current Probability	Current Financial	Current Schedule	Current Score	Post Probability	Post Financial	Post Schedule	Post Score
13463	SDS Interface Compatibility Issues Discovered During Installation [Window 7]	Event: SDS computer compatibility issues during installation. Cause: The system will be thoroughly tested prior to installation under simulated conditions but some conditions (Ispecifically driving actual field solenoid valves) cannot be simulated and therefore must be tested in the field. Impact: Both cost and schedule would be impacted by the interface compatibility issues if they arise.	1	Active	Sorin Marinescu	Dale Schnedler	02-Mar-17	Accept	30-Jun-18	2	1	3	6	1	1	3	3
			Outage Window		**Window Description**												
			007		007 - SDS1 & SDS2 Mods & Rehab												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
12327	SDS Computer Project Failure to Meet Hardware Design Requirements [Window 7]	Event: The system as designed fails to meet design requirements during design testing and qualification. Cause: Latent design flaws. Impact: Both cost and schedule could be impacted due to substantial rework being required.	1	Active	Sorin Marinescu	Dale Schnedler	02-Mar-17	Monitor	31-Dec-17	1	1	4	4	1	1	4	4
			Outage Window		**Window Description**												
			007		007 - SDS1 & SDS2 Mods & Rehab												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
14511	SDS Computer Qualified Resources Unavailable During Execution [Window 5,7,12]	EVENT: Delay due to a reassignment of SDS execution resources CAUSE: The resources currently assigned per the current SDS execution resourcing strategy are unavailable, requiring the contracting of resources less familiar with the site, system and scope of work and resulting in a delay to the schedule. IMPACT: Schedule is pushed resulting in a cost impact to the project because the work cannot be completed as planned.		Active	Ivan Dimitrov	Dale Schnedler	02-Mar-17	Mitigate	31-Dec-17	1	1	4	4	1	1	4	4
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			7761	In Progress	SDS Computers Resourcing Follow Up	Follow up with Darlington Projects and Control Maintenance to ensure that SDS qualified resources are available to support installation of the replacement SDS Computers. Develop and document a resource strategy for execution.	Ivan Dimitrov	P Sharawy	30-Jul-17	Work in this area has progressed as follows. · Breakdown of BTU and PWU installation effort provided and approved in accordance with CPAA in October, 2016. · Follow up meeting with Darlington Projects and Control Maintenance (Refurbishment) to review scope, effort and resource requirements in October, 2016. · Follow up meeting with Control Maintenance Darlington to review scope, effort and resource needs in December, 2016. · There is still a risk that sufficient SDS qualified resources would not be available to support installation. Need to confirm availability closer to installation				
			Outage Window		**Window Description**												
			007		007 - SDS1 & SDS2 Mods & Rehab												
12328	SDS Computer Project Grounding Problem [Window 7]	Event: SDS Computer grounding discovered during install. Cause: Grounding has been an issue in past computer system installations therefore there is a risk tha the same issue will arise with the installation of the new equipment. Impact: Both cost and schedule ofthe project would be impacted.	1	Active	Sorin Marinescu	Dale Schnedler	02-Mar-17	Monitor	30-Jun-18	1	1	3	3	1	1	3	3
			Outage Window		**Window Description**												
			007		007 - SDS1 & SDS2 Mods & Rehab												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
13464	SDS Equipment Fails During Installation [Window 7]	Event: SDS Equipment fails during or before installation. Cause: All SDS computer components are being prcured at the same time therefore, by the time the parts are installed for U4 refrubishmnet they will have been in storage for 7 years creating a risk that they will fail when installed. Impact: The failure of the equipment will have an impact on both cost and schedule as replacement components will have to be procured and installed.	2	Active	Sorin Marinescu	Dale Schnedler	02-Mar-17	Mitigate	30-Jun-18	1	1	3	3	1	1	3	3
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			5194	In Progress	Spare part purchases for vulnerable components	Confirm and order spares for vulnerable components.	Sorin Marinescu	P Sharawy	31-Dec-17	Update June 6, 2016 - Action date changed to correspond to the date currently scheduled for issuing the last production Purchase Order for the SDS Computers Replacement Project, including the operational spare parts for the SDS2 Trip Computers. This Purchase Order is scheduled after completion of the Hardware Qualification Tests of the system in order to ensure a complete list of spare parts has been compiled. Spares must be ordered before AFS - 3-Jun-2017				

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
13464	SDS Equipment Fails During Installation [Window 7]	Event: SDS Equipment fails during or before installation. Cause: All SDS computer components are being prcured at the same time therefore, by the time the parts are installed for U4 refrubi	**Outage Window**		**Window Description**												
			007		007 - SDS1 & SDS2 Mods & Rehab												

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

Report ID: 0707A *Tech Tips*
Report Owner: L. Greenland
Process Owner: L. Ren
Data Refreshed: 07-Mar-17 10:30 PM

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
785	Inadequate schedule detail and work instructions to support the schedule development milestones	Event: Inadequate schedule detail and task development prevents building an accurate detailed schedule. Cause: Many milestones leading to REV 0 issued were missed and pushed beyond their original completion dates. Impact: The schedule will not reflect the true requirement's of the project and could result in work execution slippage or poor work coordination.		Active	Andrew Negenman		28-Feb-17	Monitor	15-Aug-17	3	1	3	9	3	1	3	9
			Outage Window		**Window Description**												
			000		000 – No Window Related												
			There are no Draft, Not Started, In Progress Actions associated with the risk.														
788	Readiness of non-refurb funded projects for U2 execution	Event: Lack of readiness to execute AISC non refurb projects. Cause: Disengagement from the milestone and project readiness process for refurb, there is no procedural requirement for the AISC projects to demonstrate completion at the refurb milestone dates. Impact: Potential delays to work program and schedule, impact to critical path.		Active	Andrew Negenman		28-Feb-17	Mitigate	01-Jun-17	4	2	2	8	2	1	3	6
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							
			7823	In Progress	Recovery Plan 2070 : AISC projects	Recovery plan written and executed.	Bill Devlin	Joe Walsh	30-Dec-16	Dec 14th, 2016 - No Change Since Nov 28th Nov 28, 2016 updated attachments with latest status sheet although some progress is being seen, problems remain. The Place holder schedules have been accepted, however things have not been kept up to date and vendor's are not updating the schedule. This has been communicated to the Darlington Projects Execution manager per attached email. 10-June-2016 - NRU2 AISC Project Readiness Matrix (Recovery Plan) file updated and attached to the action.							
			Outage Window		**Window Description**												
			104		104 - Post Feeder Vault Projects												
800	HTS RTS Schedule Risk – Hot Conditioning or HTS Filtering with Fuel in Core	EVENT : Potential Impact of Hot Conditioning with Fuel In-Core is the creation of deposits on the fuel, these deposits could impact Fuel Performance, Core Physics, and Safety Analysis CAUSE: Hot Conditioning when performed with fuel in core has resulted in black deposits at other Candu plants post refurbishment. IMPACT: Black deposits on the fuel would be an unanalyzed configuration in the safety report and could delay unit startup significantly. See NK38-REP-03610-10005 Related issue: Fuel failures due to FME can result in unit outages and increased dose. A rigorous FME program combined with filtration with the fuel in core is the current base case. Qualifying the processes is a condition of fitness for service and a prerequisite to loading fuel.	2	Active	Andrew Negenman		28-Feb-17	Monitor	18-Dec-17	2	4	4	8	2	4	4	8
			Action#	**Status**	**Action Title**	**Action Description**	**Owner**	**Delegate**	**Due Date**	**Comments**							

800	HTS RTS Schedule Risk – Hot Conditioning or HTS Filtering with Fuel in Core	EVENT : Potential Impact of Hot Conditioning with Fuel In-Core is the creation of deposits on the fuel, these deposits could impact Fuel Performance, Core Physics, and Safety Analysis CAUSE: Hot Conditioning when performed with fuel in core has resulted in black deposits at other Candu plants post refurbishment. IMPACT: Black deposits on the fuel would be an unanalyzed configuration in the safety report and could delay unit startup significantly. See NK38-REP-03610-10005 Related issue: Fuel failures due to FME can result in unit outages and increased dose. A rigorous FME program combined with filtration with the fuel in core is the current base case. Qualifying the processes is a condition of fitness for service and a prerequisite to loading fuel.	8826	In Progress	Flush Strainer Progress	Level 1 with all the timelines of the mods is required next week. Complete Determine the need date and work backwards. Develop the plan based on backward planning. Complete Review the plan on Friday - Aug.12, 2016. Complete Next deliverable Conceptual Design is Dec 30/216. ***** Updated following Issues Meeting on 06Feb2017 ****** The conceptual design report was issued and accepted from CEI. This item is also being tracked in Issue # 342 1) Schedule SIM for team on the status of the top design options.2) Prepare for an Executive Options Review Board Meeting (March 15)	Steve Goodchild	Mario Campigotto	15-Mar-17	Heat Transport Filtration/Strainer Design: (Prepared by: Andrew Jeffery) 3 Oct 2016 A Heat Transport Filtration/Strainer Design is to be developed to mitigate risk and help protect the fuel and pressure tubes from debris. · Prepare Engineering Needs Document for Heat Transport Filter/Strainer Design (Complete, NK38-NR-REP-33000-00001 issued; ECR 24638 Approved) · Arrange Staffing Resources for HTS RTS Project (Complete) o Interim Project Manager – Ron McKibbon; MTL – Imran Malik; Interim DTL – Ali Azarbad o Additional DTL & PM interviews are on-going · Kick-Off Meeting for HTS RTS Filter/Straining Strategy – Conceptual Design (Complete as scheduled) · Preparation of Needs Document to support Chemical Addition & Monitoring Skid for Hot Conditioning (Delayed for other project support; Revised Target of Oct 10th, Owner – System Eng) · Preparation of Needs Document to support Pressurizing Skid for Operational Leak Test (Delayed for other project support; Revised Target of Oct 10th, Owner – System Eng) · Develop Design EC Level 1 for HTS RTS Modifications (30 SeptemberTBD) · Investigate waste strategy for removed debris, filters, etc (10 October) · Top Priority à Secure contract and initiate Conceptual Design phase (Contract in place: October 21; CDR complete: December 30th o Prepare Sole Source Justification for qualified vendor (MTL, Supply Chain support needed to expedite contract paperwork) o Arrange Supply Chain support (TCD: Oct 6th)

Outage Window	Window Description
082	082 - RTP Removals, Bridge Replacement
089	089 - HTS Air Hold, Fill & Hydrostatic Test
090	090 - HTS Operational Testing
093	093 - Low Power Testing & Heat-up
095	095 - Run-up & Sync
160	160 - RFR-OPG Scope GSS Defuel
170	170 - RFR- Fuel Load
187	187 - RFR-TMOD Reversal prior to Bulkhead Removal

			Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments							
764	Failure to obtain approval for early HTS Fill	Event: Maintaining current U2EE (P50 and P90) is predicated on filling HTS prior to containment restoration. Cause: At the Operational Decision Meeting (ODM) on June 1st, conditional approval (only) was obtained to allow filling the HTS prior to the restoration of the normal containment boundary. Conditions of approval include follow-up nuclear safety analysis and CNSC approval for a minor revision to an OP&P. Impact: Failure to meet these conditions would add approximately 43 days to the lead-out logic for each unit.	2	Active	Andrew Negenman		23-Feb-17	Mitigate	17-May-17	1	1	4	4	1	1	1	1

761	Failure to obtain approval for early HTS Fill	Event: Maintaining current U2EE (P50 and P90) is predicated on filling HTS prior to containment restoration. Cause: At the Operational Decision Meeting (ODM) on June 1st, conditional approval (only) was obtained to allow filling the HTS prior to the restoration of the normal containment boundary. Conditions of approval include follow-up nuclear safety analysis and CNSC approval for a minor revision to an OP&P. Impact: Failure to meet these conditions would add approximately 43 days to the lead-out logic for each unit.	5389	In Progress	Initiate Moderator RD failure scoping analysis.	Initiate preliminary analysis to establish, for the case of an in core LOCA with bursting of calandria (moderator) rupture discs, the consequences of D2O releases from Moderator and PHT systems, taking into account tritium concentrations in both the moderator and PHT, as well as the release of entrained fission products or other radiological contaminants in the released D2O.	Gerry Martin	Jose Torres	31-Mar-17	AMEC contacted to start scoping out analysis, high level analysis plan and cost and time estimate received. Review of documents generated some comments that need to be resolved before work can progress. TCD changed to Jan 15, 2016 to allow for work scope finalization and analysis to be completed. Restart HIT team formed, meetings being held to narrow down the correct questions to ask contractors to complete the analysis. Contract for the analysis is not yet in-place as scope of required analysis and initial conditions are still being developed. action extended till March 30th - Gerry Martin Jan 8th, 2016. Contract being finalized as scope was recently clarified, no firm TCD from signed contract available, action extended till Aug 30, 2016 - Gerry Martin March 24, 2016 Analysis now underway, new TCD set at Nov 30th, 2016 as work was delayed while scope frozen, computer models were created and required inputs were obtained. Gerry Martin Aug 26, 2016 Analysis is still in progress, and not scheduled to be complete until the new year before it can be reviewed and enter the comment disposition cycle, TCD extended till Feb 15, 2017 - Gerry Martin Nov 11, 2017 Analysis is being finalized. GOTHIC Report R00 has gone through one round of comment and dispositions. GOTHIC Report R01 has been issued for review and acceptance. Dose Assessment Memo R0 is going through comment and dispositions. TCD for this action extended until March 31, 2017 to align with the end date of analysis contract - Jose Torres Feb 14, 2017.

761	Failure to obtain approval for early HTS Fill	Event: Maintaining current U2EE (P50 and P90) is predicated on filling HTS prior to containment restoration. Cause: At the Operational Decision Meeting (ODM) on June 1st, conditional approval (only) was obtained to allow filling the HTS prior to the restoration of the normal containment boundary. Conditions of approval include follow-up nuclear safety analysis and CNSC approval for a minor revision to an OP&P. Impact: Failure to meet these conditions would add approximately 43 days to the lead-out logic for each unit.	5390	In Progress	Impact of non-tritium HTS radionuclides	Ensure that spill analysis for the HTS fill scenario includes an assessment of the effect of entrained contaminants or provides a limiting value.	Gerry Martin		17-Apr-17	Analysis for the D2O contingency storage project is being reviewed to determine if that analysis can be used to respond to this action. Quantification of what possible contaminants could be present in the PHT coolant may prove difficult and would need some bounding assumptions. The present analysis assumed dose came from tritium gas escaping the reactor vault, and did not assume any liquids escape. Solid contaminants would not likely escape from the vault as they are heavy, non-soluble and would stay with the liquid, and not exit the RV with the tritium gas. C-14 may be presents, but typically, the dose from tritium is 7 times that from C-14 for scenarios such as this one. TCD extended to Jan 15, 2016 to allow for D2O storage tank work to be completed and finalized - to determine applicability to this situation. Restart HIT team formed, meetings being held to narrow down the correct questions to ask contractors to complete the analysis. Contract for the analysis is not yet in-place as scope of required analysis and initial conditions are still being developed. action extended till March 30th - Gerry Martin Jan 8th, 2016 Contract being finalized as scope was recently clarified, no firm TCD from signed contract available, action extended till Aug 30, 2016 - Gerry Martin March 24, 2016 Analysis now underway, new TCD set at Nov 30th, 2016 as work was delayed while scope frozen, computer models were created and required inputs were obtained - Gerry Martin Aug 26, 2016 Analysis is still in progress, and not scheduled to be complete until the new year before it can be reviewed and enter the comment disposition cycle, TCD extended till Feb 15, 2017 - Gerry Martin Nov 11, 2017 Analysis continues to be in progress, but is taking longer than anticipated. TCD extended till April 17, 2017 - Gerry Martin Feb 17, 2017

761	Failure to obtain approval for early HTS Fill	Event: Maintaining current U2EE (P50 and P90) is predicated on filling HTS prior to containment restoration. Cause: At the Operational Decision Meeting (ODM) on June 1st, conditional approval (only) was obtained to allow filling the HTS prior to the restoration of the normal containment boundary. Conditions of approval include follow-up nuclear safety analysis and CNSC approval for a minor revision to an OP&P. Impact: Failure to meet these conditions would add approximately 43 days to the lead-out logic for each unit.	5391	In Progress	Assessment of spill volume and rate	The analysis is to include an assessment of maximum volume of tritiated D2O that may be released in the event of an accident, the maximum rate of release that may be experienced and the impact of that volume/rate on the proposed release mitigation strategy.	Gerry Martin		17-Apr-17	Assessment of total spill volume is underway and argument to be supported is that there is enought spill capacity containment in the vault that water will not be exiting the RV. TCD extended to Jan 15 2016 due to completing prioirties of Aug 15 design milestone and now DNGD VBO support. Restart HIT team formed, meetings being held to narrow down the correct questions to ask contractors to complete the analysis. Contract for the analysis is not yet in-place as scope of required analysis and initial conditions are still being developed. action extended till March 30th - Gerry Martin Jan 8th, 2016 Contract being finalized as scope was recently clarified, no firm TCD from signed contract available, action extended till Aug 30, 2016 - Gerry Martin March 24, 2016 Analysis now underway, new TCD set at Nov 30th, 2016 as work was delayed while scope frozen, computer models were created and required inputs were obtained. Gerry Martin Aug 26, 2016 Analysis is still in progress, and not scheduled to be complete until the new year before it can be reviewed and enter the comment disposition cycle, TCD extended till Feb 15, 2017 - Gerry Martin Nov 11, 2017 Analysis continues to be in progress, but is taking longer than anticipated. TCD extended till April 17, 2017 - Gerry Martin Feb 17, 2017							
			5392	In Progress	Submit OP&P revision request with supporting analysis to CNSC	Submit safety assessment information as required to support the revision of OP&P to allow HTS to be pressurized while the refurbishment unit is disconnected from Containment.	Gerry Martin		16-Oct-17									
			Outage Window		**Window Description**														
			089		089 - HTS Air Hold, Fill & Hydrostatic Test														
791	Refurbishment project not properly accomodated in the Generation Plan	Event: Outage schedule and planned generation does not currently take into account the shared O&M and vendor support for the outages at PNGS and DNGS. Cause: Refurbishment project reflected on the long range generation plan only as a high level place keeper. Impact: Potential unnavailability of critical resoruces or vendors during peak demands due to scheduled overlaps.	4	Active	Andrew Negenman		28-Feb-17	Monitor	31-Mar-17	2	1	2	4	2	2	1	4		
			Outage Window		**Window Description**														
			000		000 – No Window Related														
			There are no Draft, Not Started, In Progress Actions associated with the risk.																
798	Higher Than Expected CSA Demand for U134	Event: Assumptions about CSA demands for Units 134 are lower than potentially required. Cause: RQE reflects requirement for 8.5 CSA's post 2018. This is due to an assumption that demand will drop after unit 2. Impact: Inability to support units 134 with the same # of CSA's required for Unit 2. 11 CSA's were required to support the prereq and execution readiness preparedness work on unit 2, this was documented in CCF 812.	1	Active	Karen Fritz	Vijay Santhanam	10-Feb-17	Monitor	31-Mar-17	2	2	1	4	2	2	1	4		
			Outage Window		**Window Description**														
			000		000 – No Window Related														
			There are no Draft, Not Started, In Progress Actions associated with the risk.																
810	Data Integrity resources and oversight insufficient to meet the extensive needs of maintaining data integrity of IDB.	Event: Many data sources compound data gathering and reporting ease for refurb. Cause: IDB pulls from 22 separate databases to bring the data into one central place for the purposes of producing reports and metrics. Impact: Inaccurate reporting on status and progress of outage, this includes trending and tracking.	4	Active	Karen Fritz	Ron Hall	13-Feb-17	Monitor	19-Apr-17	2	2	2	4	2	2	2	4		
			Outage Window		**Window Description**														
			000		000 – No Window Related														
			There are no Draft, Not Started, In Progress Actions associated with the risk.																

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776	Critical path Impact of HTS Pump Motor Changeout	Event: PHT motor lifts over the vault, motors must be removed and replaced during refurb outage. Cause: Weight of motor exceeds safe load level above the vault while workers are in the room. Impact: Potential delays to critical path, clearing the vault and stopping RFR work while lifts are in progress.	3	Active	Andrew Negenman	Barry King	10-Feb-17	Monitor	31-Mar-17	2	1	1	2	2	1	1	2

Outage Window	Window Description
022	022 - Remove PHT Pump Motors

There are no Draft, Not Started, In Progress Actions associated with the risk.

ONTARIO POWER GENERATION

Risk Report by Project with Associated Actions

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										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
561	Availability and Retention of Project Leadership	Risk pertains to securing and retaining project management leadership talent which could impact on our ability to execute Refurbishment.	3	Active	Candice Kay		24-Feb-17	Mitigate	29-Sep-17	3	3	3	9	3	3	3	9

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
3306	In Progress	PPR Health & Development Planning 4.4	Knowledge Management Transfer development planning - critical for ongoing success	Candice Kay		29-Sep-17	· PPR for 2017 to be aligned with Project Excellence goals - cascade to all staff. · Staffing Plan to be approved/finalized · Project Management Capability Builder - Plan in place as per Project Management Peer Team
9523	In Progress	Longevity Strategy	The project is 10 plus years and during this time we will lose critical leaders. Complete the following tasks: Redesign organization to provide ability to sustain work and to transfer knowledge. Launch PMCD to create future leaders. PDIT - Project Director In Training - to secure & retain future leaders.	Candice Kay		30-Jun-17	Redesign organization to provide ability to sustain work and to transfer knowledge. Launch PMCD to create future leaders. PDIT - Project Director In Training - to secure & retain future leaders. Targeted external hiring for key leadership roles Increased focus on development planning

Outage Window	Window Description
083	083 - Lower Feeder Installation
118	118 - CT Install Series
119	119 - Fuel Channel Install Series

ID	Risk Title	Risk Description	Urgency	Risk Status	Owner	Delegate	Risk Date Last Reviewed	Risk Response Type	Post Mitigation TCD	Current				Post			
										Probability	Financial	Schedule	Score	Probability	Financial	Schedule	Score
959	Augmented Staff Hiring and Re-Hire Process	Event: Augmented Staff and Re-Hire procedure, in some cases, is causing a delay which may impact our ability to attract and retain key individuals to support Refurbishment. Case: Recent revision of OPG Re-Hire and Augmented Staff procedure is causing potential delays in staffing process and limiting available resources. Impact: Potential cost impact if unable to hire and retain key individuals to support the project.	3	Active	Candice Kay	Candice Kay	24-Feb-17	Mitigate	31-Mar-17	2	3	3	6	1	1	2	2

Action#	Status	Action Title	Action Description	Owner	Delegate	Due Date	Comments
9954	In Progress	Review OPG Augmented Staff and Re-Hire Procedure	Integrated team is in place to review the OPG Augmented Staff and Re-Hire Procedure. Representatives from various NR organizations are members of the team.	Candice Kay		31-Mar-17	Initial results will be provided in early March 2017.

Outage Window	Window Description
000	000 – No Window Related

ATTACHMENT 'B'

Confidential, Unredacted Documents