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Title:
**REFURBISHMENT UNIT PLANNING MILESTONES**

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# Refurbishment Unit Planning Milestones

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## Revision Summary

| Revision Number | Date | Comments |
|---|---|---|
| R001 | 2018-02-26 | • Section 1.1: Extended duration to provide recovery plan following DSR approval. Clarified specific exceptions are to be submitted within 6 weeks of compliance date.<br>• Section 1.2 Updated compliance for this revision<br>• Section 3.3 Clarified milestone tracking and closure requirements. Added time period to add closure notes.<br>• Section 4.0 specified required template to be used for Milestone Recovery Plans (see Appendix A).<br>• Removed the following milestones which were completed for Unit 3 and do not need to be met on subsequent units:<br>  o Section 5.1.1 Outage Leadership Assigned<br>  o Section 5.1.2 Outage Planning Organization identified<br>  o Section 5.1.6 Outage Execution Organization Identified<br>• Removed Section 5.6.2 New Projects Permanent Modifications Planning Complete milestone requirement. Engineering design complete milestones are adequately captured in Section 5.6.3 and 5.6.4.<br>• Section 5.6.3 Projects Permanent modifications complete and Section 5.6.4 Other Design Modifications Documents Issued updated requirement to have ECs in only Approved status. ECs may not be released until previous Unit execution is complete to allow lessons learned to be incorporated. Also clarified requirements for 5.6.4 to align with 5.6.3.<br>• Section 5.2.2 Major Scope Approved in Rooms and Section 5.2.3 Minor Scope Approved in Rooms milestone requirements clarified.<br>• Added Section 5.2.9 Segment 0 Scope Approved in Rooms as a Program Milestone which replaced the equivalent Pre-requisite Window Milestone. Modified milestone window dates.<br>• Section 5.3.5 Schedule Update and 5.5.1 removed formal requirement for documenting lessons learned. Lessons learned will continue to be documented based on best practice.<br>• Section 5.3.6 Segment 0 Schedule Issued moved the window open date forward to align with other milestones.<br>• Section 5.4 Cost Estimate Milestones added requirements to prepare project schedules and estimates to support gating requirements for each of the cost milestones.<br>• Added Section 5.5.6 Segment 0 Long Lead Material Purchase Orders Issued as a Program Milestone which replaced the equivalent Segment 0 Window Milestone. Modified milestone window dates.<br>• Section 6.0 Limited post-window milestones to only lessons learned and extended duration to complete to ensure AFS is captured post-window closure.<br>• Added Appendix A Milestone Recovery Plan Template<br>• Appendix B, C and D milestone diagrams updated to reflect changes in milestones per this revision<br>• Clarified Director Subsequent Unit Planning, Director Unit Outage, Outage Manager (Planning), Outage Manager (Execution) and Subsequent Unit Planning Project Manager roles throughout document<br>• Clarified Segment 0 and Pre-requisite scope |

| | | |
|---|---|---|
| | | • Added requirements to review and incorporate lessons learned throughout document.<br>• Additional clarifications and editorial changes |
| R000 | 2017-04-10 | Initial issue. |

## 1.0 DIRECTION

Planning of the Darlington Refurbishment Outages is required to start early and be rigorous in meeting commitments on time and with quality in order to be successful in execution. The planning milestones in this document are intended to provide a consistent and structured approach to planning the execution of work.

Project Managers shall plan their projects to meet these milestones. Where projects are complex and work may take longer than a milestone window provides, the Project Manager is responsible to initiate the work early enough to meet the milestone end date. Projects will also have deliverables that may not be associated with these milestones. It is the responsibility of the projects to identify these deliverables and ensure they are planned appropriately to ensure readiness to execute the work.

This document takes authority from NK38-MAN-09701-10005 Nuclear Refurbishment Work Management.

Refurbishment planning dates related to these milestones are published in NK38-PLAN-00300-10000 Darlington Refurbishment Program Milestone & Integrated Master Schedule (PIMS).

### 1.1 Exceptions

The milestone requirements in this document are not applicable to Unit 2, other than the post-window lessons learned requirement.

Projects that are identified late and accepted into Refurbishment scope may require approval to deviate from some milestones. Deviation from milestones shall be identified as part of scope approval in these cases and approved by the SUP Director. A milestone recovery plan, see Appendix A, will also be prepared within 90 days of DSR approval and approved by the SUP Project Manager.

Operations and Maintenance work that is not tied to a project or a specific execution window shall adhere to N-PROC-MA-0002 Work Planning. This work shall be in a ready state, with all required permits prepared, material available, and holds removed by 6 weeks prior to when the work is scheduled. Exceptions or injected work after T-6 weeks shall be approved by the Outage Manager or delegate.

Specific exceptions to this document based on contractual or other constraints, as documented and approved by the VP U3 Refurbishment Execution within 6 weeks of the compliance date.

### 1.2 Compliance Date

The requirements of this document are effective immediately.

## 2.0 PLANNING MILESTONE OVERVIEW

Refurbishment Outage Planning Milestones are broken out into four types: Program, Segment, Window, and Segment 0 (prior to breaker open). Each type is to satisfy different stages of the outage or the project and is described in the following sections. Visual overviews of the milestones are represented in the appendixes of this document.

### 2.1 Program Milestones

These relatively high level planning milestones are those activities to support overall readiness for breaker open. They support development of outage scope, an overall execution schedule, outage resource and material requirements, regulatory approval planning, and risk planning. These milestones are completed once, prior to the start of each outage. In some cases, these program milestones have an associated segment milestone which serves to update the information provided in the initial program milestone.

### 2.2 Segment Milestones

The Darlington Refurbishment Outage schedule is divided into four main segments based on the major critical path activities scheduled in the segments. In addition, Segment 2 (Removal) is separated into 2a and 2b, each of which may be considered a separate segment for the purposes of planning. Segmented planning milestones are those activities that may be completed in a staged manner, to support the execution of each outage segment. These staged milestones include completing engineering designs, obtaining regulatory approvals, and balancing resource profiles. The primary advantage of these staged milestones is the ability to prioritize work based on execution schedules and level the resources needed to complete these activities.

### 2.3 Window Milestones

Window milestones represent activities that are required to plan the successful execution of a specific scope of work prior to the associated execution window, and those activities required to gather lessons learned following window closure. These window milestones include preparing execution documentation (example: work instructions), receiving and staging materials, acquiring lay down areas, verifying the availability of tools, equipment, and facilities, and finalizing project specific logic and work permitry. If appropriate, window milestones may be grouped to include a number of small windows with similar work. The Project Managers hold the accountability for ensuring these window milestones are met with quality for their projects.

### 2.4 Segment 0 Milestones

Segment 0 work includes any work that needs to be completed prior to the start of the refurbishment outage. This includes work performed with the unit at power, and as such must comply with N-PROC-MA-0022 Integrated On-Line Work Schedule. The planning milestones for this work are separate and distinct from the milestones related to work executed during the refurbishment outage and have been developed to

support early planning and meet the requirements of N-PROC-MA-0022. The outage Segment 0 execution for on-line work starts approximately one year in advance of the refurbishment outage start. Similar to window milestones, the Project Managers hold the accountability for ensuring these milestones are met with quality for their projects.

## 3.0 MILESTONE MANAGEMENT

Program milestones may have management specific requirements specified in the milestone description. These specific requirements may include a milestone kickoff meeting, and/or a Milestone Review Board. The Milestone Owner is responsible to manage the milestone and ensure sub-owners are aware of the requirements. The milestone owner is also responsible to get regular status updates from each of the milestone sub owners.

### 3.1 Milestone Kick-off Meetings

Milestone Kick-off meetings represent a formal ‘pre-job brief’ of the milestone requirements and expectations of the Milestone Owner. Where a Milestone Kick-off Meeting is required, the Milestone owner will schedule a meeting with sub-owners and support staff within two weeks (either side) of the milestone open date. Record of attendance and notes of the meeting are to be attached to the associated milestone Action (RMO). Where a meeting is not required in the Milestone definition, it is at the discretion of the Milestone Owner how to ensure sub-owners are briefed on expectations.

Kick-Off Meeting Attendance:

(a) Chair & Presenter: Milestone Owner
(b) Outage Manager (Planning)
(c) SUP Project Manager
(d) Milestone Sub-Owners
(e) If a sub-owner misses the kickoff meeting and fails to send a delegate, a separate meeting with the sub-owner is required to review the expectations.

Meeting Agenda:

(a) Review milestone requirements and expectations
(b) Detail milestone metrics (as applicable)
(c) Agree on a status update frequency and method
(d) Discuss any help required

Section 5.0, Table 1 identifies Program milestones which require a kick-off meeting.

### 3.2 Milestone Review Board

For some milestones, where quality of completion has a significant impact on successful planning of the project, the milestone management requirements include a Milestone Review Board (MRB).

Milestone Review Board is where the milestone owner demonstrates to a 'Board Quorum' that the requirements to satisfy the milestone will be complete with quality by the due date. The meeting should be held at least 2 weeks prior to the milestone completion date to allow sufficient time to address MRB feedback.

As evidence is presented by the milestone owner, all attending members may challenge or request information. The 'Board Quorum' votes on acceptance of the closure evidence and mitigating actions where applicable. A full acceptance vote by all 'Board quorum' members is required to pass the milestone. A failure to pass the milestone requires a milestone recovery plan, see Appendix A, and may require an SCR.

The meeting should be established by the Outage Manager (Planning) and milestone Owner with the following structure:

Board Quorum:

(a) Chair: Outage Manager (Planning).
(b) Presenter: Milestone Owner.
(c) Director SUP (delegate permitted).
(d) Milestone Owner's line manager.
(e) SUP Project Manager.
(f) Receiving milestone Owner(s) (Most impacted downstream milestone(s), as determined by the Outage Manager (Planning) (delegate permitted).

Other required attendees:

Sub Milestone Owners (Stratum III delegates permitted).

Where a Sub Milestone Owner is listed as 'Project Managers', one project manager may attend on behalf of a project bundle, unless they are requested by the Outage Manager or Milestone Owner to attend in person. (This may be requested due to milestone completion performance issues).

In some cases, Sub Milestone Owners may be excused from attending by the Milestone Owner based on a lesser importance of their role in the determination of quality completion.

Meeting Agenda:

(a) Review milestone completion data provided by the Milestone Owner.
(b) Validate that all the requirements identified for that milestone will support successful completion of downstream milestones.
(c) Board to provide feedback and agree on any specific actions to improve milestone completion quality by the milestone date.
(d) Board vote.
(e) Discussion of Lessons Learned.

Section 5.0, Table 1 identifies Program milestones which require a MRB.

## 3.3 Milestone Tracking and Closure

Program and Segment milestones will be managed through RMO actions. Metrics to support tracking of progress and health of these milestone will be proposed by Milestone Owner(s) and accepted by either the SUP Project Manager or Outage Manager.

Segment 0 and Window milestones should be managed on the project P6 schedule, and discussed at weekly project meetings (or equivalent). Both the OPG Project Manager and the Vendor Project Manager are responsible to ensure the Segment 0 and Window milestones are met on time and with quality. Reporting will generate metrics for tracking of these milestones as identified by the SUP Project Manager or Outage Manager.

For closure of Program and Segment milestones the Milestone Owner will provide sufficient evidence and justification demonstrating the milestone has been met including uploading of any supporting material such as MRB acceptance. The Milestone Owner is responsible for obtaining evidence from sub-owners. Closure notes may reference other completed RMO actions. Milestones are to be closed in RMO within 5 business days of meeting the milestone and set to the milestone completion date. This is only to allow for time for system updates and attachment of final evidence which must identify it was complete on or ahead of the milestone.

## 3.4 Milestone Lessons Learned

Significant or complex milestones may have a requirement to review and document lessons learned. The intent of this is to promote continuous improvement in the quality completion of milestone requirements. Lessons learned shall be documented in the RMO Lessons Learned module, with ‘Planning Milestone’ in the title. The Milestone Owner is responsible for documenting Lessons Learned. The SUP Project Manager will determine if a formal Lessons Learned meeting is required.

Section 5.0, Table 1 identifies Program milestones which require Lessons Learned.

# 4.0 ESCALATION AND MILESTONE RECOVERY PLANS

Escalation of milestones at risk is the responsibility of the SUP Project Manager or Outage Manager depending on the state of planning and unit execution. Escalation occurs at the point when a milestone’s progress is judged not to be sufficient to allow completion of requirements within the milestone window without a recovery plan; however, it should not be left so late that the milestone will be missed despite a reasonable recovery plan.

Escalation is to the line supervisor of the Milestone Owner. Where the owner is the Project Manager, escalation is to the OPG Project Director.

Escalation shall be followed by a request for a milestone recovery plan, see Appendix A, from the milestone owner, and the appropriate sub-owner(s) tracking behind requirements. The milestone recovery plan is accepted by the line supervisor,

and Approved by the SUP Project Manager or Outage Manager. A copy of the milestone recovery plan shall be provided to the Director SUP or Outage Director and filed to records. A bi-weekly review of the recovery progress is required until the milestone is fully recovered or complete.

A milestone recovery plan should include the cause(s) of the milestone tracking behind, and clear recovery actions to meet the requirements of the milestone by the due date.

A trending SCR should be entered for each milestone recovery plan prepared as a minimum. If a Program or Segment milestone is not met despite a recovery plan, each sub-owner that missed the milestone will initiate a C3 ACE SCR, flagged for CARB review. Corrective actions are to include recovery of any downstream milestones that may be affected. Failure to complete a Window milestone or a Segment 0 milestone prior to the required date will require an SCR for trending as a minimum.

## 5.0 PROGRAM AND SEGMENT MILESTONES

Program and Segment Milestones are summarized in Table 1, represented visually in Appendix B, and are detailed in the following sub-sections. For some milestones, suggested target completion dates are included for activities within the milestone. The milestone owner has the authority to adjust these dates as required in order to successfully meet the milestone. The milestone owner also has the authority to provide clarity (non-intent updates) related to the milestone definitions.

**Table 1 – Program & Segment Milestone Summary Chart**

| Milestone Title | Milestone Owner | M/S Open | M/S Due | M/S Type | Management requirement |
|---|---|---|---|---|---|
| ***Leadership & Resource Milestones*** | | | | | |
| Vendor Work Assigned for Known Scope | Director SUP | 34 | 27 | Program | Kick-off |
| Vendor Work Assigned for all Major Scope | Director SUP | 20 | 16 | Program | |
| Maintenance Contract & Bulk Labour Requirements | Maintenance Manager | 20 | 12 | Program | |
| Execution Resource Profile Established | Outage Manager (Planning) | 5 | 2 | Program | |
| Execution Resource Profile Reconciled | Outage Manager (Planning/Execution) | 5 | 2 | Segment | |
| ***Scope & Planning Milestones*** | | | | | |
| Segment 0 Scope Identified | Outage Manager (Planning) | 34 | 30 | Program | |
| Major Scope Identified | Sr Manager Plant Reliability | 30 | 22 | Program | Kick-off<br>MRB<br>LL |
| Minor Scope Identified | Outage Manager (Planning) | 18 | 12 | Program | Kick-off<br>MRB<br>LL |
| Initial Work Order Assessment | Outage Manager (Planning) | 30 | 10 | Program | Kick-off<br>MRB<br>LL |
| Unit Transition Plan Approved | Director SUP | 24 | 12 | Program | Kick-off |
| Support Documents Need Identified | Outage Manager (Planning/Execution) | 18 | 8 | Segment | |
| Permitry Strategy Prepared | Operations Manager | 6 | 1 | Segment | |
| Safety Support Plans Prepared | Outage Manager (Planning/Execution) | 6 | 1 | Segment | |
| Segment 0 Scope Approved in ROOMS | Outage Manager (Planning) | 30 | 24 | Program | |
| ***Schedule Milestones*** | | | | | |
| Revision ‘A’ Schedule Issued | Outage Manager (Planning) | 27 | 18 | Program | |
| Revision ‘B’ Schedule Issued | Outage Manager (Planning) | 18 | 8 | Program | LL |
| Revision ‘C’ Schedule Issued | Outage Manager (Planning) | 8 | 3 | Program | LL |

| Milestone Title | Milestone Owner | M/S Open | M/S Due | M/S Type | Management requirement |
|---|---|---|---|---|---|
| Revision '0' Schedule Issued | Outage Manager (Planning) | 3 | 0.5 | Program | |
| Schedule Update | Outage Manager (Planning/Execution) | 5 | 0.5 | Segment | |
| Segment 0 Schedule Issued | Outage Manager (Planning) | 30 | 20 | Program | |
| ***Cost Estimate Milestones*** | | | | | |
| Planning Estimate & Release | Director Project Controls | 32 | 28 | Program | Kick-off LL |
| Preliminary Estimate & Release | Director Project Controls | 24 | 18 | Program | Kick-off LL |
| Execution Estimate & Release | Director Project Controls | 14 | 6 | Program | Kick-off LL |
| ***Material Milestones*** | | | | | |
| Long Lead Materials Identified | Parts Manager | 30 | 18 | Program | |
| Long Lead Materials POs Issued | Parts Manager | 27 | 14 | Program | Kick-off LL |
| Materials POs Issued for known materials | Parts Manager | 14 | 6 | Program | Kick-off |
| All Materials POs Issued | Parts Manager | 12 | 6 | Segment | |
| At-Risk Material List Generated | Parts Manager | 6 | 3 | Segment | |
| Segment 0 Long Lead Materials POs Issued | Parts Manager | 30 | 24 | Program | |
| ***Engineering & Training Milestones*** | | | | | |
| Segment 0 Designs Complete | Director Refurb Engineering | 34 | 22 | Program | |
| Projects Permanent Modifications Design Complete | Director Refurb Engineering | 24 | 12 | Segment | |
| Other Design Modifications Documents Issued | Director Refurb Engineering | 18 | 10 | Segment | |
| Commissioning Specifications Issued | Director Refurb Engineering | 10 | 6 | Segment | |
| Training Readiness | Director Refurb Training | 6 | 0 | Segment | |
| Segment Briefing Package | Corporate Relations & Coms Manager | 3 | 1 | Segment | |
| ***Regulatory & Risk Milestones*** | | | | | |
| Regulatory Approvals Plan Issued | Regulatory Affairs Manager Refurb | 24 | 15 | Program | |
| Regulatory Approvals Obtained | Regulatory Affairs Manager Refurb | 15 | 3 | Segment | |
| Risk Mitigation Plans Prepared | Risk Manager | 12 | 7 | Program | Kick-off |
| Pre-outage Readiness Review | Outage Manager (Planning) | 4 | 2 | Program | |
| Reactor Safety challenge Meeting | Reactor Safety Manager | 3 | 1 | Segment | |

## 5.1 Leadership and Resource Milestones

### 5.1.1 Outage Leadership Assigned

This milestone has been removed.

### 5.1.2 Outage Planning Organization Identified

This milestone has been removed.

### 5.1.3 Vendor Work Assigned for Known Scope

Assignment of the vendor responsible for execution of each project is required prior to detailed planning and execution of the work. Timeliness of this milestone is critical to ensure the vendors are able to meet downstream milestones. This milestone applies to all known refurbishment outage scope.

**Milestone Timeline**

This program milestone window opens 34 months prior to the outage and is complete by 27 months prior to the outage.

**Milestone Owner**
Director SUP

**Sub-milestone Owners**
OPG Project Directors

**Milestone Management Specific Requirements**
Milestone Kick-off meeting

**Requirements to Satisfy the Milestone:**

(a) Sub-owner: Project Directors - Known major scope has been reviewed and vendors or OPG functions have been assigned to complete the work. Target Completion 30 months prior to the outage start.

(b) Sub-owner: Project Directors - Project funding releases have been approved and PO releases or equivalent has been completed to enable the vendor to start planning the work in order to meet planning milestones. Target completion 27 months prior to the outage.

### 5.1.4 Vendor Work Assigned for all Major Scope

Assignment of the vendor responsible for execution of each project is required prior to detailed planning and execution of the work. Timeliness of this milestone is critical to ensure the vendors are able to meet downstream milestones. This milestone is after Major Scope in ROOMS so that any new approved scope by this milestone can be assigned.

**Milestone Timeline**

This program milestone window opens 20 months prior to the outage start and is complete by 16 months prior to the outage start.

**Milestone Owner**
Director SUP

**Sub-milestone Owners**
OPG Project Directors

**Milestone Management Specific Requirements**
N/A

**Requirements to Satisfy the Milestone:**

(a) Sub-owner: Project Directors - Approved major scope in ROOMS and new approved DSRs have been reviewed and vendors or OPG functions have been assigned to complete the work. Target Completion 19 months prior to the outage start.

(b) Sub-owner: Project Directors - Project funding releases have been approved and PO releases or equivalent has been completed to enable the vendor to start planning the work in order to meet planning milestones. Target completion 16 months prior to the outage start.

### 5.1.5 Maintenance Contract & Bulk Labour Requirements Identified

Labour requirements for cyclic scope and known preventative/corrective/deficient work (including valve work) needs to be reviewed and a strategy developed for vendor contract or bulk labour (as required).

**Milestone Timeline**

This program milestone window opens 20 months prior to the outage start and is complete by 12 months prior to the outage start.

**Milestone Owner**

Refurbishment Maintenance Manager

**Sub-milestone Owners**
N/A

**Milestone Management Specific Requirements**
N/A

**Requirements to Satisfy the Milestone:**

(a) Maintenance has reviewed the cyclic scope and known preventative/ corrective/deficient work with respect to maintenance resources.

(b) A strategy for contracting work or bulk labour has been developed (as required), and funding has been allocated. A plan and schedule has been developed and documented for issuance of any required PO's.

### 5.1.6 Outage Execution Organization Identified

This milestone has been removed.

### 5.1.7 Execution Resource Profile Established

An overall picture of the outage resource profile is to be generated by two months prior to the outage based on fully resourced level III schedules. This program milestone has a complementary segmented milestone for resource profile reconciliation which further refines the detail on resources prior to the start of the segment.

**Milestone Timeline**

This program milestone window opens 5 months prior to the outage and is complete by 2 months prior to the outage.

**Milestone Owner**

Outage Manager (Planning)

**Sub-milestone Owners**
Maintenance Manager - Refurbishment
Fuel Handling Manager
Radiation Protection Manager - Refurbishment
Operations Manager - Refurbishment
Project Directors
Vendor Site Representatives
Project Director, Projects & Modifications
Manager Work Management - Station

**Milestone Management Specific Requirements**
Lessons Learned Documented

**Requirements to Satisfy the Milestone:**

(a) Sub-Owner: Vendor Site Representatives – Vendor Resource Plans submitted for the entire outage with contract mobilization plans established. Resource Risks identified with mitigation plans. Target completion 3 months prior to the outage start.

(b) Sub-Owner: Outage Manager (Planning) – Resource Balance Toolkit (RBT) loaded and reviewed against demand. Any significant over allocations of resources have been rectified or identified for resolution. Target completion 3 months prior to the outage start.

(c) Sub-Owner: Maintenance Manager, Operations Manager, Project Director Projects & Modifications, RP Manager, Project Directors – Resource risks identified in RMO with mitigation plans. Target completion 2 months prior to the outage start.

### 5.1.8 Execution Resource Profile Reconciled

This segmented milestone updates resource requirements for the outage segment and identifies risks to the schedule. This milestone is complementary to the Program Milestone - Outage Resource Profile Established milestone.

**Milestone Timeline**

This segmented milestone window opens 5 months prior to the segment start and is complete by 2 months prior to the segment start. This milestone is not required for Segment 1 as there is a complementary Program milestone.

**Milestone Owner**

Outage Manager (Planning/Execution)

**Sub-milestone Owners**
Maintenance Manager
Fuel Handling Manager
Radiation Protection Manager
Operations Manager
Vendor Project Managers
OPG Project Managers
Project Director, Projects & Modifications
Manager Work Management - Station

**Milestone Management Specific Requirements**
Lessons Learned Documented

**Requirements to Satisfy the Milestone:**

(a) Sub-Owner: Vendor Site Representatives – Updated Vendor Resource Plans and mobilization plans submitted for the remaining outage duration. Resource Risks identified with mitigation plans. Target completion 2 months prior to the segment start.

(b) Sub-Owner: Outage Manager (Planning/Execution) – Resource Balance Toolkit (RBT) loaded and reviewed against demand. Any significant over allocations of resources have been rectified or identified for resolution. Target completion 3 months prior to the segment start.

(c) Sub-Owner: Maintenance Manager, Operations Manager, Project Director Projects & Modifications, RP Manager, Project Directors – Resource risks identified in RMO with mitigation plans. Target completion 2 months prior to the segment start.

## 5.2 Scope and Planning Milestones

### 5.2.1 Segment 0 Scope Identified

Execution work related to the Refurbishment unit scope that is to be scheduled prior to the unit breaker open is included in this milestone. This work will be scheduled to start approximately a year prior to the outage start, so it is important that it be identified as early as possible. This includes work that is a prerequisite to Breaker Open (such as Fuel Handling preparatory work), opportunities to complete Refurbishment project work that does not require the unit shut down, and Station or AISC work to be completed prior to the outage to reduce risk during the refurbishment outage (example overhaul of pumps or cranes required to execute the outage). Some project work may start in Segment 0 and be carried on into future Refurbishment outage segments, depending on project requirements.

For online work, N-PROC-MA-0022 Integrated On-line Work Schedule requirements shall be adhered to. The Segment 0 milestones as listed in Section 7.0 of this document will ensure adherence to N-PROC-MA-0022.

Segment 0 scope that requires a station outage should also be identified as part of this milestone. Any station outage scope must be identified before the scope freeze date of the target station outage, per N-PROC-MA-0013 Planned Outage Management. It is the responsibility of the OPG Project Directors to identify this scope in AS7 by the required date.

**Milestone Timeline**

This program milestone window opens 34 months prior to the outage start and is complete by 30 months prior to the outage start.

**Milestone Owner**
Outage Manager (Planning)

**Sub-milestone Owners**
OPG Project Directors
Maintenance Manager – Refurbishment
Operations Manager – Refurbishment
Radiation Protection Manager – Refurbishment
Director, Darlington Projects & Modifications
Senior Manager Plant Reliability – Refurbishment
Director, Refurbishment Engineering

**Milestone Management Specific Requirements**
N/A

**Requirements to Satisfy the Milestone:**

(a) Sub-owner OPG Project Directors, Maintenance Manager, RP Manager - List of Segment 0 scope developed, and approved by the OPG Project Directors (or equivalent for Functional work). This list should include (as applicable):

(1) Project #
(2) DSR #
(3) MEC #
(4) Execution organization
(5) Description of work, including whether it is replicated scope from earlier unit(s), modified scope from earlier unit(s), or new scope. Where scope is replicated from earlier units, include the project # associated with the earlier unit.
(6) Station outage requested scope with outage reference and associated Work Order numbers

(b) Sub-owner OPG Project Directors, Maintenance Manager, RP Manager - List provided to Milestone Owner, Director Refurbishment Engineering, and Senior Manager Plant Reliability – Refurbishment.

### 5.2.2 Major Scope Identified and Approved in ROOMS

Major scope for the Darlington Refurbishment Program (DRP) was approved prior to planning of the first refurbishment outage and is controlled through the Darlington Scope Request (DSR) Database.

Work orders related to this major scope are required to be approved in ROOMS with outage number assigned (example: DNRU3/D1931) in order to complete initial work assessing. Existing deficient and corrective work should also be reviewed at this milestone to ensure significant work has not been missed.

Additions to major scope may include AISC projects that are required to be completed within the outage timeframe or lifecycle work identified after the early initial approval of major refurbishment scope. Approval for these major scope additions or changes is as per NK38-INS-09701-10001 Darlington Nuclear Refurbishment Program – Scope Control. It is expected that this scope will be identified in a DSR and approved in time to meet the requirements of this milestone.

**Milestone Timeline**

This program milestone window opens 30 months prior to the outage start and is complete by 22 months prior to the outage start.

**Milestone Owner**
Senior Manager Plant Reliability – Refurbishment

**Sub-milestone Owners**
Vendor Project Managers
OPG Project Managers
Refurbishment Maintenance Manager
Refurbishment Operations Manager
Outage Manager (Planning)
Director, Darlington Projects and Modifications
Manager, Darlington Work Management
Return to Service Manager

**Milestone Management Specific Requirements**
Milestone Kick-off meeting Required
Milestone Review Board Required
Milestone Lessons Learned Documented

**Requirements to Satisfy the Milestone:**

(a) Sub-owner OPG Project Managers: All approved DSR related scope work orders identified in ROOMS with outage identified (example: DNRU3) and Health of Scope identified in the DSR database, per NK38-INS-09701-10001 Darlington Nuclear Refurbishment Program Scope Control. Exceptions shall be documented and approved by the milestone owner. Target completion 24 months prior to the outage start.

(b) Sub-owner Director, Darlington Projects: All AISC projects requiring a window in refurbishment outage have been identified in approved DSRs. Work orders are identified in ROOMS with outage identified (example: DNRU3), and Health of Scope identified in the DSR database per NK38-INS-09701-10001 Darlington Nuclear Refurbishment Program Scope Control. Target completion 27 months prior to the outage start.

(c) Sub-owner Sr Manager Plant Reliability – Refurbishment: All Project Engineering Modifications (minor mods) requiring a window in refurbishment outage have been identified in approved DSRs. Work orders are identified in ROOMS with outage identified (example: DNRU3), and Health of Scope identified in the DSR database per NK38-INS-09701-10001 Darlington Nuclear Refurbishment Program Scope Control. Master Engineering Changes (MEC's) have been generated. Target completion 24 months prior to the outage start.

(d) Sub-owner Sr Manager Plant Reliability – Refurbishment: All corrective or deficient outage work (not approved for an outage prior to the refurbishment outage), has work orders identified in ROOMs with outage number assigned (Example: D1931). Target completion 26 months prior to the outage start.

(e) Sub-owner Sr Manager Plant Reliability – Refurbishment: All corrective or deficient online work with very long lead material (i.e. 2-5 years putting it in the window of the refurbishment outage), has work orders identified in ROOMs with outage number assigned (Example: D1931). Target completion 26 months prior to the outage start.

(f) Sub-owner Sr Manager Plant Reliability – Refurbishment: FAC/PIP/MIC/HX's work to be executed in the outage has work orders identified in ROOMs with outage number assigned (Example: D1931). Target completion 24 months prior to the outage start.

(g) Sub-owner Refurbishment Maintenance Manager: Operating PM Work Orders with frequency greater than or equal to 1 year, have been created for all operating PM with due dates falling within the refurbishment outage period, identified and approved in ROOMs with outage number assigned (Example: D1931). Target completion 24 months prior to the outage start.

(h) Sub-owner Refurbishment Maintenance Manager: Outage PM Work Orders with frequency greater than or equal to 1 year frequency falling within the Refurbishment outage period up to next planned outage, have been created and approved in ROOMs with outage number assigned (Example: D1931). Target completion 24 months prior to the outage start.

(i) Sub-owner Sr Manager Plant Reliability – Refurbishment: Work order recommendation and engineering details have been completed for all work orders identified as Major Scope above. Target completion 22 months prior to the outage start.

(j) Sub-owner Outage Manager (Planning): Work order recommendation has been completed for all work orders identified as Major Scope above. Target completion 22 months prior to the outage start.

(k) Sub-Owner Outage Manager (Planning): ROOMS work order approval has been completed and the supporting assessment managers and Project Directors have been notified to commence Initial Work Order Assessment. Target completion 22 months prior to the outage start.

### 5.2.3 Minor Scope Identified and Approved in ROOMS

Minor scope related to deficient and corrective work to be completed post breaker open is to be identified and approved in ROOMS prior to this milestone. Any PM exceptions not identified as part of major scope should also be approved in ROOMS by this milestone.

It is noted that additional deficient and corrective work will continue to be identified after this milestone. This new work will be processed by Station or Refurbishment depending on timing and assessments, and as agreed to in an approved Work Control transition plan (or equivalent).

**Milestone Timeline**

This program milestone window opens 18 months prior to the outage start and is complete by 12 months prior to the outage start.

**Milestone Owner**
Outage Manager (Planning)

**Sub-milestone Owners**
Maintenance Manager - Refurbishment
Manager, Darlington Work Management
Sr Manager Plant Reliability –Refurbishment
Refurbishment Operations Manager

**Milestone Management Specific Requirements**
Milestone Kick-off meeting Required
Milestone Review Board Required
Milestone Lessons Learned Documented

**Requirements to Satisfy the Milestone:**

(a) Sub-owner Sr Manager Plant Reliability – Refurbishment: All remaining known corrective or deficient work order to be executed after breaker open have been identified in ROOMS. Target completion 14 months prior to the outage start.

(b) Sub-owner Sr Manager Plant Reliability – Refurbishment: All other type work orders, including operation routines not on a PM, have been identified in ROOMS and scope rationalized through engineering. Target completion 13 months prior to the outage start.

(c) Sub-owner Refurbishment Maintenance Manager: All remaining predefined maintenance work (frequency less than 1 year) to be executed after transition of the unit to Refurbishment has been identified and approved in ROOMS. Target completion 14 months prior to the outage start.

(d) Sub-owner Sr Manager Plant Reliability – Refurbishment: Work order recommendation complete. Target completion 13 months prior to the outage start.

(e) Sub-owner: Outage Manager (Planning): Work order recommendation complete. Target completion 13 months prior to the outage start.

(f) Sub-owner: Outage Manager (Planning): ROOMS work order approval has been completed and the supporting assessment managers and Project Directors have been notified to commence Initial Work Order Assessment. Target completion 12 months prior to the outage start.

### 5.2.4 Initial Work Order Assessment Complete

This initial assessment of Major Scope work orders in ROOMS is to identify tasks, materials, equipment, resources, and planning holds. Projects should also have P6 execution schedules developed.

Note that detailed assessment of work is part of the window milestones, when the final work execution documentation is available.

**Milestone Timeline**

This program milestone window opens 30 months prior to the outage start and is complete by 10 months prior to the outage start.

**Milestone Owner**
Outage Manager (Planning)

**Sub-milestone Owners**
Vendor Project Managers
OPG Project Managers
Maintenance Manager - Refurbishment
Director, Darlington Projects & Modifications
Operations Manager – Refurbishment

**Milestone Management Specific Requirements**
Milestone Kick-off meeting Required
Milestone Review Board Required
Lessons Learned Documented

**Requirements to Satisfy the Milestone:**

(a) Sub-owners: Project Managers, Director Darlington Projects & Modifications, Maintenance Manager – Work orders are tasked out with resources, materials, and equipment identified with planning holds where required. Target completion 12 months prior to outage start.

(b) Sub-owner Project Managers and Director Darlington Projects & Modifications: Tasks have been created for required OPG support. Target Completion is 12 months prior to the outage start (to allow time for initial assessing of these tasks).

(c) Sub-owners Maintenance Manager and Operations Manager: OPG project support tasks initial assessment complete. Target Completion 10 months prior to outage start.

(d) Sub-owner Project Managers and Director Darlington Projects & Modifications: Project P6 Execution Schedule Level III logic developed. Target completion 10 months prior to outage start.

### 5.2.5 Unit Transition Plan Approved

A transition of the Refurbishment Unit between the Station and Refurbishment organizations must occur in a planned manner. The transition of processes, programs, and staff between the two organizations must be defined. NK38-PLAN-09701-10215 Nuclear Refurbishment Site Integrated Transition Plan was issued in preparation for Unit 2 Refurbishment. This transition plan and associated documents must be reviewed and updated as required. This review should include returning the Refurbishment unit to the Station (as applicable).

The Refurbishment DOM in consultation with the Station DOM may authorize cancellation of this milestone for the last two Refurbishment Outages, if deemed not necessary.

**Milestone Timeline**

This program milestone window opens 24 months prior to the outage start and is complete by 12 months prior to the outage start.

**Milestone Owner**
Director SUP

**Sub-milestone Owners**
Director Operations and Maintenance – Refurbishment
Director Operations and Maintenance – Station
Manager Station Work Control
Manager Return to Service
Manager Refurbishment Operations and Maintenance Programs
Outage Manager (Planning)
Outage Manager (Execution)
Preceding Unit and/or Next Director Unit Outage(s)
Functional Managers Refurbishment (as applicable)
Functional Managers Station (as applicable)
Manager Nuclear Waste

**Milestone Management Specific Requirements**
Milestone Kick-off Meeting

**Requirements to Satisfy the Milestone:**

(a) NK38-PLAN-09701-10215 (or equivalent) has been reviewed and updated (as required).

(b) Associated Department Transfer Plans have been reviewed and updated (as required).

(c) All additional supporting documents have been reviewed, and updated (as required), or have been reviewed and have an action to update them on a schedule approved by the Milestone Owner.

(d) Transition Plan between Refurbishment Planning and Refurbishment Execution Organizations has been approved.

### 5.2.6 Support Documents Need Identified

Supporting documents required to execute the work are to be identified and logged in P6 or the applicable software systems. Project EC's where they are being used are set to approved, and Technical Procedure Action Requests (TPARs) are to be submitted to Operations.

**Milestone Timeline**

This segmented milestone window opens 18 months prior to the segment start and is complete by 8 months prior to the segment start.

**Milestone Owners**
Outage Manager (Planning/Execution)

**Sub-milestone Owners**
Vendor Project Managers
OPG Project Managers
Maintenance Manager - Refurbishment
Operations Manager - Refurbishment
Director, Darlington Projects & Modifications
Director Refurbishment Engineering

**Milestone Management Specific Requirements**
N/A

**Requirements to Satisfy the Milestone:**

(a) Sub-owners: Project Managers and Director Darlington Projects & Modifications - Supporting documents including workplans, commissioning plans, ITPs, CWPs, have level 3 activities in the definition schedule using P6 templates showing stages of documentation completion.

(b) Sub-owners: Director Refurbishment Engineering, Project Managers, and Director Darlington Projects & Modifications - Project EC's set to Approved (as required)

(c) Sub-owners: Director Refurbishment Engineering, Project Managers, and Director Darlington Projects & Modifications- All required TPARs submitted to Operations.

### 5.2.7 Permitry Strategy Prepared

A permitry strategy is to be prepared by Operations to support OPG permit requirements during the segment. Note that PC1 submission is a Window milestone; as a result, not all PC1's will be available to Operations prior to the close of this permitry strategy milestone.

**Milestone Timeline**

This segmented milestone window opens 6 months prior to the segment start and is complete by 1 month prior to the segment start.

**Milestone Owner**
Refurbishment Operations Manager

**Support Managers**
Vendor Project Managers
OPG Project Managers
Outage Manager (Planning/Execution)
Refurbishment Maintenance Manager

**Milestone Management Specific Requirements**
N/A

**Requirements to Satisfy the Milestone:**

(a) Permitry strategy developed based on scheduled work and vertical schedule interactions.

(b) Segment Permitry Strategy approved by Refurbishment DOM and provided to Outage Manager (Planning).

### 5.2.8 Safety Support Plans Prepared

Safety Support Plans related to work scope during the segment are to be prepared for Conventional Safety, Chemistry & Environment, and Radiation Protection. Plans shall be reviewed based on lessons learned, changes in execution strategies or scope, and industry best practices.

**Milestone Timeline**

This segmented milestone window opens 6 months prior to the segment start and is complete by 1 month prior to the segment start.

**Milestone Owner**
Outage Manager (Planning/Execution)

**Sub-milestone Owners**
Radiation Protection Manager
Chemistry Manager
Conventional Safety Manager

**Milestone Management Specific Requirements**
N/A

**Requirements to Satisfy the Milestone:**

(a) Sub-owner: Conventional Safety Manager - Conventional Safety Plan for segment scope issued and a brief provided to the Outage Manager (Planning/Execution) and Director of Operations & Maintenance (or delegate).

(b) Sub-owner: Chemistry Manager - Chemistry & Environment Safety Plan for segment scope issued and a brief provided to the Outage Manager (Planning/Execution) and Director of Operations & Maintenance (or delegate).

(c) Sub-owner: Radiation Protection Manager Radiation Protection Safety Plan (ALARA Plan) for segment scope issued and a brief provided to the Outage Manager (Planning/Execution) and Director of Operations & Maintenance (or delegate).

### 5.2.9 Segment 0 Scope Approved in ROOMS

Work orders related to Segment 0 scope are required to be approved in ROOMS with outage number assigned (example: DNRU3) and flagged PREREQ.

**Milestone Timeline**

This program milestone window opens 30 months prior to the outage start and is complete by 24 months prior to the outage start.

**Milestone Owner**

Outage Manager (Planning)

**Sub-milestone Owners**

Vendor Project Managers
OPG Project Managers
Refurbishment Maintenance Manager
Refurbishment Operations Manager
Outage Manager (Planning)
Manager, Darlington Work Management
Return to Service Manager

**Milestone Management Specific Requirements**

Milestone Kick-off meeting Required

**Requirements to Satisfy the Milestone:**

(a) Sub-owner OPG Project Managers: All Refurbishment Outage Segment 0 Project Scope has been identified in ROOMS and is coded per D-GUID-09701-10013 (i.e. scope required to be completed prior to Breaker Open). Target completion 26 months prior to the outage start.

(b) Sub-owner Outage Manager (Planning): ROOMS work order approval has been completed and the supporting assessment managers and Project Directors have been notified to commence Initial Work Order Assessment. Target completion 24 months prior to the outage start.

## 5.3 Schedule milestones

### 5.3.1 Revision 'A' Schedule Issued

The Revision 'A' schedule is a Level I schedule overview depicting the key components of the outage Critical Path, approved Major Scope, and anticipated System Window logic with proposed durations. It provides the overall duration and layout of the refurbishment outage.

This schedule is based on ROOMS approved scope, available initial assessments, standard window logic, and equipment constraints.

**Milestone Timeline**

This program milestone window opens 27 months prior to the outage start and is complete by 18 months prior to the outage start.

**Milestone Owner**
Outage Manager (Planning)

**Supporting Managers**
Vendor Project Managers
OPG Project Managers
Maintenance Manager – Refurbishment
Reactor Safety Manager – Refurbishment
Operations Manager – Refurbishment
Return to Service Manager

**Milestone Management Specific Requirements**
N/A

**Requirements to Satisfy the Milestone:**

(a) Sub-owner: Project Managers, Maintenance Manager, and RTS Manager - Level II schedules prepared. Target completion 18 months prior to outage start.

(b) The Revision 'A' schedule has been developed and reviewed based on known outage scope. Level I Critical Path and major system/project window logic is presented in the schedule. Initial lessons learned have reviewed and incorporated into the Level I. Target completion 18 months prior to outage start.

### 5.3.2 Revision 'B' Schedule Issued

Revision 'B' outage schedule depicts the horizontal detail of the refurbishment outage and describes Level III detail of the critical path, major maintenance and modification activities, and layout of the system windows. The schedule should include: finalized work scope, logic ties and pre/post-requisite identification. Level III schedules are available to integrate with the overall program based on the Level I logic.

**Milestone Timeline**

This program milestone window opens 18 months prior to the outage start and is complete by 8 months prior to the outage start.

**Milestone Owner**
Outage Manager (Planning)

**Sub-milestone Owners**
OPG Project Directors
Vendor Project Managers
OPG Project Managers
Maintenance Manager – Refurbishment
Reactor Safety Manager – Refurbishment
Operations Manager – Refurbishment
Return to Service Manager
Director of Operations & Maintenance – Refurbishment

**Milestone Management Specific Requirements**
Lessons Learned Documented

**Requirements to Satisfy the Milestone:**

(a) Sub-owner Project Managers, Maintenance Manager, and RTS Manager – Level III schedules prepared. Lessons learned from previous Unit execution have been reviewed and incorporated. TCD 10 months prior to the outage start.

(b) Sub-owner Outage Manager (Planning) – Prepare revised Level I with Level II Window Layout and Level III critical path identified. Lessons learned from previous Unit execution have been reviewed and incorporated. TCD 9 months prior to the outage start.

(c) The Revision 'B' schedule has been reviewed by Sub-owners and approved by the Director of Operations and Maintenance Refurbishment. Target completion 8 months prior to outage start.

### 5.3.3 Revision 'C' Schedule Issued

The goal of this milestone is to develop a resourced Level III schedule, with finalized critical path, logic ties and support activities identified. This schedule depicts the vertical interactions of the outage.

**Milestone Timeline**

This program milestone window opens 8 months prior to the outage start and is complete by 3 months prior to the outage start.

**Milestone Owner**
Outage Manager (Planning)

**Sub-milestone Owners**
Vendor Project Managers
OPG Project Managers
Maintenance Manager – Refurbishment
Reactor Safety Manager – Refurbishment
Operations Manager – Refurbishment
Return to Service Manager

**Milestone Management Specific Requirements**
Lessons Learned Documented

**Requirements to Satisfy the Milestone:**

(a) Sub-owner Outage Manager (Planning): All level III schedules integrated with the Interface Milestone File (IMF) for all the windows. All level III details are rolled up to level II (Work Packages).

(b) Sub-owner Outage Manager (Planning): Vertical Slice Challenge meetings have been held and associated adjustments made. Target Completion 5 months prior to outage start.

(c) Sub-owner Outage Manager (Planning): Electrical Load Lists have been reviewed to facilitate proper planning of electrical bus outage and related temporary power supplies and confirm understanding of the full scope of electrical work and the potential impact planned electrical work may have on other work and on-line work. Associated adjustments made. Target Completion 5 months prior to outage start.

(d) Sub-owner Outage Manager (Planning): Lessons learned from previous Unit execution have been reviewed and incorporated. Draft Rev 'C' schedule sent to Reactor Safety and Operations by 5 months prior to outage start.

(e) Sub-owner Reactor Safety Manager: Probabilistic Risk Assessment (PRA) analysis and recommendations completed and sent to Outage Manager (Planning). Target completion 4 months prior to outage start.

(f) Sub Owner Operations Manager: Review of shutdown safety transitions such as heat sinks, shutdown guarantees, and special safety system unavailability. Recommendations communicated to Outage Manager. Target completion 4 months prior to outage start

(g) Reactor Safety and Operations recommendations incorporated into the Rev. ‘C’ schedule, and approved by the Director of Operations and Maintenance Refurbishment. Target completion 3 months prior to outage start.

### 5.3.4 Revision ‘0’ Schedule Issued

Revision ‘0’ outage schedule describes Level III detail of the critical path, major maintenance and modification activities, and the finalized layout of the system windows. At this point, the schedule should include Reactor Control Hold Points and shutdown scripting. Once approved this is the baseline schedule for the Refurbishment outage.

**Milestone Timeline**

This program milestone window opens 3 months prior to the outage start and is complete by 0.5 months prior to the outage start.

**Milestone Owners**
Outage Manager (Planning)

**Sub-milestone Owners**
Vendor Project Managers
OPG Project Managers
Maintenance Manager – Refurbishment
Reactor Safety Manager – Refurbishment
Operations Manager – Refurbishment
Return to Service Manager

**Milestone Management Specific Requirements**
N/A

**Requirements to Satisfy the Milestone:**

(a) Fully developed schedule with:

(1) Level I schedule overview identifying the key components of the finalized Critical Path, major projects and programs.
(2) Level II schedule overview identifying the execution windows with durations.
(3) All Level III task level schedules with activities logically tied, resource loaded and levelled.
(4) All Level III schedules are fully integrated with IMF.

(b) Draft Rev ‘0’ schedule sent to Reactor Safety and Operations for review. Lessons learned from previous Unit execution have been reviewed and incorporated. Target completion 2 months prior to outage start.

(c) Reactor Safety and Operations recommendations incorporated. Target completion 1 month prior to the outage start.

(d) Final Schedule approved by the Director of Operations and Maintenance Refurbishment.

### 5.3.5 Schedule Update

The Revision 0 schedule issued prior to the start of the first Segment was based on the best information available at the time. This segmented milestone will allow a review and re-forecast of the Level III schedules to adjust for window movement, and increased planning detail for the upcoming segment.

**Milestone Timeline**

This segment milestone window opens 5 months prior to the segment start and is complete by 0.5 month prior to the segment start. This is not required for Segment 1, as the program milestone related to the Revision 0 schedule meets the requirements.

**Milestone Owners**
Outage Manager (Planning/Execution)

**Sub-milestone Owners**
Vendor Project Managers
OPG Project Managers
Maintenance Manager – Refurbishment
Reactor Safety Manager – Refurbishment
Operations Manager – Refurbishment
Return to Service Manager

**Milestone Management Specific Requirements**
N/A

**Requirements to Satisfy the Milestone:**

(a) Review the forecast for windows expected to cross into the next segment, as well as windows planned to start in the next segment.

(b) Updated project schedules and resource profiles incorporated into the schedule.

(c) Horizontal and vertical reviews complete for any windows that have moved or that will be carried over, and for any changes to execution strategy of work in the windows. A challenge meeting is held.

(d) Mitigation plans put in place for risks related to window movements.

(e) For the lead-out segment only (Reactor Safety Considerations during fuel load, refill and start-up):

    (1) Draft schedule sent to Reactor Safety and Operations by 3 months prior to the start of the lead out segment.

    (2) Probabilistic Risk Assessment (PRA) analysis and recommendations completed by Reactor Safety and sent to Outage Manager

(Planning/Execution) by two months prior to the start of the lead out segment.

(3) Reactor Safety and Operations recommendations incorporated into the schedule.

(4) The schedule has been reviewed and approved by the Director of Operations and Maintenance Refurbishment.

(f) Issue updated Revision ‘x’ Schedule.

### 5.3.6 Segment 0 Schedule Issued

The goal of this milestone is to develop a Level I schedule for the execution of Segment 0 activities. At this milestone, projects with Segment 0 work also have Level II schedules prepared. All DPZ WOs to be executed by the station have also been identified and flagged “DPZ”.

**Milestone Timeline**

This Program milestone window opens 30 months prior to the outage start and is complete by 20 months prior to the outage start.

**Milestone Owner**
Outage Manager (Planning)

**Sub-milestone Owners**
Vendor Project Managers with work in Segment 0
OPG Project Managers with work in Segment 0
Maintenance Manager – Refurbishment
Reactor Safety Manager – Refurbishment
Operations Manager – Refurbishment
Station Work Control Manager

**Milestone Management Specific Requirements**
N/A

**Requirements to Satisfy the Milestone:**

(a) Sub-owner Outage Manager (Planning): Prepare Level I with Level II Window Layout. Review with Station Work Control Manager. Lessons learned from previous Unit execution have been reviewed and incorporated. Target completion 20 months prior to the outage start.

(b) Sub-owner Outage Manager (Planning): Issue Level I Segment 0 schedule with Level II Window Layout, accepted by Station Work Control Manager. Target completion 20 months prior to the outage start.

(c) Sub-owner Outage Manager (Planning): WOs required for Outage Readiness have been identified and flagged “DPZ”. Outage Manager (Planning) has met Station Work Control/Outage Manager and have provided written/email concurrence. Target completion 20 months prior to the outage start.

## 5.4 Cost Estimate Milestones

### 5.4.1 Planning Estimate and Release

This milestone is to support a Board of Directors decision to release the funds required to execute preliminary planning (up to the next scheduled Board of Directors release).

**Milestone Timeline**

This Program Milestone window opens 32 months prior to the outage and is complete by 28 months prior to the outage. Completion date of this milestone is reliant on the date of the Board of Directors meeting.

**Milestone Owner**
Director Project Controls

**Sub-milestone Owners**
OPG Project Directors
Director Refurbishment Engineering
Director Operations & Maintenance – Refurbishment
Director Supply Chain
Director Finance

**Milestone Management Specific Requirements**
Kick-off Meeting
Lessons Learned

**Requirements to Satisfy the Milestone**

(a) Sub-owner Project Directors, Director Operations & Maintenance, Director Refurbishment Engineering – For preliminary planning, review the planning resource and cost estimates (PEPC level), cash flow, scope, schedules, risks and contingency. This should include any changes to the Release Quality Estimate at the work package level through change control processes. Target completion 30 months prior to the outage start.

(b) Sub-owner Director Project Controls – Evaluate and document any changes to the planning estimates and risk profile. Prepare estimate support package for Board of Directors review. Target Completion 29 months prior to the outage start.

(c) Sub-owner Director Project Controls – support Board of Directors meeting preparation. Target Completion 28 months prior to the outage start.

(d) Sub-owner Project Managers – Project Schedules and Estimates required to for Segment 0 and Execution Planning as well as long lead materials are prepared. Schedules and Estimates are to support next Gate Release (e.g. Gate 2). Target Completion 30 months prior to outage start.

### 5.4.2 Preliminary Estimate and Release

This milestone is to support a Board of Directors decision to release the funds required to execute planning and Segment 0 execution (up to the Execution release). Major outage scope is known for this milestone.

**Milestone Timeline**

This Program Milestone window opens 24 months prior to the outage and is complete by 18 months prior to the outage. Completion date of this milestone is reliant on the date of the Board of Directors meeting.

**Milestone Owner**
Director Project Controls

**Sub-milestone Owners**
OPG Project Directors
Director Refurbishment Engineering
Director Operations & Maintenance – Refurbishment
Director Supply Chain
Director Finance

**Milestone Management Specific Requirements**
Kick-off Meeting
Lessons Learned

**Requirements to Satisfy the Milestone:**

(a) Sub-owner Project Directors, Director Operations & Maintenance, Director Refurbishment Engineering – For remaining planning and Segment 0 execution, review the planning and Segment 0 execution resource and cost estimates (PEPC level), cash flow, scope, schedules, risks and contingency. This should include any changes to the Release Quality Estimate at the work package level through change control processes. Target completion 20 months prior to the outage start.

(b) Sub-owner Director Project Controls – Evaluate and document any changes to the planning estimates and risk profile. Prepare estimate support package for Board of Directors review. Target Completion 19 months prior to the outage start.

(c) Sub-owner Director Project Controls – Support Board of Directors meeting preparation. Target Completion 18 months prior to the outage start.

(d) Sub-owner Project Managers – Project Schedules and Estimates required for Segment 0 Execution and Execution Planning are prepared. Schedules and Estimates are to support next Gate Release (e.g. Gate 3a). Target Completion 20 months prior to outage start.

### 5.4.3 Execution Phase Final Estimate and Release

This milestone is to support a Board of Directors decision to release the funds required to execute the Refurbishment Outage. Updated schedule and risks are available for this execution release.

A set of source documents will be produced for this estimate, which will include the full set of project management plans, schedules, cost estimates, risk plans and other documents on a projects and/or functional basis.

**Milestone Timeline**

This Program Milestone window opens 14 months prior to the outage and is complete by 6 months prior to the outage. Completion date of this milestone is reliant on the date of the Board of Directors meeting.

**Milestone Owner**
Director Project Controls

**Sub-milestone Owners**
OPG Project Managers
Director Refurbishment Engineering
Director Operations & Maintenance – Refurbishment
Director Supply Chain
Director Finance

**Milestone Management Specific Requirements**
Kick-off meeting required
Lessons Learned Documented

**Requirements to Satisfy the Milestone:**

(a) Sub-owner: Project Managers, Director Operations & Maintenance, Director Refurbishment Engineering – Update Project Management Plans including a complete set of execution phase strategies. Target completion 10 months prior to the outage start.

(b) Sub-owner: Project Directors, Director Operations & Maintenance, Director Refurbishment Engineering – For execution phase, review the cost estimates (PEPC level), cash flow, schedules, risks and contingency. This should include any changes to the Release Quality Estimate at the work package level through change control processes. Target completion 10 months prior to the outage start.

(c) Sub-owner: Director Project Controls – Reviews and assembles the Final Estimate Package, which includes the full set of project management plans, schedules, cost estimates, risk plans and other documents on a projects and/or functional basis as required to meeting the Final estimates complete as

documented in Project Management Plan. Target completion 9 months prior to the outage start.

(d) Sub-owner Director Project Controls – Prepares a set of verification documents contained within the Final Estimate Package which represents the auditable confirmation that the Project representative document set reflects a Class III minimum or better required project definition maturity level. Target completion 7 months prior to the outage start.

(e) Sub-owner Director Project Controls – Prepare the estimate support package for Board of Directors review and support Board of Directors meeting preparation. Target Completion 6 months prior to the outage start.

(f) Sub-owner Project Managers – Project Schedules and Estimates required for Execution are prepared. Schedules and Estimates are to support next Gate Release (e.g. Gate 3b). Target Completion 10 months prior to outage start.

## 5.5 Material Milestones

### 5.5.1 Long Lead Materials Identified

Long lead materials (LLM) associated with approved scope in ROOMS are to be identified. For the purpose of this milestone, Long lead materials includes any material with a lead time (time from purchase order issue to delivery of material) of 6 months (180 days) or greater.

**Milestone Timeline**

This program milestone window opens 30 months prior to the outage start and is complete by 18 months prior to the outage start.

**Milestone Owner**
Parts Manager (EPC Procurement Manager)

**Sub-milestone Owners**
Vendor Project Managers
OPG Project Managers
Refurbishment Maintenance Manager
Director Refurbishment Engineering
Project Director, Projects & Modifications
Manager Supply Chain

**Milestone Management Specific Requirements**
N/A

**Requirements to Satisfy the Milestone:**

(a) Sub Milestone Owner: Director Refurbishment Engineering - Where OPG Engineering is the Design Service Provider, the DTL has identified LLM associated with project design modifications and a list has been issued to the associated Project Directors, the executing vendor organization, and the Parts Manager. Target Completion 19 months prior to the outage start.

(b) Sub Milestone Owner: Project Managers – LLM identified by OPG Engineering has been entered into the Parts Tracking Tool (PTT).

(c) Sub Milestone Owner: Project Managers – Where OPG Engineering is not the Design Service Provider, the associated project (and their DSP) has identified LLM associated with project design modifications and input the list into the Parts Tracking Tool (PTT). Target Completion 19 months prior to the outage start.

(d) Sub Milestone Owner: Maintenance Manager – Approved scope in ROOMS has been reviewed and long lead material needs have been identified by inputting LLM flags on the associated work orders as applicable. LLM is identified in the PTT. Target Completion 19 months prior to the outage start.

(e) Sub Milestone Owner: Director Darlington Projects & Modifications – All required LLM has been identified in the PTT. Target Completion 19 months prior to the outage start.

(f) Sub-milestone owner: Vendor Project Managers – Letter/email has been issued to the Project Director, from the EPC Vendor and accepted by the Milestone Owner, stating that the milestone has been met according to the above criteria.

### 5.5.2 Long Lead Material Purchase Orders Issued

Long lead materials should be ordered soon after identification. At this milestone, all long lead material PO's are to be generated so that identified material is delivered no later than 3 months prior to the execution window start.

**Milestone Timeline**

This Program milestone window opens 27 months prior to the outage start and is complete by 14 months prior to the outage start.

**Milestone Owners**
Parts Manager (EPC Procurement Manager)

**Sub-milestone Owners**
Vendor Project Managers
OPG Project Managers
Refurbishment Maintenance Manager
Project Director, Projects & Modifications
Manager Supply Chain

**Milestone Management Specific Requirements**
Milestone Kick-off meeting Required
Lessons Learned Documented

**Requirements to Satisfy the Milestone:**

(a) All long lead materials identified have purchase orders issued so that material will be delivered no later than 3 months prior to the execution window start.

(b) All purchase orders and target delivery dates have been recorded in the Parts Tracking Tool for material including those ordered through AS7.

(c) Letter/email issued to the Project Director, from the EPC Vendor and accepted by the Milestone Owner, stating that the milestone has been met according to the above criteria.

### 5.5.3 Material Purchase Orders Issued for Known Materials

At this program milestone, PO's should be generated so that known material requirements for all segments is delivered no later than 3 months prior to the execution window start. Purchase orders have been generated and input into the PTT by the organization doing the purchasing. Some material requirements will not be known at this milestone; these additional materials may be ordered as per the associated segmented milestone.

**Milestone Timeline**
This program milestone window opens 14 months prior to the outage start and is complete by 6 months prior to the outage start.

**Milestone Owners**
Parts Manager (EPC Procurement Manager)

**Sub-milestone Owners**
Vendor Project Managers
OPG Project Managers
Maintenance Manager - Refurbishment
Director Refurbishment Engineering
Project Director, Projects & Modifications
Manager Supply Chain

**Milestone Management Specific Requirements**
Milestone Kick-off meeting

**Requirements to Satisfy the Milestone:**

(a) Sub-owner Project Managers & Maintenance Manager: Known material requirements are listed in PTT and have approved MRs in AS7 (as applicable). Target completion 10 months prior to the outage start.

(b) Sub-owner Project Managers & Manager Supply Chain: Materials identified have purchase orders issued to ensure material is delivered no later than 3 months prior to the execution window start. PO references available in PTT. Target Completion 7 months prior to outage start.

(c) Letter/email issued to the Project Director, from the EPC Vendor and accepted by the Milestone Owner, stating that the milestone has been met according to the above criteria.

### 5.5.4 All Material Purchase Orders Issued

At this segment milestone, PO's should be generated so that all identified material is delivered no later than 3 months prior to the segment start. All material purchase orders have been generated and input into the PTT by the organization doing the purchasing.

**Milestone Timeline**
This segment milestone window opens 12 months prior to the segment start and is complete by 6 months prior to the segment start.

**Milestone Owners**
Parts Manager (EPC Procurement Manager)

**Sub-milestone Owners**
Vendor Project Managers
OPG Project Managers
Maintenance Manager - Refurbishment
Director Refurbishment Engineering
Project Director, Projects & Modifications
Manager Supply Chain

**Milestone Management Specific Requirements**
N/A

**Requirements to Satisfy the Milestone:**

(a) Sub-owners Director Refurbishment Engineering & Project Managers: Where the Design Organization and the Procurement Organization are different, the Modification Team Lead (or delegate) has turned over BOM to the executing organization in a face-to-face brief, with a focus on any changes to materials based on design revisions. Target completion 10 months prior to the segment start.

(b) Sub-owner Project Managers & Maintenance Manager: Material requirements are listed in PTT and have approved MRs in AS7 (as applicable). Target completion 9 months prior to the segment start.

(c) Sub-owner Project Managers & Manager Supply Chain: Materials identified are to have purchase orders issued to ensure material is delivered no later than 3 months prior to the execution window start. PO references available in PTT. Target Completion 6 months prior to segment start.

(d) Letter/email issued to the Project Director, from the EPC Vendor and accepted by the Milestone Owner, stating that the milestone has been met according to the above criteria.

### 5.5.5 At Risk Material List Generated

At this segment milestone, an “At Risk Materials” list is generated based on a review of the PTT and Material Requests (MRs). “At Risk Materials” are defined as parts that are forecast not to arrive before 3 months of the planned execution window start. Monthly updates of this list are expected to be reported to the Outage Manager (Planning/Execution) and associated Project Directors, and risk mitigation plans prepared as appropriate.

**Milestone Timeline**
This segment milestone window opens 6 months prior to the segment start and is complete by 3 months prior to the segment start.

**Milestone Owners**
Parts Manager (EPC Procurement Manager)

**Sub-milestone Owners**
Vendor Project Managers
OPG Project Managers
Maintenance Manager - Refurbishment
Project Director, Projects & Modifications
Manager Supply Chain

**Milestone Management Specific Requirements**
N/A

**Requirements to Satisfy the Milestone:**

(a) Milestone Owner has generated an ‘At Risk Materials List’ for the segment, identifying any material that is forecast for delivery less than 3 months from the start of the execution window of the work. List provided to the Outage Manager (Planning/Execution) and associated Project Managers and Directors for appropriate action. Target completion 3 months prior to the segment start.

### 5.5.6 Segment 0 Long Lead Material Purchase Orders Issued

Long lead materials should be ordered soon after identification. At this milestone, all long lead material PO's are to be generated for Segment 0 work so that identified material is delivered no later than 3 months prior to the execution window start.

**Milestone Timeline**

This Program milestone window opens 30 months prior to the outage start and is complete by 24 months prior to the outage start.

**Milestone Owners**
Parts Manager (EPC Procurement Manager)

**Sub-milestone Owners**
Vendor Project Managers
OPG Project Managers
Refurbishment Maintenance Manager
Project Director, Projects & Modifications
Manager Supply Chain

**Milestone Management Specific Requirements**
Milestone Kick-off meeting Required
Lessons Learned Documented

**Requirements to Satisfy the Milestone:**

(a) All long lead materials identified have purchase orders issued so that material will be delivered no later than 3 months prior to the execution window start.

(b) All purchase orders and target delivery dates have been recorded in the Parts Tracking Tool for material including those ordered through AS7.

(c) Letter/email issued to the Project Director, from the EPC Vendor and accepted by the Milestone Owner, stating that the milestone has been met according to the above criteria.

## 5.6 Engineering Milestones

### 5.6.1 Segment 0 Projects Permanent Modifications Design Complete

All identified Segment 0 project design modifications are fully approved at this milestone. Segment 0 project execution starts approximately 1 year prior to the outage start date and must meet the requirements of N-PROC-MA-0022, so early approval of modifications is required. This one year period to complete designs is considered adequate for replicated and less complex designs. The executing project manager(s) are responsible to ensure that any designs considered high risk are initiated early enough to complete the milestone by the due date.

**Milestone Timeline**
This Program milestone window opens 34 months prior to the outage start and is complete by 22 months prior to the outage start.

**Milestone Owners**
Director Refurbishment Engineering

**Sub-milestone Owners**
Vendor Project Managers with Segment 0 scope
OPG Project Managers with Segment 0 scope
Project Director, Projects & Modifications (as applicable)

**Milestone Management Specific Requirements**
N/A

**Requirements to Satisfy the Milestone:**

(a) All Segment 0 project design modifications (Design ECs) completed by a Design Service Provider (i.e. non-OPG) have lessons learned incorporated (as applicable), DCAVR complete and have been set to approved.

(b) All Segment 0 project design modifications (Design ECs) completed by OPG Engineering have lessons learned incorporated, are set to approved.

(c) Project EC's have been created as necessary and are set to approved.

(d) ADLs correctly identify Operations and Maintenance affected documents.

(e) Where the Design Organization and Executing Organization are different, the Executing organization and the OPG project team has been briefed on the final design and material requirements.

### 5.6.2 New Projects Permanent Modifications Planning Complete

This milestone has been removed.

### 5.6.3 Projects Permanent Modifications Design Complete

This segmented milestone is to complete the design of all permanent modifications to be executed in the segment. This one year period to complete designs is considered adequate for replicated and less complex designs. The executing project manager(s) are responsible to ensure that any designs considered high risk are initiated with enough time to complete by 12 months prior to the start of the execution segment.

**Milestone Timeline**
This segment milestone window opens 24 months prior to the segment start and is complete by 12 months prior to the segment start.

**Milestone Owners**
Director Refurbishment Engineering

**Sub-milestone Owners**
Vendor Project Managers
OPG Project Managers
Project Director, Projects & Modifications
Operations Manager
Maintenance Manager

**Milestone Management Specific Requirements**
N/A

**Requirements to Satisfy the Milestone:**

(a) All project design modifications (Design ECs) to be executed in the segment and completed by a Design Service Provider (i.e. non-OPG) have lessons learned incorporated, DCAVR complete and have been set to approved per N-PROC-MP-0090 Modification Process, and NK38-GUID-01900-10001 Darlington Refurbishment: Design Completion Assurance.

(b) All project design modifications (Design ECs) to be executed in the segment and completed by OPG Engineering have lessons learned incorporated, have been set to approved per N-PROC-MP-0090.

(c) EC related document requirements or Project EC's related to the modifications have been identified in AS7.

(d) Where the design organization and the executing organization are different, the executing organization and the OPG project team have been briefed on the final design and material requirements by the design teams.

### 5.6.4 Other Design Modifications Documents Issued

This segmented milestone is to complete any additional TMODs or NICRs be executed in the segment.

**Milestone Timeline**
This segment milestone window opens 18 months prior to the segment start and is complete by 10 months prior to the segment start.

**Milestone Owners**
Director Refurbishment Engineering

**Sub-milestone Owners**
Vendor Project Managers
OPG Project Managers
Project Director, Projects & Modifications

**Milestone Management Specific Requirements**
N/A

**Requirements to Satisfy the Milestone:**

(a) All known Temporary Modifications (TMODS) or Non-Identical Component Replacements (NICRs) Design ECs to be executed in the segment and completed by a Design Service Provider (i.e. non-OPG) have lessons learned incorporated, DCAVR complete and have been set to approved per N-PROC-MP-0090 Modification Process, and NK38-GUID-01900-10001 Darlington Refurbishment: Design Completion Assurance.

(b) All TMODS or NICRs Design ECs to be executed in the segment and completed by OPG Engineering have lessons learned incorporated, have been set to approved per N-PROC-MP-0090.

(c) EC related document requirements or Project EC's related to the modifications have been identified in AS7.

(d) Where the design organization and the executing organization are different, the executing organization and the OPG project team have been briefed on the final design and material requirements by the design teams.

### 5.6.5 Commissioning Specifications Issued

This segmented milestone is to issue commissioning specifications related to any design modifications to be executed during the segment.

**Milestone Timeline**
This segmented milestone window opens 10 months prior to the segment start and is complete by 6 months prior to the segment start.

**Milestone Owners**
Director Refurbishment Engineering

**Sub-milestone Owners**
Vendor Project Managers
OPG Project Managers
Project Director, Projects & Modifications
Sr Manager Equipment Reliability

**Milestone Management Specific Requirements**
N/A

**Requirements to Satisfy the Milestone:**

(a) Sub-owners Director Refurbishment Engineering, Project Managers, and Project Director Projects and Modifications - Commissioning specifications related to design modifications to be executed during the segment are issued.

(b) Sub-owners Director Refurbishment Engineering, Project Managers, and Project Director Projects and Modifications - Where the design is replicated and the same commissioning specification is being used, Engineering has completed a task to review the commissioning specification with respect to the replicated design and lessons learned, and either confirmed no changes are required, or have updated and issued the revised commissioning specification.

## 5.7 Training milestones

### 5.7.1 Training Readiness

This segmented milestone is to complete training for staff to be ready to execute work in the segment.

**Milestone Timeline**
This segmented milestone window opens 6 months prior to the segment start and is complete by the segment start date.

**Milestone Owners**
Director Refurbishment Training

**Sub-milestone Owners**
Vendor Training Managers
Darlington Training Manager

**Milestone Management Specific Requirements**
N/A

**Requirements to Satisfy the Milestone:**

(a) OPG Training requirements for execution of work in the segment are documented and approved.

(b) Training requirements for vendor execution of work in the segment are documented by vendor partners and provided to OPG (Director Refurbishment Training).

(c) Required training is available, and all staff requiring training has completed it, or are scheduled in a manner to support work execution. Proof of completion is available.

### 5.7.2 Segment Briefing Package

This segmented milestone is to issue the Segment Briefing Package to inform staff of the work and the timelines expected to be complete during the segment of the outage.

**Milestone Timeline**
This segment milestone window opens 3 months prior to the segment start and is complete by 1 month prior to the segment start.

**Milestone Owner**
Corporate Relations and Communication Manager (CRCM) – Refurbishment

**Sub-milestone Owners**
Outage Manager (Planning/Execution)
OPG Project Directors
Manager Integrated Scheduling

**Milestone Management Specific Requirements**
N/A

**Requirements to Satisfy the Milestone:**

(a) Sub-owner Outage Manager - ‘Segment Roadmap’ prepared and approved with overview of the major work in the segment and the expected timelines.

(b) Sub-owner CRCM - A communication plan has been prepared to inform staff and stakeholders of the segment transition.

## 5.8 Regulatory and Risk Milestones

### 5.8.1 Regulatory Approvals Plan Issued

This milestone is to issue a plan to obtain CNSC approvals or provide CNSC notifications as required to execute work or clear hold points.

**Milestone Timeline**
This program milestone window opens 24 months prior to the outage start and is complete by 15 months prior to the outage start.

**Milestone Owners**
Regulatory Affairs Manager – Refurbishment

**Supporting Managers**
Director Refurbishment Engineering
Director of Operations & Maintenance – Refurbishment
Regulatory Affairs Manager – Darlington Station
Refurbishment Project Directors
Project Director, Projects & Modifications

**Milestone Management Specific Requirements**
N/A

**Requirements to Satisfy the Milestone:**

(a) Milestone Owner has issued a plan detailing all CNSC approvals or notifications required during the refurbishment outage. The plan will include owners and dates for drafts, reviews, issuance, and expected CNSC responses. Support from Sub-milestone owners may be required.

(b) The Regulatory Approvals Plan has an associated tracking process (AR, RMO, P6, etc.) for assignments accepted by owners.

### 5.8.2 Regulatory Approvals Obtained

This segment milestone is to obtain CNSC approvals or provide CNSC notifications as required to execute work or clear hold points in the segment.

**Milestone Timeline**
This segmented milestone window opens 15 months prior to the segment start and is complete by 3 months prior to the segment start.

**Milestone Owners**
Regulatory Affairs Manager – Refurbishment

**Sub-milestone Owners**
Director Refurbishment Engineering
Director of Operations & Maintenance – Refurbishment
Regulatory Affairs Manager – Darlington Station
Refurbishment Project Directors
Project Director, Projects & Modifications

**Milestone Management Specific Requirements**
N/A

**Requirements to Satisfy the Milestone:**

(a) All CNSC approvals or notifications required during the segment have been obtained or are completed. Any approval not obtained by this milestone for work during the segment has a project recovery plan.

(b) The Regulatory Approvals Plan for the outage has been updated with references of letters sent/received, and any changes to the plan.

### 5.8.3 Risk Mitigation Plans Prepared

This milestone is to review and update the risks and mitigation plans for the projects. Best practice is that risks should be updated as part of ongoing project planning; the intent of this milestone window is intended to be a focussed review and update of the project risks incorporating lessons learned from previous outages and ensuring contingencies are built into the outage schedule. Risks should continue to be reviewed and updated throughout the project planning and execution.

**Milestone Timeline**
This program milestone window opens 12 months prior to the outage start and is complete by 7 months prior to the outage start.

**Milestone Owners**
Risk Manager – Project Controls

**Sub-milestone Owners**
OPG Project Managers
Vendor Project Managers
Operations Manager
Maintenance Manager
Radiation Protection Manager
Return to Service Manager
Project Director, Projects & Modifications
Director Refurbishment Engineering

**Milestone Management Specific Requirements**
Milestone kick-off meeting required

**Requirements to Satisfy the Milestone:**

(a) The risks and mitigation plans related to each project have been reviewed and updated, incorporating lessons learned from other projects and previous outages. Lessons learned may be obtained from RMO, SCRs, or project files.

(b) Risks are ranked and contingency assigned.

(c) First of a Kind (FOAK) or First in a While (FIAW) projects have held initial challenge meetings.

### 5.8.4 Pre-Outage Readiness Review Complete

This program milestone is to hold a pre-outage readiness review. This review is an executive challenge of readiness and risks.

**Milestone Timeline**
This program milestone window opens 4 months prior to the outage start and is complete by 2 months prior to the outage start.

**Milestone Owner**
Outage Manager (Planning)

**Sub-milestone Owners**
OPG Project Directors
Director Engineering – Refurbishment
Director Operations & Maintenance – Refurbishment
Director Project Controls
Project Director, Projects & Modifications

**Milestone Management Specific Requirements**
N/A

**Requirements to Satisfy the Milestone:**

(a) A readiness review package has been prepared detailing the level I schedule, milestone completion, significant risks and mitigation plans, FOAK/FIAW challenges, and execution resources.

(b) A challenge meeting has been held or a Divisional Self Assessment has been completed (at the discretion of the Milestone Owner).

(c) Actions from the challenge meeting or Divisional Self Assessment are documented with owners and due dates, and tracked in AS7 or RMO.

### 5.8.5 Reactor Safety Challenge Meeting Complete

This segmented milestone is to hold a Reactor Safety Challenge Meeting for work in the segment, based on the latest revision of the outage schedule. For segments where the Nuclear Safety risk has been eliminated, the Milestone Owner may disposition the requirement for a Reactor Safety Challenge Meeting. This disposition may be in the form of reference to approved governance, or a memo approved by the Director of Operations & Maintenance.

**Milestone Timeline**
This segment milestone window opens 3 months prior to the segment start and is complete by 1 month prior to the segment start.

**Milestone Owner**
Reactor Safety Manager – Refurbishment

**Sub-milestone Owners**
Director SUP
Director Unit Outage
OPG Project Directors
Director Engineering – Refurbishment
Director Operations & Maintenance – Refurbishment
Director Operations & Maintenance – Darlington Station
Operations Manager – Refurbishment
Project Director, Projects & Modifications

**Milestone Management Specific Requirements**
N/A

**Requirements to Satisfy the Milestone:**

(a) The Terms of Reference in N-PROC-MA-0013, Planned Outage Management, Milestone #38 are to be used as the basis for the challenge meeting as applicable to the segment and reactor state. The Milestone Owner determines applicability.

(b) Meeting will be chaired by the Reactor Safety Manager. Quorum for the meeting includes a minimum of the following 5 representatives: Duty Manager qualified Manager, Operations Manager or DOM, Outage Manager (Planning/Execution), Maintenance Manager, and an Engineering Manager or Engineering Director.

(c) The Reactor Safety Challenge meeting has been completed and any required actions have been documented in an SCR (C3 NFE) for resolution before the start of the segment, or on a timeline approved by the Refurbishment DOM.

(d) Manager Operations – Refurbishment and Station, has communicated the presentation(s) to licensed staff.

## 6.0 WINDOW MILESTONES

Window milestones are detailed in Table 2 and visually represented in Appendix C.

The Project Managers own all of these milestones in partnership with the Operations Manager for Work Permits and OPG Work Plans, and the Sr Manager Equipment Reliability for Commissioning Plans. For these specific partnered window milestones it will be crucial that the project provide the associated inputs on-time (approved CWPs and PC-1's) and provide face-to-face hand-off to Operations and/or Engineering and ongoing support to these functions during the windows. It is expected that at the start of each window milestone that lessons learned from previous Unit(s) executed will be reviewed and incorporated (as applicable).

Lessons learned are a mandatory post-window milestone which are intended to capture lessons learned and apply key updates to subsequent unit schedules while execution staff are still connected to the project, and memories are still fresh. These milestones are only required for scope that is planned to be repeated on a future refurbishment unit. If a project has consecutive windows of relatively short duration, post-window lessons learned and/or next unit milestones may be combined to include more than one window of similar work.

**Table 2 – Window Milestones**

| Window Milestone (wks) | Window Milestone | Owner | Sub Owners | Requirements |
|---|---|---|---|---|
| **-52-16** | Work Instructions Ready for Execution | Project Managers | Operations Manager<br>Sr Manager Engineering Plant Reliability | • Work Instructions updated and approved with lessons learned incorporated from previous units. Work instructions may include work plans and/or ITPs.<br>• CWPs Assembled (as required)<br>• ITPS accepted by TSSA (as required)<br>• D-FORM-10883 Step 2 Complete/Approved (or equivalent)<br>• OPG Support Tasks in AS7 with assessing complete<br>• All additional MR's Approved<br>• Operations Turnover Plans approved<br>• TPARs verified and updated/resubmitted as required<br>• PC1s Submitted<br>• Face-to-face briefing with Operations and/or Engineering for any required OPG work permit preparation, commissioning plans, or OPG workplans. |
| **-24-14** | Commissioning Plans and all OPG Workplans issued | Project Managers | Operations Mngr<br>Sr Manager Eng Plant Reliability | • OPG workplans that support vendor work in the window have been approved.<br>• Commissioning workplans to be executed in the window have been approved.<br>• All associated ITPs have been accepted by the TSSA.<br>• All associated OPG support tasks entered into AS7 and fully assessed. |
| **-24-12** | Materials Receipted or Dispositioned | Project Managers | Parts Manager | • Material and associated documentation has been receipted |

| Window Milestone (wks) | Window Milestone | Owner | Sub Owners | Requirements |
|---|---|---|---|---|
| | | | | • Identify Material Risks and need for contingency strategy. This risk is to be input into RMO and communicated to the Parts Manager and the Outage Manager (Execution). |
| **-22-12** | SATMs Approved | Project Managers | SERM | • SATMs required for work execution are approved |
| **-16-08** | Work Permits Prepared | Operations Manager | Project Managers | • PC1's Reviewed by OPG Operations and Permits prepared.<br>• Vendor Lock-Out-Tag-Out (LOTOs) prepared |
| **-12-08** | Project Window Readiness Review | Project Managers | Operations manager<br><br>Maintenance Manager | • Collaborative review of window readiness with Trades and OPG support group participation (as applicable).<br>• Verification of alignment of documentation, WO assessments, schedule logic, materials, tools, equipment, etc. |
| **-12-07** | Materials Released for Installation | Project Managers | Procurement Engineering | • All materials receipt inspected<br>• Any Required CATIDs Request issued to PE to set to ready |
| **-10-06** | Schedule Freeze | Project Managers | Outage Manager (Execution) | • Project execution schedule fully reviewed and verified.<br>• Logic or schedule changes after this milestone must be approved by the Outage Manager (Execution) or delegate. |
| **-07-05** | Materials Staged* | Project Manager | Quality Engineering | • Materials staged for execution<br>• PB Materials staged in the East Warehouse (or equivalent) by ITP.<br>• TSSA has released PB material |

| Window Milestone (wks) | Window Milestone | Owner | Sub Owners | Requirements |
|---|---|---|---|---|
| | | | | *This milestone may be modified by the project manager based on specific project requirements and as agreed by TSSA Inspector (where required). |
| **-10-06** | Holds Removed | Project Managers | Engineering Managers | • All AS7 holds resolved and removed |
| **-10-05** | Tools, Equipment and Facilities verified available | Project Managers | Maintenance Manager<br>Outage Manager (Execution) | • All special Tools, Equipment and Facilities listed out and verified available |
| **-06-02** | Document Exceptions Complete | Project managers | | • Exceptions listed in D-FORM-10883 complete |
| **-05-02** | Final Walkdowns | Project Managers | Construction Manager | • Walkdowns of the work site complete<br>• Construction challenge meeting held and actions complete (as required).<br>• Confirm CATIDs set to ready |
| **AFS – 2wks** | Ops & Maintenance Procedures issued for validation | Operations Manager | Project Manager | • Modifications requiring updates to Technical Procedures have revisions issued for validation 2 weeks prior to scheduled AFS. |
| **+01+08** | Lessons Learned | Project Managers | Operations Mngr<br>Maintenance Mngr<br>RP Manager<br>Engineering<br>Vendor field staff<br>SUP Project Manager | • Post window lessons learned meeting held with representatives from each of the execution groups.<br>• Lessons entered into RMO |

## 7.0 SEGMENT 0 PROJECT MILESTONES

Segment 0 project milestones are detailed in Table 3 and visually represented in Appendix D. These milestones apply to those projects being performed prior to the refurbishment outage and meet the intent of N-PROC-MA-0022 Integrated On-Line Work Schedule, requirements. It is important to note that this work is targeted to begin execution approximately one year prior to the refurbishment outage.

It is expected that at the start of each milestone that lessons learned from previous Unit(s) executed will be reviewed and incorporated (as applicable).

**Table 3 – Segment 0 Milestones**

| Milestone Window T-wks | Segment 0 Milestone | Owner | Sub Owners | Requirements |
|---|---|---|---|---|
| **52-20** | Vendor Work Instructions Approved and CWPs Assembled | Project Manager | | • D-FORM-10883 Step 2 Complete (or equivalent)<br>• All required support tasks in AS7 and assessing complete<br>• All MRs approved<br>• Operations Turnover Plans Approved<br>• TPARs Submitted |
| **52-30** | All Material PO's Issued | Parts Manager | Project Managers | • All material and PO's listed in PTT and AS7 (as applicable) |
| **28-20** | Materials Receipted | Parts Manager | Project Managers | • Materials delivered (not necessarily to site), including documentation<br>• Risks/Contingency identified |
| **27-21** | EPC Project Outlines submitted | Outage Manager | Project Managers | • EPC Project Outlines submitted to Station Work Control. Includes Level I and Station Resource Profile.<br>• Project P6 Schedules developed |
| **24-16** | OPG Workplans & Commissioning Plans Issued | Project Manager | Operations Manager; Engineering Manager | • OPG Workplans that support vendor work execution approved.<br>• Commissioning plans issued for modifications. |
| **22-12** | SATMS Approved | Project Manager | SERM | • All required SATMs applied for and fully approved. |
| **20-12** | CNSC Approvals | Regulatory Affairs Manager | Project Manager; Engineering Manager | • All CNSC approvals obtained or notifications made. |
| **20-16** | ITPs Accepted by TSSA | Project Managers | Quality Manager | • TSSA acceptance of all ITPs<br>• CWPs fully ready for execution. Exceptions per signed D-FORM-10883 (or equivalent).<br>• PC-1's submitted |

| Milestone Window T-wks | Segment 0 Milestone | Owner | Sub Owners | Requirements |
|---|---|---|---|---|
| **16-06** | Holds Removed | Project Managers | Engineering Managers | • Engineering non-parts holds removed by T-13<br>• BMU and Procurement Engineering by T-12<br>• Parts by T-6 |
| **14-10** | Project Readiness Review | Project Managers | | • Collaborative review of window readiness with PMs, trades and support organization participation.<br>• Confirmation of alignment of documentation and schedule.<br>• Schedule Logic Refined |
| **12-04** | Work Permits prepared | Operations Manager | Project Managers | • PC-1's reviewed by OPG Operations and Work Permits prepared<br>• Vendor LOTOs prepared |
| **12-08** | Project P6 Schedule Freeze | Project Manager | Outage Manager | • Project P6 Schedules fully reviewed and verified (IPG Schedule freeze). |
| **12-07** | Materials Released | Project Manager | Quality Manager | • Materials receipt inspected<br>• Any required CATIDs requests to PE to set to ready |
| **10-05** | Tools, Equipment and Facilities verified Available. | Project Manager | Maintenance Manager | • Any special equipment or tooling requirements verified (example: Cranes, special hoses, etc) |
| **07-05** | Materials Staged* | Project Manager | | • Materials Staged in Warehouse (PB Materials staged by ITP)<br>• TSSA released (as required)<br>• PB Holds released |

| Milestone Window T-wks | Segment 0 Milestone | Owner | Sub Owners | Requirements |
|---|---|---|---|---|
| | | | | *This milestone may be modified by the project manager based on specific project requirements and as agreed by TSSA Inspector (where required). |
| **06-02** | Document Exceptions Complete | Project Manager | | • Exceptions listed in D-FORM-10883 Complete.<br>• Confirm CATIDs set to Ready |
| **05-03** | Final Walkdowns | Project Manager | Construction Manager | • Field Walkdowns complete<br>• Final challenge meeting (as required NK38-REF-00211-00001)<br>• Review lessons learned as documented in RMO tool |

## Appendix A: Milestone Recovery Plan Template

To (SUP Project/Outage Manager):

From (Milestone or Sub-MS Owner):

Date:

SCR # (Documenting adverse condition):

RMO #:

Milestone # and Milestone Name:

Milestone Due Date:

1. Cause of milestone challenge:

2. Course of Action to recover the milestone
(Include: Due dates for Actions, Responsible individuals and Internal impacts).

| # | Action to Recover | Responsible | RMO# | Due Date |
|---|---|---|---|---|
| | | | | |

3. Identify effect on cascading or successor pre-outage milestones (if applicable).
This shall include dates by which all successor cascading pre-outage milestones will be met:

4. Date by which full recovery will be complete (prior to milestone):

5. Bi-weekly recovery review meeting (date/time/room/attendees):

Milestone Owner:

Print Name | Signature / Date

Accepted By
Milestone Owner
Line Supervisor:

Print Name | Signature / Date

Approved By:

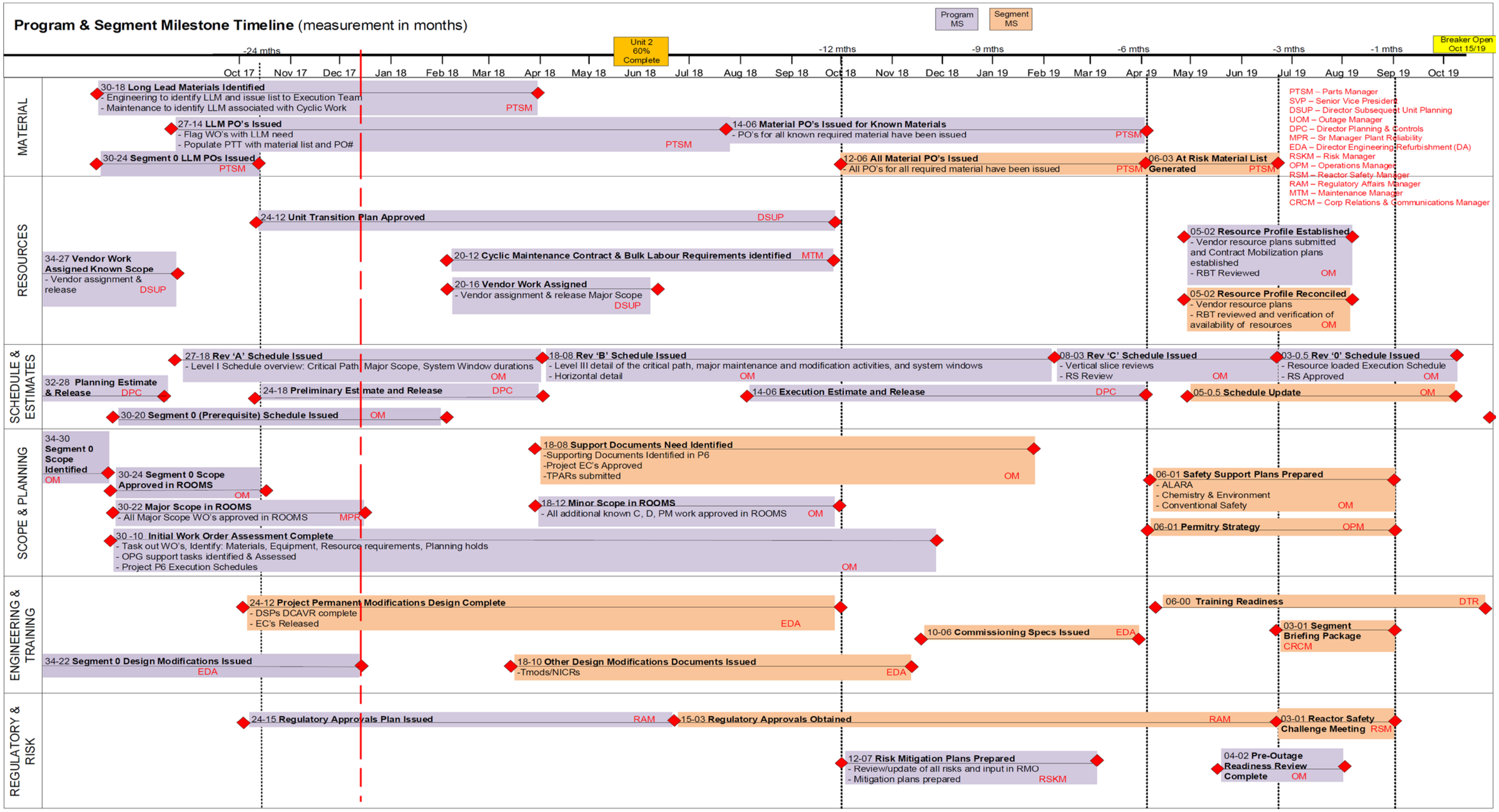
SUP Project / Outage Manager | Signature / Date

## Appendix B: Program & Segment Milestones

**Manual**

| Internal Use Only | | |
|---|---|---|
| Document Number: NK38-MAN-09701-10005 | | Usage Classification: Information |
| Sheet Number: MLST | Revision Number: R001 | Page: 77 of 81 |

Title: **REFURBISHMENT UNIT PLANNING MILESTONES**

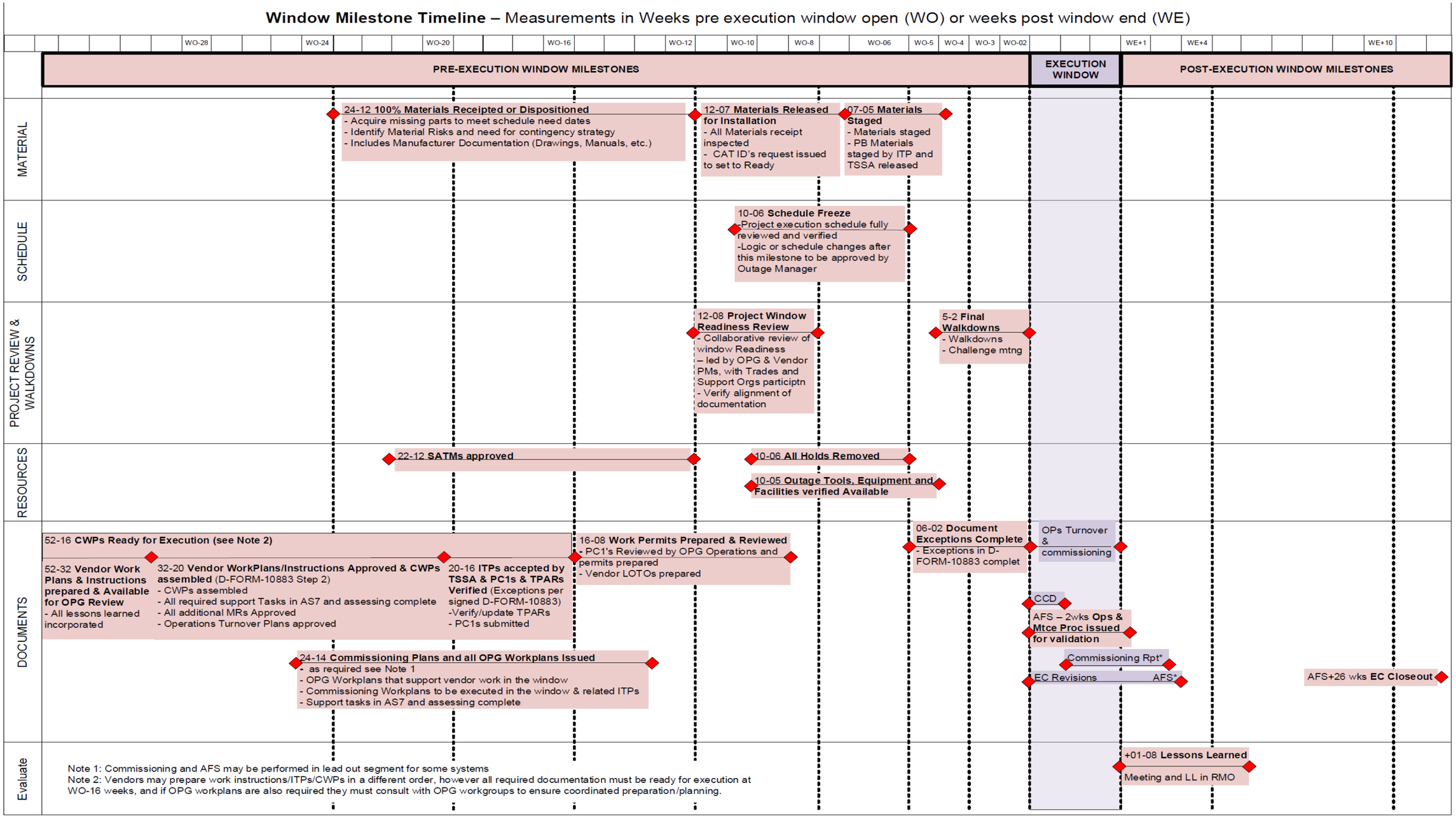


## Appendix C: Window Milestones

**Manual**

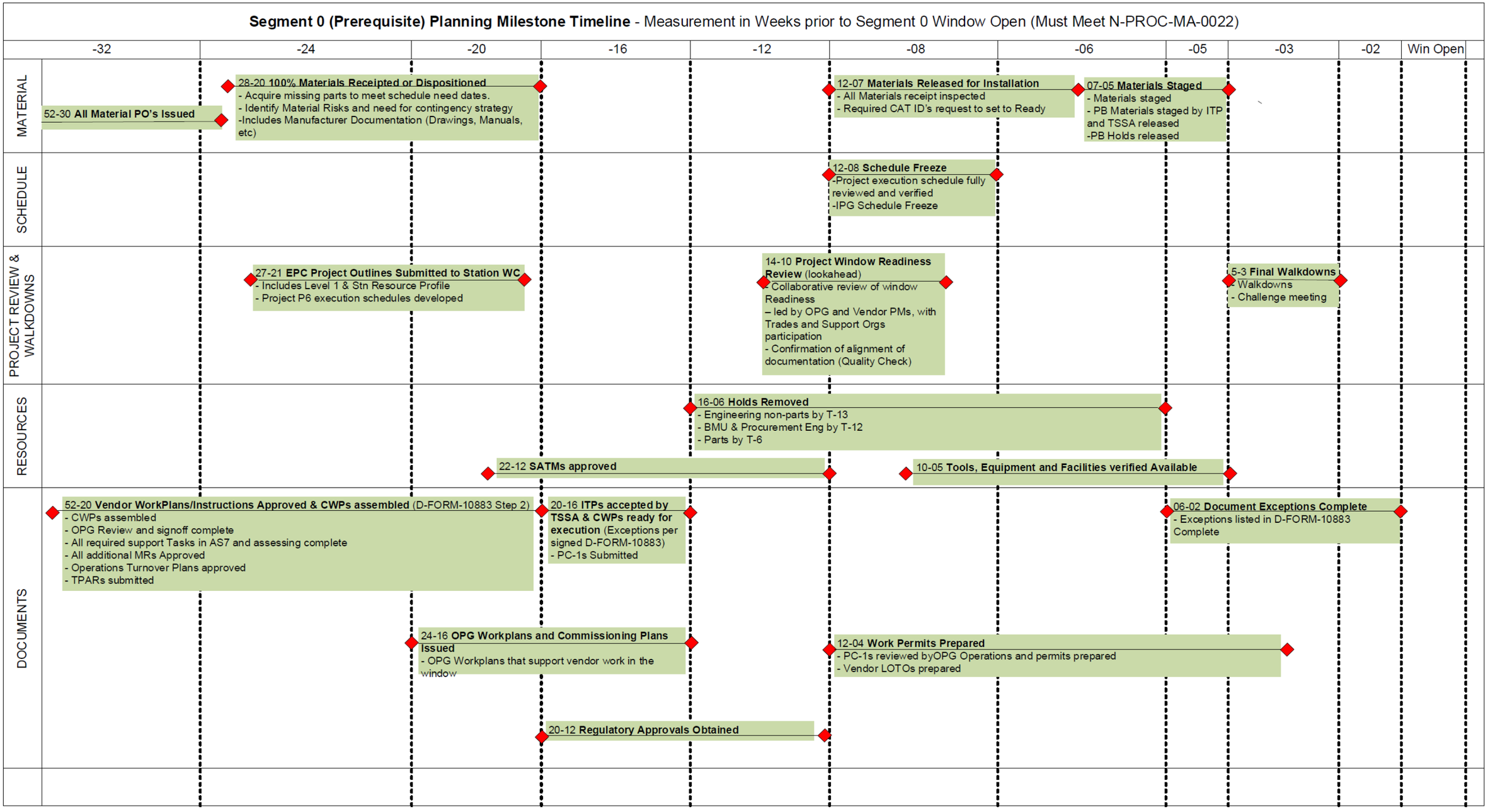
| Internal Use Only | | |
|---|---|---|
| Document Number: NK38-MAN-09701-10005 | | Usage Classification: Information |
| Sheet Number: MLST | Revision Number: R001 | Page: 79 of 81 |

Title: **REFURBISHMENT UNIT PLANNING MILESTONES**



## Appendix D: Segment 0 Milestones

**Manual**

| Internal Use Only | | |
|---|---|---|
| Document Number: NK38-MAN-09701-10005 | | Usage Classification: Information |
| Sheet Number: MLST | Revision Number: R001 | Page: 81 of 81 |

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