ONTARIO POWER GENERATION

Plan

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Title:
PROGRAM RETURN TO SERVICE MANAGEMENT PLAN

Program Return To Service Management Plan

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Revision Summary

Revision Number	Date	Comments
R000	2013-01-31	Initial issue.

1.0 INTRODUCTION

This Return to Service Management Plan describes the processes, procedures and organization that will be used during the Darlington Refurbishment Project to manage the commissioning and restart activities and demonstrate that all licence conditions have been met.

Refer to NK38-REP-09701-0450177, Darlington Refurbishment - Return To Service Strategy for a more detailed description.

2.0 PROGRAM RETURN TO SERVICE DESCRIPTION

The "return to service" (RTS) portion of the refurbishment outage covers the range of activities from completion of installation and maintenance work by OPG and Contractors, to reactor power at 100% FP.

2.1 Return to Service Phases

The RTS activities will occur in 4 phases:

- Phase A: restart activities prior to fuel load
- Phase B: fuel load and activities leading up to, but not including, guaranteed shutdown state (GSS) removal and first approach to critical (ATC)
- Phase C: ATC and low power testing
- Phase D: high power testing (>1%) and power escalation to full power

During these phases, a test programme will integrate:

- normal start-up testing
- non-standard tests that are unique to a refurbishment outage
- outstanding commissioning tests

Appendix A shows how the phases align with major milestones and hold points. The duration of these activities will be determined as the outage scope is refined and the testing and commissioning details are developed.

2.2 Commissioning and Restart Activities

RTS activities are comprised of two elements, which will be integrated into the restart logic:

- Commissioning – which is only associated with modified or new equipment. A Detailed Commissioning Specifications (DCS) will be prepared for all systems, structures and components (SSCs) that have been modified. The DCS will specify the critical parameters to be proven during commissioning and will include the acceptance criteria. OPG Nuclear Refurbishment Design Engineering is accountable for the preparation of the DCS as described in N-INS-00960-10000.

- Restart - returning equipment and systems to normal operation at the end of the outage. Generally, this equipment would have been in operation or in lay-up during the outage. A Detailed Restart Specification (DRS) will be prepared for all systems to identify equipment specific functional tests and system level tests that will confirm the normal operation of the system. These tests may be specified as routine SRSTs (Safety Related System Tests) or operating manual procedures. In some cases, the tests will require development of non-routine instructions. Refurbishment System Engineers will be responsible for preparation of the DRS and associated execution instructions as described in N-INS-09701-10002. For maintenance activities included as part of refurbishment scope, the components will generally be returned to service using normal station processes such as post maintenance testing.

2.3 Completion Assurance

There will be four levels of “completion assurance” performed as part of the return to service process, described in further detail in Section 3.2:

- Construction Completion Declaration (CCD)

- Modifications Available for Service process (MAFS).

- System Available for Service (SAFS)

- Readiness for Service (RFS)

Milestone completion assurance reports will be submitted to the CNSC in support of a request to remove a CNSC hold point. These reports will provide confirmation that all pre-requisites, commissioning, testing, system restart activities and commitments have been completed to allow release of the specific hold point.

In addition, CNSC Regulatory Document RD-360, Section 8.0 requires the licensee to submit design completion assurance reports. The design completion assurance reports for modifications identified in the Integrated Implementation Plan will be prepared per NK38-GUID-01900-10001, “Darlington Refurbishment: Design Completion Assurance” and submitted to the CNSC by Darlington Refurbishment Engineering well in advance of the Construction Completion Declaration.

3.0 PROGRAM RETURN TO SERVICE MANAGEMENT APPROACH

3.1 Roles and Responsibilities

The RTS Department will be part of Nuclear Refurbishment – Operations & Maintenance. The role of the RTS Department is to:

- develop and manage RTS processes and procedures (described in Section 3.2)
- develop an integrated RTS logic which coordinates restart testing and commissioning activities
- prepare commissioning and restart instructions
- execute commissioning and return to service activities using dedicated O&M resources. Contractors/Vendors will provide a supporting role during commissioning.

During the outage preparation phase, the RTS organization will be comprised of a Department Manager and Section Manager. These individuals will focus on the development of the RTS processes and procedures. They will also work with Project Managers and the Planning & Controls Department to develop an integrated RTS logic.

As the organization transitions from preparation to execution, the RTS Department will have dedicated resources from Operations, Maintenance and Engineering that prepare, coordinate and execute the plans to commission, start-up and demonstrate unit readiness for service. The mature organization will have three sections – Preparation, Execution and Available for Service (AFS) as described below. See appendix D for a graphical representation of the organization.

3.1.1 Return to Service Preparation Section

The RTS Preparation Group will be led by a Section Manager and have the following direct reports:

- Engineering
- Operations Specialist

- Maintenance Specialist
    - Control
    - Mechanical

This section will develop and coordinate governance, procedures and execution plans for commissioning and return to service activities.

3.1.2 Return to Service Execution Section

The group will be led by a Section Manager, with the following direct reports:

- Cost & Scheduling Technician
- System Window Coordinator/Work Control Team Lead
- Commissioning Engineers (matrix from Engineering)
- Operations and Maintenance Field Execution

This section will be staffed for the Execution Phase and be responsible for execution of the commissioning and return to service activities.

3.1.3 Return to Service Available For Service Section (MAFS/SAFS/RFS)

The group will be led by a Section Manager, with the following direct reports:

- MAFS/SAFS coordinator
- RFS preparation
- Document Clerk

As each project progresses during the Execution Phase, this section will interface with the contractor for system turnover for commissioning and coordinate modification and system available for service documentation. This section will also prepare the Unit Readiness for Service documentation.

3.2 Return to Service Management Process

A suite of procedures have been drafted to define the RTS requirements to ensure the activities are performed in a systematic sequence from pre-operational tests on individual pieces of equipment to integrated system testing and ultimately declaring the Unit in-service. The process flow of these activities is shown in Appendix B. The following sections provide a brief summary of the documents.

3.2.1 Construction Check and Test

At the completion of modification or refurbishment activities for a specific bundle of work and prior to turnover to OPG, the Contractor will perform a suite of “check-out & test” (COAT) activities on the SSC. These checks, generally performed prior to placing the equipment in-service for commissioning or restart and will confirm the SSC was installed or maintained as per the design requirements. The COAT activities are functional checks or inspections completed as a pre-requisite to commissioning and will generally be identified and verified in an Inspection and Test Plan (ITP). Reference draft document N-GUID-09701-10019.

3.2.2 Construction Completion Declaration

For specific bundles of work, the Contractor will confirm that all modification and non-modification work has been completed by preparation of a Construction Completion Declaration (CCD) package. The CCD will assemble documentation such as status of work packages, field changes, non-conformance reports, marked-up drawings, SCRs, ITPs, etc. This package will be reviewed and accepted by the NR-Project Manager and in turn the Return to Service Manager as a pre-requisite to initiating commissioning and RTS activities. Reference draft document N-GUID-09701-10021.

3.2.3 Modification Available for Service

Commissioning results will be documented in a Commissioning Report as described in N-INS-00960-10000. This report will be included in the modification available for service (MAFS) package prepared for acceptance by the Refurbishment Operations Manager. The MAFS process will confirm the modification has been installed and commissioned to meet the design requirements and is available to be placed in service. The MAFS process will follow N-PROC-MP-0090.

3.2.4 System Available for Service

Integrated with commissioning of individual modifications, a System Available for Service (SAFS) process will be followed to restart systems when unit conditions are appropriate. Restart of systems means returning them to the normal operating condition – removing lay-up, realigning valves, filling pipework, performing normal start-up testing, etc. The SAFS will also include a review of backlogs, pre-defined maintenance and System Health Reporting. Based on the status of the reviews (i.e. extent of open items), the NR Director – Operations & Maintenance will accept or reject the SAFS declaration. Reference draft document N-INS-09701-10005.

3.2.5 Unit Readiness for Service

A Unit Readiness for Service (RFS) process will be used to document and control how the unit is restarted. The RFS process will provide assurance at identified restart milestones, that integrated system testing is complete and that systems, conditions and pre-requisites are acceptable to progress past the milestone. There will be a number of RFS meetings scheduled as the unit progresses through the restart phases. For example, RFS meetings will be held prior to loading fuel, prior to removing the containment bulkhead and prior to approach to critical. This process and meetings will be similar to the RFS process used for a normal planned outage, but will also consider the readiness to execute unique requirements of a refurbishment outage, such as on-power commissioning tests, non-standard start-up tests and CNSC hold points. Reference draft document N-INS-09701-10006.

3.3 Program Plan and Key Milestones

The "return to service" (RTS) portion of the refurbishment outage covers the range of activities from completion of installation and maintenance work by OPG and the Contractor, to reactor power at 100% FP and will transition through 4 phases as described in Section 2.1 and Appendix A. The duration of these activities will be determined as the outage scope is refined and the testing and commissioning details are developed. Refer to NK38-PLAN-09701-10072, “Darlington Nuclear Refurbishment Unit 2 - Conceptual Level 1” for more detail.

Hold points will be used during the Unit Readiness for Service process to ensure prerequisites are complete and approvals are obtained prior to transitioning from one state to another. A number of hold points will require formal CNSC approval to proceed. The remaining hold points will be controlled by the Director- Operations and Maintenance. The following hold points will be identified in the schedule (preliminary):

- Moderator fill
- Fuel Load (CNSC hold point)
- Containment Bulkhead removal
- Heat Transport System (HTS) fill and pressurization
- GSS Removal/ATC (CNSC hold point)
- 1% - Low Power Testing (CNSC hold point)
- Turbine Run-up and Synchronize
- >30% - High Power Testing (CNSC hold point)

In addition to the hold points identified above, the schedule will include a Load Rejection Test, physics holds (still to be defined) and a thermal performance hold at 99% FP.

For each CNSC hold point, a Completion Assurance Document (CAD) will be produced, consistent with RD-360 requirements. The CAD provides confirmation to the CNSC that refurbishment activities required for a specified hold point have been successfully completed (design, installation, maintenance, testing, commissioning, Regulatory scope/commitments). In-complete items will be dispositioned and tracked.

3.4 Site and Department Transition Plans

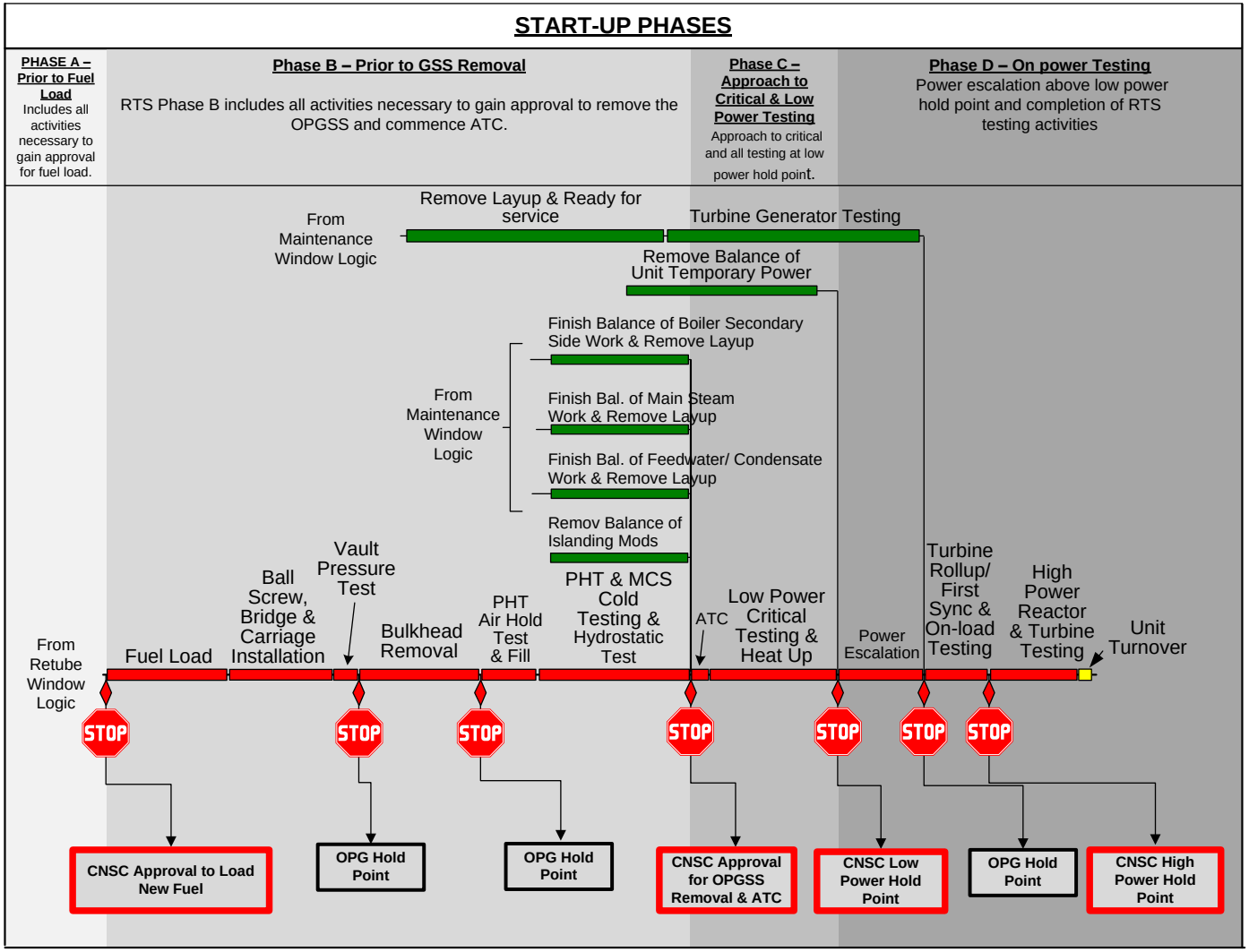
The effectiveness of transitioning between Station Operations to Refurbishment Operations and subsequently from Refurbishment Operations to Station Operations is critical to the overall success of the Darlington refurbishment. The transition plan for Darlington Refurbishment is described in the following documents:

- NK38-PLAN-09701-10097, " Interface Agreement Between Nuclear Refurbishment and Darlington Nuclear"
- NK38-REP-09701-10067, "Darlington Refurbishment Transition Plan Strategy"

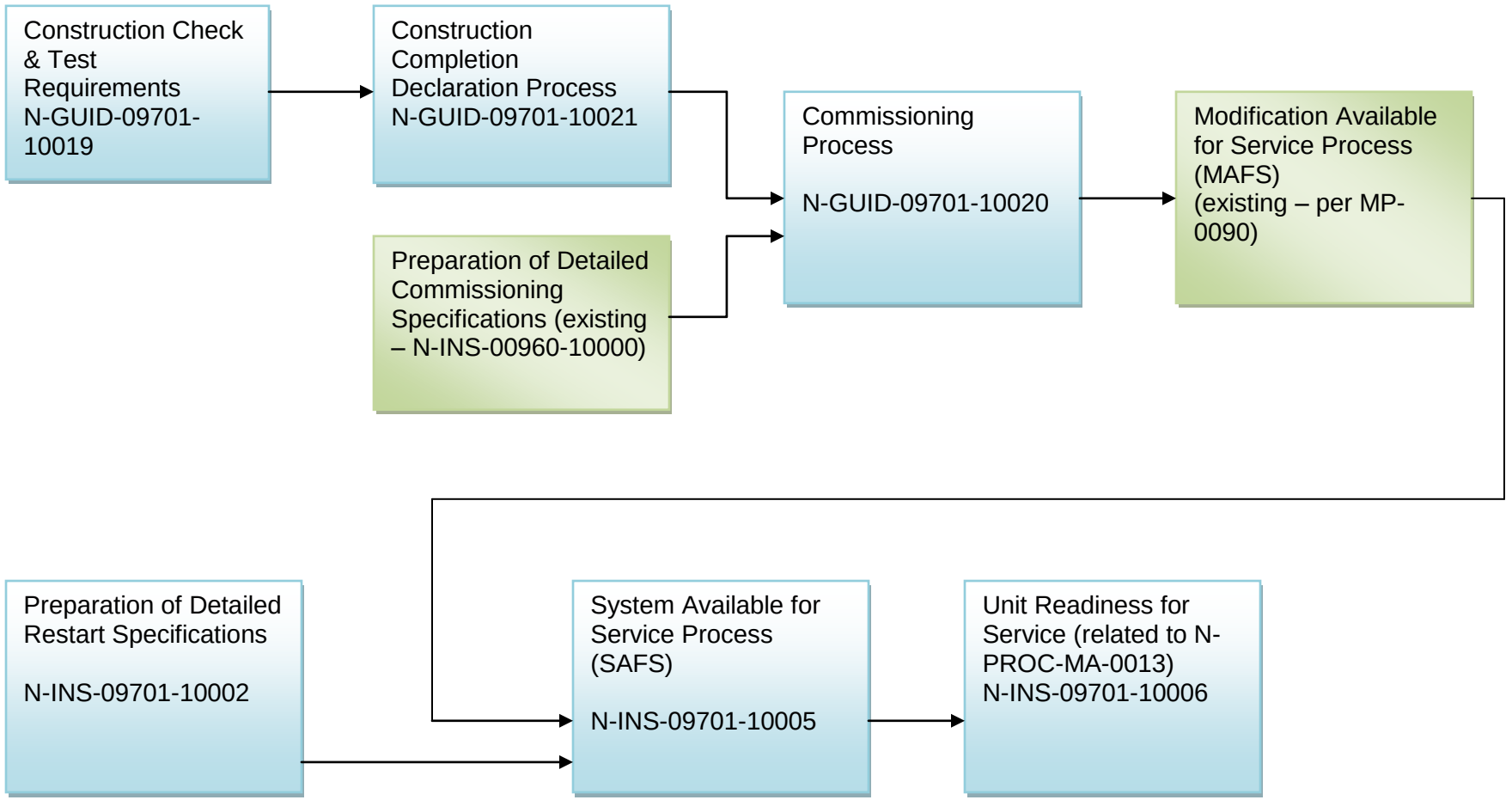
The Transition Plan identifies:

- development and completion of departmental assessments associated with transition and operational readiness throughout various phases of the Project
- the management team and lines of responsibility throughout the Project
- how and when the processes and programs, as documented in interface agreements and protocols, will be implemented and integrated.

Appendix A: Start-up Phases



Appendix B: RTS Processes/Procedures



Appendix C: Darlington Refurbishment – Return to Service Organization (Mature)