ONTARIO POWER GENERATION

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DNGS REFURBISHMENT MANAGEMENT PLAN – REFURBISHMENT ENGINEERING

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Table of Contents

1.0 PURPOSE

This management plan defines the mission, scope, responsibilities, and strategies for Refurbishment Engineering for the Darlington Refurbishment Project. In addition, this document describes the major deliverables, activities, organization and staffing plans, assumptions, constraints, risk and mitigation plans associated with the execution of the defined work program by Refurbishment Engineering.

Refurbishment Engineering is responsible to execute Engineering work within the governance structure and the expectations set out by the Chief Nuclear Engineer (CNE). Within Refurbishment Engineering there are 3 Divisions, Engineering Services, Nuclear Safety and Engineering Projects which are collectively responsible to deliver Engineering products and support the Project teams.

ENGINEERING SERVICES

The Engineering Services Division is accountable for the work packages as shown on the WBS (refer to the attached Work Breakdown Structure (WBS) in Figures 1a and 1b). The Director of Engineering Services is also the Design Authority (DA) for the project. The Division is responsible for Design, Procurement, and System departments of Engineering.

The Division shall be actively involved and take ownership for the development and subsequent approval of the modification definition package as defined in NK38-GUID-01900-10003 and commissioning requirements for engineering activities carried out as part of the Engineer, Procure and Construct (EPC) contract strategy model. In addition, it is expected that all Engineering Change Control (ECC) deliverables shall be accepted and/or authorized through this Division. The Division is responsible to provide input to the Project Oversight Plan to assure that the Vendor is conducting Engineering work in accordance with the EPC framework and provide assurance of the vendor's correct execution of the required Engineering activities.

NUCLEAR SAFETY

The Nuclear Safety Division is accountable for the work packages as shown on the WBS (refer to the attached Work Breakdown Structure (WBS) in Figures 1a and 1b). The Division is responsible for Integrated Safety Review (ISR) and support, Environmental Assessment (EA), Outage Safety Assessments and Analysis, Deterministic Safety Analysis and Probabilistic Safety Analysis associated with the modifications and operations evolutions. Additionally, the Division provides Reactor Safety Support as required to support the modification program and the maintenance and inspection programs for the refurbishment outage.

ENGINEERING PROJECTS

The Engineering Projects Division is accountable for the work packages as shown on the WBS (refer to the attached Work Breakdown Structure (WBS) in Figures 1a and 1b). The Division provides Contract Management Support for Projects and other functional groups within Engineering for contracted technical services. The Division is accountable

to make sure that the Engineering deliverables are correctly and clearly defined as well as planned. As such, the Division is accountable to ensure resource estimates are adequate to support required work and that resources are put in-place to meet defined deadlines and milestones. The Division also facilitates in the maintenance and reporting of metrics related to Engineering deliverables.

The Engineering Projects Division is accountable to manage the Owner's Support Services (OSS) Master Services Agreement (MSA) contract to provide a wide variety of Engineering Services to the project in support of the Project Integrated Master Schedule (PIMS - NK38-PLAN-00300-10000). As such the Division provides necessary resources to build and sustain the owner / contractor relationship in a culture of continuous improvement and to assist contract users in managing the non-technical aspects of Engineering contracted services.

2.0 MISSION

REFURBISHMENT ENGINEERING

The goal of Refurbishment Engineering is to execute work defined in the project plan consistent with the following principles:

- Deliver the required Refurbishment Engineering deliverables and performance results.
- Work with the highest safety benefit will be done first.
- Refurbishment Engineering work program will be managed consistent with best industry project management practices.
- Realistic objectives will be set, against which progress will be measured.
- Refurbishment Engineering commitments will be met.
- Refurbishment Engineering program will deliver the required results in a manner which results in minimum long-term cost to Ontario Power Generation.
- Refurbishment Engineering will deliver results at the required quality level.
- Work will be carried out in accordance with approved procedures.
- Rework will be kept to a minimum.

3.0 SCOPE AND RESPONSIBILITIES

3.1 Engineering Services Division

The Work Breakdown Structure (WBS) defines the scope and responsibilities of Engineering Services Division as follows:

Design Engineering: Major Design activities within Nuclear Refurbishment (NR) scope as defined by lower level WBS elements

- Design Support: Create; modify technical specifications and Standards within NR scope. Design within the EPC framework items assigned to the NR Design Department.
- Assessments: within the Darlington Scope Request (DSR) database, perform assessments to determine the path forward for plant equipment.
- Campus Plan: performing engineering activities for both Pickering and Darlington plants in support of the Plant Projects groups. Vendor Oversight: within the EPC framework, provide assurance of the vendor's correct execution of required activities.
- Modification Scoping: Create Design deliverables as per N-PROC-MP-0090, and support NR groups as required within NR scope.
- Modification Planning: Perform Design assessments to support alternatives for NR activities.
- Modification Detailed Design: Provide Subject Matter Expert (SME) advice on NR activities.
- Configuration Management: Provide Engineering resources, Design, acceptance, within NR scope.
- Base Design Briefs: to provide direction and options for Engineering work.
- Design Changes: to support changes, in cyclical or other specified work, not covered in the EPC contracts.
- Materials and Services: to support changes, in cyclical or other specified work not specified in EPC contracts. System Available for Refurbishment (SAFR)/ System Available for Service (SAFS).
- PE Evaluations/ Specifications: to support changes, in cyclical or other specified work not specified in EPC contracts

Reactor Engineering: Provide technical support for vendor oversight activities for Design activities within NR scope.

- Reactor Components and Registration
- Tooling
- Modifications and Mock-up

Construction and Support - Supply Engineering support for construction activities, within NR scope.

- Installation: Supply Engineering support for installation activities and oversight of EPC vendor activities
- Commissioning: Engineering Commissioning Activities - eg. work plans, processes. Commission, as per the Contract Owners Interface Requirements (COIR N-DAI-00150-10000), refurbished components and systems.
- Closeout: Supply Engineering support for closeout activities within NR scope.
- Materials and Services Procurement Engineering (PE): Provide engineering support for Procurement of Materials and Services within NR Engineering Scope.
- PE Oversight: within the EPC framework, provide assurance of the vendor's correct execution of required activities.
- New Cat Ids: Approve new Cat Ids as per the COIR.
- Vendor Documents: Ensuring vendor documentation is received and linked in appropriate OPG systems
- Material Equipment List (MEL) Bill of Material (BOM) Update: As per N-PROC-MP-0090, and COIR specifications, update Passport with specified information as required for future plan operation.

Systems/Components: Provide System Engineering Support within NR Scope,

- PE Evaluations/ Specifications: to support changes, in cyclical or other specified work not specified in EPC contracts.
- ECR/ Charters: Create, review, approve, accept ECRs, and Charters
- System Configuration: Systems & Component heath monitoring, trending, reporting.
- Layup/ Return to Service: Prepare Layup Specifications, Support Layup Plans, Prepare Return to Service Plans.

- Component Condition Assessment: CCAs.
- Equipment Reliability: Support for Special Safety System (SSS) Testing & Assessment.

Fleet Support: Provide Support to other units to deal with NR initiated issues

- Pickering Design Authority: Provide Pickering Design Authority activities within NR or Campus Plan scope.
- Darlington Design Authority: Provide Darlington Design Authority activities within NR or Campus Plan scope.
- Implement RD-310: Implement Safety Analysis requirements within Refurb Scope.
- NR - Fukushima Support: Provide Fukushima Project support as it relates to NR Scope.

Quality Engineering: Major Quality Engineering Activities as defined by lower level WBS elements.

- Corrective Action Plan (CAP) Program: Execution of CAP programs within NR scope.
- Surveillance: Execution of OPG NR Surveillance.
- Self Assessments: Execution of Self Assessments within NR scope.

Management accountability is consistent with the management role document N-MAN-08131-10000-S5-0080, Director, Engineering Programs.

3.2 Nuclear Safety Division

The Work Breakdown Structure (WBS) defines the scope and responsibilities of Nuclear Safety Division as follows:

Nuclear Safety Assessment and Support: Nuclear and Reactor Safety for the NR Project.

Nuclear Safety Standards/Procedures Admin: Revise/ update relevant Nuclear Safety related standards/procedures (eg: Nuclear Safety Design Guides).

Safety Analysis: To ensure Nuclear Safety Analysis support for the Refurbishment Project is completed, as required, for all phases of the refurbishment project lifecycle.

- Hazard Analysis: To provide needed Nuclear Safety Assessments to support the Refurbishment Project.
- Deterministic Safety Analysis: Deterministic analysis in support of modifications and outage configurations (eg: shutdown and running units safe operation during refurbishment outage, SOW definition, plans for modifications).
- Probabilistic Safety Analysis: Probabilistic Analysis in support of modifications and outage configurations (eg: DARA Level 3, development of DARA models and reliability models update for modifications).

Nuclear Safety Studies/ Assessments: Provide Nuclear and Reactor Safety assessments that are required for advancing individual phases of the NR project.

Reactor Safety Support: Reactor Safety Support as required to support the modification program, maintenance and inspection programs for the refurbishment outage.

Environmental Assessment (EA)/ Integrated Safety Review (ISR) Support: Provide required inputs and reviews in support of activities associated with ISR/EA. Provide responses and clarifications to CNSC questions on the ISR.

Global Assessment Report (GAR) and Integrated Implementation Plan (IIP):

Submit the IIP and GAR to the CNSC. Respond to questions on the IIP and GAR from the CNSC.

3.3 Engineering Projects Division

The Work Breakdown Structure (WBS) defines the scope and responsibilities of Engineering Projects Division as follows:

Engineering Project Management: Project Management for the Nuclear Refurbishment Engineering Projects.

Capability: Activities to define and create staff resources and infrastructure required for the NR Engineering Project.

- Rules and Governance: Create, modify, governance required for project operation, either base or Project specific. (under Design Engineering function).
- Training: Identify and execute required training for NR Engineering staff.
- Facilities: Obtain, maintain facilities for staff for NR project.

- Information Systems: Identify, obtain and maintain Engineering information systems (i.e. EWMS) for NR activities.

Supervision: Supervision activities for NR Management

- Staffing: Identify resource needs, hire staff for NR project.
- Schedule: Development and maintenance of Engineering schedule.

Scope: Identify NR Scope Elements by processing Darlington Scope Requests (DSRs), resource and map to appropriate scheduling tool, (i.e. P6).

Contract Management: Create; manage contracts for Engineering Resources outside major NR project activities.

Owner's Support Services (OSS) Contract Support:

- Manage OSS Master Service Agreement (MSA) terms and conditions (T&Cs). The OSS contract provides a wide variety of technical services (including Engineering), contract support services and other required services to the project in support of the PIMS.
- Assure OSS process abides by OPG governance and legal requirements.
- Provide necessary resources to sustain the owner/ contractor relationship in a culture of continuous improvement and to assist contract users in managing non-technical aspects of Engineering contracted services.
- Provide oversight on all stages of contracted services within the OSS MSA in accordance with N-GUID-00150-10002, *Technical Contractor Management Process* and assure that the best practices are followed.
- Develop processes required to effectively manage the OSS contract and/ or assure value for money.
- Implement lessons learned and OPEX. Identify contract/process risks and implement the mitigation strategies.

Management accountability is consistent with the management role document N-MAN-08131-10000-S5-0080, Director, Engineering Programs.

Engineering Studies: Maintain Project accountability for the definition and execution prerequisite elements to support decision making processes in the aid of DSR scope advancement.

Engineering Project Portfolio

- Provide Contract Management Support for Projects and other functional groups, and advise the Vice President (VP),NR Engineering with respect to:
    - Engineering Projects: Define and execute elements from other major projects that are purely or have a majority of Engineering work.
    - Engineering Scope: Manage and control the program scope.

4.0 STRATEGIES

- Act as one of the principle interfaces between the Project Managers and the various Engineering groups providing products to ensure:
- Engineering deliverables are correctly and clearly defined and planned.
- Resource estimates are adequate and are in-place to meet defined deadlines and milestones.
- Ensure Engineering Projects are integrated in PIMS and executed to meet stakeholder's needs. .
- Provide the necessary infrastructure to support the VP Refurbishment Engineering by efficiently and effectively managing the following:
    - Conduct of Engineering and Training programs (including TRPC, CRC participation) within Refurbishment Engineering.
    - Support Engineering Work Management and Engineering Metrics.

4.1 Project Management Principles (Industry Best Practice)

The Refurbishment Engineering work programs will be conducted in a manner consistent with industry best practice as defined by the Managed System Governance. Work will be scheduled and resourced in the specified tool (P6), and integrated with the Project Milestones and progress will be statused and reported. Missed commitments will be tracked and mitigated in the Corrective Action Program and other tools as appropriate.

4.2 Engineering Strategy

Engineering, Nuclear Safety & Project Engineering activities will be compliant with fleet practice and in accordance with Conduct of Engineering, N-PROG-MP-0007.

4.3 Execution Strategy Engineering Services

The Darlington Refurbishment Project will execute the work according to the following principles:

- Standard and Governance will be addressed early to provide a clear and consistent relationship with EPC vendors and others.
- An overall assessment of the Engineering Services needs associated with refurbishment will be completed early in the project through the DSR process.
- Studies and assessments which may affect refurbishment scope will be identified prior to relevant scope being frozen.
- Engineering Services creation of Design Requirements and other deliverables required for contracting activities will be resourced and scheduled to ensure timely completion of scheduling activities.
- Studies and assessments which affect cyclical maintenance or other outage activities will be performed to enable any required work to be identified and assessed, consistent with outage milestones and project deliverables.
- Timely support will be provided for in-outage activities which require Engineering Services support or review.
- The "Make/ Buy" decisions will follow these guidelines:

OPG STAFF WILL BE USED FOR

1. Real Time Station Support
    - System & Component Engineering
    - Plant Design Support/Parts Engineering
    - Fuel and Physics
    - Reactor Safety Support
2. Management of Engineering Vendors
    - Own and Approve Modification and Commissioning Requirements
    - Oversight & acceptance of Products
    - Direct the Commissioning Activities

3. Expertise Unique & Important to OPG
    - E.g. Fuel Channels
4. Engineering Programs to meet codes and industry standards*
    - Contract Management
    - Technical Project Management

VENDOR STAFF WILL BE USED FOR

1. Detailed Design for Projects to meet OPG's Design Requirements
2. Expertise not unique to OPG e.g. Turbine/ Generator, obsolescence
3. Support where vendor has the best expertise e.g. Darlington Fuel Handling Design by General Electric
4. Studies/ Reviews/ Analysis
5. Engineering Programs to meet codes and industry standards*
6. R&D

*Either group may execute Engineering Programs, based on best use and availability of resources.

4.4 Execution Strategy Nuclear Safety

The Darlington Refurbishment Project will execute the work according to the following principles:

1) An overall assessment of the Nuclear Safety issues associated with refurbishment will be completed early in the project (ISR).
2) Studies and assessments which may affect refurbishment scope will be identified prior to scope being frozen.
3) Nuclear Safety review of Design Requirements, and other deliverables required for contracting activities will be resourced and scheduled to ensure timely completion of scheduling activities.
4) Studies and assessments which affect cyclical maintenance or other outage activities will be performed to enable any required work to be identified and assessed, consistent with outage milestones and project deliverables.
5) Timely support will be provided for in-outage activities which require Nuclear Safety support or review.

6) The "Make/ Buy" decisions will follow these guidelines: see Section 4.3.

Nuclear Safety specific execution strategies are as follows:

Engineering Services Analysis, Nuclear Safety Analysis of Record and DARA updates for the Nuclear Refurbishment Project will be executed in collaboration with the center led Nuclear Safety organization.

Nuclear Safety Studies will be executed through Nuclear Refurbishment – Nuclear Safety Division.

The Safety Report update to meet the CNSC requirements for RD-310 implementation will be owned and managed by the center led Nuclear Safety organization. The RD-310 implementation plan will proceed in parallel with the Refurbishment under a separate timeline to be agreed to by the CNSC.

4.5 Execution Strategy Engineering Projects

1) The scope will be identified and reviewed using the Scope Review Board (SRB) process.

2) Activities identified in the major projects' scope will be identified and assigned its own project.

3) Engineering project activities will be scheduled to align with the project priorities and needs and will be executed as per the division of work, below:

4) The "Make/Buy" decisions will follow these guidelines: see Section 4.3.

Engineering Projects specific execution strategies are as follows:

Engineering Projects will resource 'overflow' or peak Engineering resource needs for the functional and project alternative methods such as OSS or Augmented staff services.

Engineering Resource Strategy

The Darlington Refurbishment Project will resource the work according to the following principles:

- Minimize number of staff positions incremental to current organization.
- Provide for staff exchange between other support organizations/ station to build/ support organization.
- Maintain Leadership/ Core Functions within OPG (there will always be an OPG member responsible for any project product or service).
- Buy options will be utilized when internal base resources are not available.
- Ensure staff development / training / opportunities for junior staff in place.

- Ensure staff development / training / opportunities for junior staff in place.
- The resourcing strategy for staff will be consistent with the project directives, with the following framework:

4.6 Quality Strategy

Darlington Refurbishment Quality Engineering Plan, NK38-INS-01900-10002, defines the processes, roles and responsibilities of the Quality Engineering (QE) function within the Darlington Refurbishment Organization. This document provides an overview of the scope of the QE function and the methods used to implement QE processes and programs throughout the Refurbishment life cycle. See Design Engineering Scope and responsibilities section.

The scope of the QE function includes, but is not limited to the following:

- Engineering Rules and Governance.
- Station Condition Records (SCR) and the Corrective Action Program (CAP).
- Self-Assessments within the Refurbishment organization.
- Benchmarking and Lessons Learned.
- OPEX.
- Quality Engineering Surveillance and Support to Project Oversight.
- Human Performance Improvement.
- Vendor Surveillance.
- Engineering Quality Improvement.
- Other duties as assigned by the Refurbishment Engineering Director.

5.0 MILESTONES AND KEY DATES

The overall Refurbishment Project team has developed a Program Level I Integrated Schedule (PIMS) NK38-PLAN-00300-10000 to identify and track the important project milestones and key dates.

Key engineering milestones have been included on this schedule either as a dedicated functional deliverable or as a project team deliverable supported by a functional engineering department. See below:

2013 Engineering Key Milestones

2013 Engineering Key Milestones	Status	Comments
75 Modification Design Requirements(MDR) Complete - 15 November	✓	
57 DSR's for Engineering Studies Complete - 15 November	✓	
Engineering Standards Complete - 30 November	✓	
Health of Scope < 20 Complete – 1 December	✓	
Submission of Integrated Implementation Plan (IIP) - 2 December	✓	

✓	✓	x	xx
Complete	On track	at Risk	Late

6.0 MAJOR WORK AND SUMMARY ACTIVITIES

Major Engineering work program is defined in the Level 1 Project plan (P6 schedule), with associated milestones.

7.0 ASSUMPTIONS AND CONSTRAINTS

Major assumptions for the integrated project are maintained in the Assumptions Database.

8.0 RISKS AND MITIGATION MEASURES

Engineering Program Risks are maintained in the Project Risk Register (RADAR). Risks are monitored on a bi-weekly basis with each Division Director.

9.0 OVERALL ENGINEERING RESOURCE PLAN

This section describes the staffing plan of the Overall Refurbishment Engineering that is necessary for the completion of the work scope throughout the DR Program life cycle.

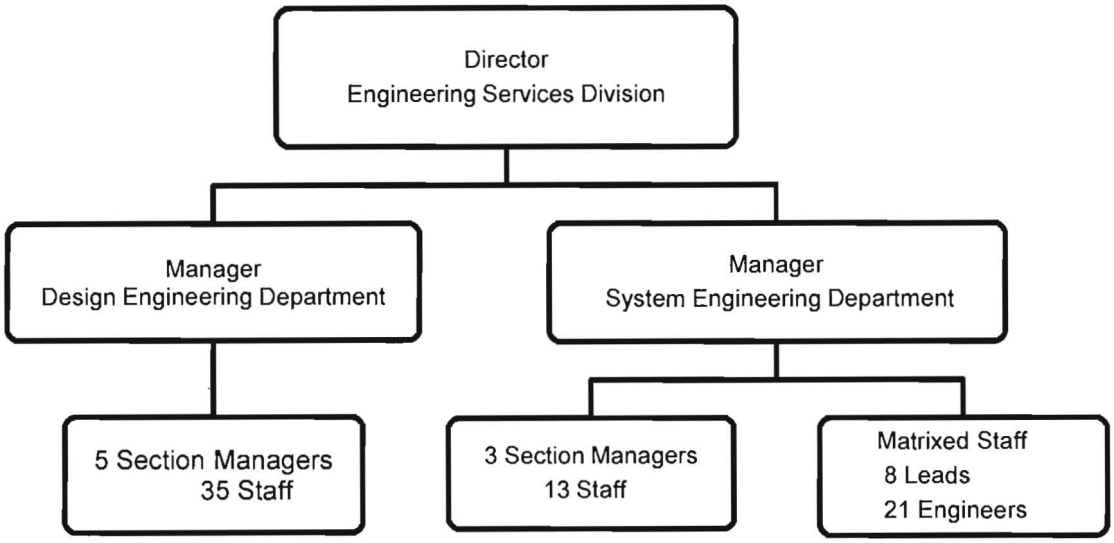
9.1 Overall Engineering Resources

	Core VP Engineering (Strat VI)	Core Directors (Strat V)	Core MG Scale (Admin)	Core Band G (Strat IV)	Core SM (Strat III)	Core Eng Nuc Ops (Strat II)	Core Eng Nuc Ops (strat II) F&IP	Station Swing Staff (strat II)	**Total Core**	**Matrix Engineers (Strat II)**	**Matrix Engineering Leads (Strat III)**
										Total	**Total**
2013	1	3	3	7	15	69	4	**0**	**131**	**21**	**8**
2014	1	3	3	6	13	62	4	**0**	**131**	**30**	**9**
2015	1	3	3	6	13	62	4	**0**	**131**	**30**	**9**
2016	1	3	3	5	13	58	0	**5**	**131**	**34**	**9**
2017	1	3	3	5	13	49	0	**6**	**131**	**42**	**9**
2018	1	2	2	5	13	51	0	**6**	**131**	**42**	**9**
2019	1	2	2	5	13	51	0	**6**	**131**	**42**	**9**
2020	1	2	2	4	12	48	0	**6**	**126**	**42**	**9**
2021	1	2	2	3	11	42	0	**3**	**115**	**42**	**9**
2022	1	1	1	3	11	35	0	**3**	**97**	**33**	**9**
2023	1	1	1	3	8	24	0	**3**	**76**	**27**	**8**
2024	1	1	1	3	6	18	0	**0**	**40**	**8**	**2**
2025	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**

9.2 Engineering Services Division Resource Plan

This section describes the organization and staffing plan of the Engineering Services Division that is necessary for the completion of the work scope throughout the DR Program life cycle.

The following organization reflects the Engineering Services Division from 2012-202



Engineering Services Total Resources

	Core Director (strat V)	Core Mngmnt Group (Admin)	Core Band G (strat IV)	Core SM (strat III)	Core Eng Nuc Ops (strat II))	Core Eng Nuc Ops (strat II) F&IP	Station Swing Staff (strat II)	**Matrix FTEs (strat II/III)**	**Total Core**
2013	1	1	3	8	44	4	**0**	**29**	**61**
2014	1	0	2	7	36	4	**0**	**39**	**50**
2015	1	0	2	7	45	4	**0**	**39**	**59**
2016	1	0	2	7	41	0	**5**	**43**	**51**
2017	1	0	2	7	32	0	**6**	**51**	**42**
2018	1	0	2	7	36	0	**6**	**51**	**46**
2019	1	0	2	7	36	0	**6**	**51**	**46**
2020	1	0	2	7	33	0	**6**	**51**	**43**
2021	1	0	2	7	31	0	**3**	**51**	**41**
2022	1	0	2	7	24	0	**3**	**42**	**34**
2023	1	0	2	6	16	0	**3**	**35**	**25**
2024	1	0	2	5	12	0	**0**	**10**	**20**
2025	0	0	0	0	0	0	**0**	**0**	**0**

9.2.1 System Engineering Resources

	Core Band G (strat IV)	Core SM (strat III)	Core Eng Nuc Ops (strat II)	Station Swing Staff (strat II)	**Matrix FTEs (strat II/ III)**	**Total Core**
2013	1	3	13	0	**29**	**17**
2014	1	3	14	0	**39**	**18**
2015	1	3	14	0	**39**	**18**
2016	1	3	14	5	**43**	**23**
2017	1	3	14	6	**51**	**24**
2018	1	3	14	6	**51**	**24**
2019	1	3	14	6	**51**	**24**
2020	1	3	14	6	**51**	**24**
2021	1	3	12	3	**51**	**19**
2022	1	3	12	3	**42**	**19**
2023	1	2	9	3	**35**	**15**
2024	1	2	5	0	**10**	**8**
2025	0	0	0	0	**0**	**0**

9.2.2 Design Resources

	Core Band G (strat IV)	Core SM (strat III)	Core Eng Nuc Ops (strat II)	Core Eng Nuc Ops (strat II) F&IP	**Total Core**
2013	1	5	31	4	**41**
2014	1	4	22	4	**31**
2015	1	4	31	4	**40**
2016	1	4	27	0	**32**
2017	1	4	18	0	**23**
2018	1	4	22	0	**27**
2019	1	4	22	0	**27**
2020	1	4	19	0	**24**
2021	1	4	19	0	**24**
2022	1	4	12	0	**17**
2023	1	4	7	0	**12**
2024	1	3	7	0	**11**
2025	0	0	0	0	**0**

The rationale for the Design function staffing is described below:

- Minimum capability requirements for Design Engineering to retain viability are 1 Stratum IV, 4 Stratum III's, and 3 engineers in each discipline of Mechanical, Electrical and Controls, 2 in the Civil discipline plus 4 for PE. This results in a minimum viability count of 20 FTE's. Below this level the ability of the Design function to work in compliance with Conduct of Engineering requirements is not achievable.

- We are running with one additional Stratum III in Mechanical as a result of the volume of work.

- Contract leverage in a smart buyer role increases this requirement by another 0.33 FTE per FTE of contracted work as experienced by Stuart Harris previously within OPG. The estimate for the smart buyer role is 5 FTE's given current work scope definition.

- Staff inexperience increases the requirement by another 6 FTE's for the next 30 months.

- Governance Management, Metrics, Estimating, and they additional incremental expectations on an emergent basis for Design Engineering add 3 FTE's

- Expected attrition and to SSIT program (- 2 in 2012) add a need for 4 FTE's

- Campus Plan and NEF work adds another 8 FTE's

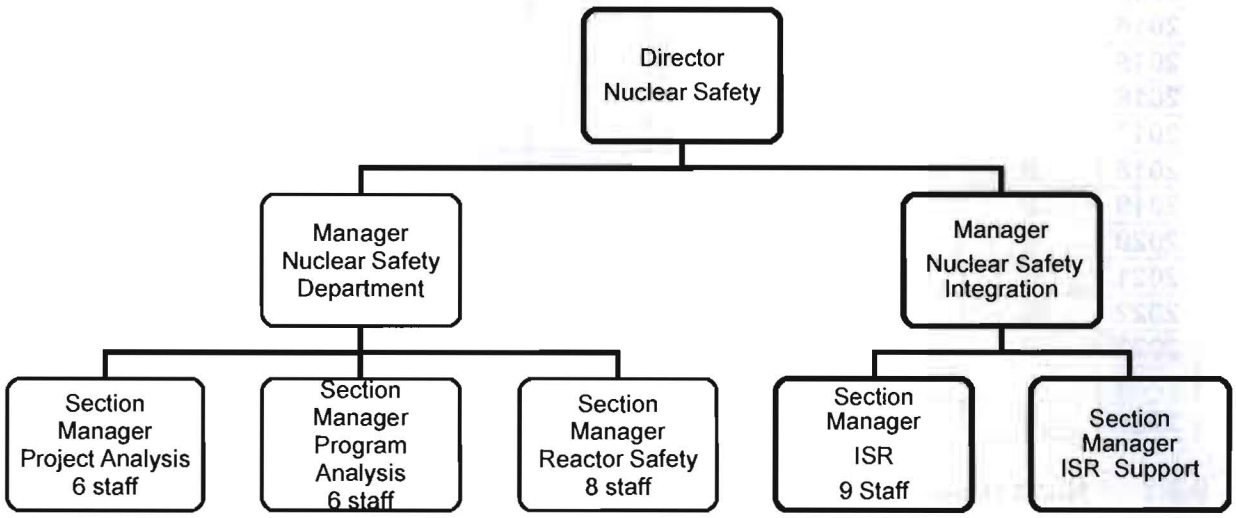
This puts the required staff count at 41 FTE's. Any additional demand above this will need to be filled by Purchased Services.

The minimum capability requirements for System Engineering are 17 which what current levels are defined at. Any additional Engineering staff are fully matrixed to the Project teams as tabulated in the table above. The basis for the minimum capability consists of 1 Stratum IV, 3 Stratum III's and 4 Nuclear Systems, 4 Conventional Systems and 5 Common Systems Engineers.

9.3 Nuclear Safety Resource Plan

This section describes the organization and staffing plan of the Nuclear Safety Division that is necessary for the completion of the work scope throughout the DR Program life cycle.

The following organization reflects the Nuclear Safety Division from 2012-2025.



9.3.1 Nuclear Safety Division

	Core Director (strat V)	Core Management Group (Admin)	Core Band G (Strat IV)	Core SM (Strat III)	Core Eng Nuc Ops (Strat II)	**Total Core**
2013	1	0	2	5	24	**32**
2014	1	1	2	4	25	**33**
2015	1	1	2	4	16	**24**
2016	1	1	1	4	16	**23**
2017	1	1	1	4	16	**23**
2018	0	0	1	4	14	**19**
2019	0	0	1	4	14	**19**
2020	0	0	1	4	14	**19**
2021	0	0	1	3	10	**14**
2022	0	0	1	3	10	**14**
2023	0	0	1	2	8	**11**
2024	0	0	1	1	6	**8**
2025	0	0	0	0	0	**0**

9.3.2 Nuclear Safety Integration

	Core Director (strat V)	Core Management Group (Admin)	Core Band G (Strat IV)	Core SM (Strat III)	Core Eng Nuc Ops (Strat II)	**Total Core**
2013	1	0	1	2	7	**11**
2014	1	1	1	1	7	**11**
2015	1	1	1	1	2	**6**
2016	1	1	0	1	2	**5**
2017	1	1	0	1	2	**5**
2018	0	0	0	1	2	**3**
2019	0	0	0	1	2	**3**
2020	0	0	0	1	2	**3**
2021	0	0	0	1	2	**3**
2022	0	0	0	1	2	**3**
2023	0	0	0	0	2	**2**
2024	0	0	0	0	2	**2**
2025	0	0	0	0	0	**0**

9.3.3 Nuclear Safety Analysis and Reactor Safety

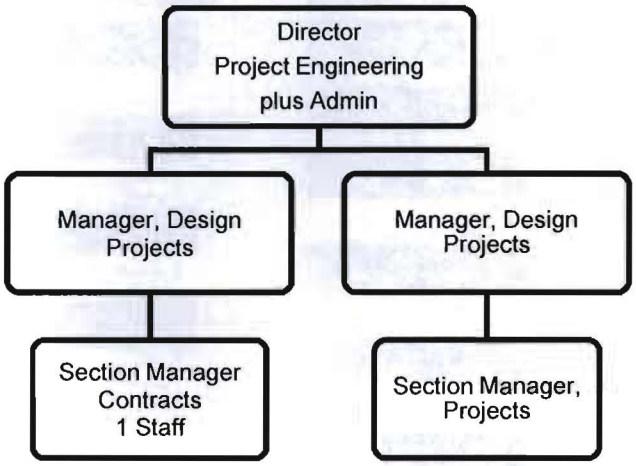
	Band G (Strat IV)	SM (Strat III)	Eng Nuc Ops (Strat II))	**Total Core**
2013	1	3	17	**21**
2014	1	3	18	**22**
2015	1	3	14	**18**
2016	1	3	14	**18**
2017	1	3	14	**18**
2018	1	3	12	**16**
2019	1	3	12	**16**
2020	1	3	12	**16**
2021	1	2	8	**11**
2022	1	2	8	**11**
2023	1	2	6	**9**
2024	1	1	4	**6**
2025	0	0	0	**0**

9.4 Engineering Projects Resource Plan

This section describes the organization and staffing plan of the Engineering Projects Division that is necessary for the completion of the work scope throughout the NR Program life cycle.

The following organization reflects the Engineering Projects Division from 2012-2014.

9.4.1 Engineering Projects



	Core Director (strat V)	Management Group (admin)	Core Band G (strat IV)	Core SM (strat III)	Core Eng Nuc Ops (strat II))	**Total Core**
2013	1	1	2	2	1	**7**
2014	1	1	2	2	1	**7**
2015	1	1	2	2	1	**7**
2016	1	1	2	2	1	**7**
2017	1	1	2	2	1	**7**
2018	1	1	2	2	1	**7**
2019	1	1	2	2	1	**7**
2020	1	1	1	1	1	**5**
2021	1	1	0	1	1	**4**
2022	0	0	0	1	1	**2**
2023	0	0	0	0	0	**0**
2024	0	0	0	0	0	**0**
2025	0	0	0	0	0	**0**

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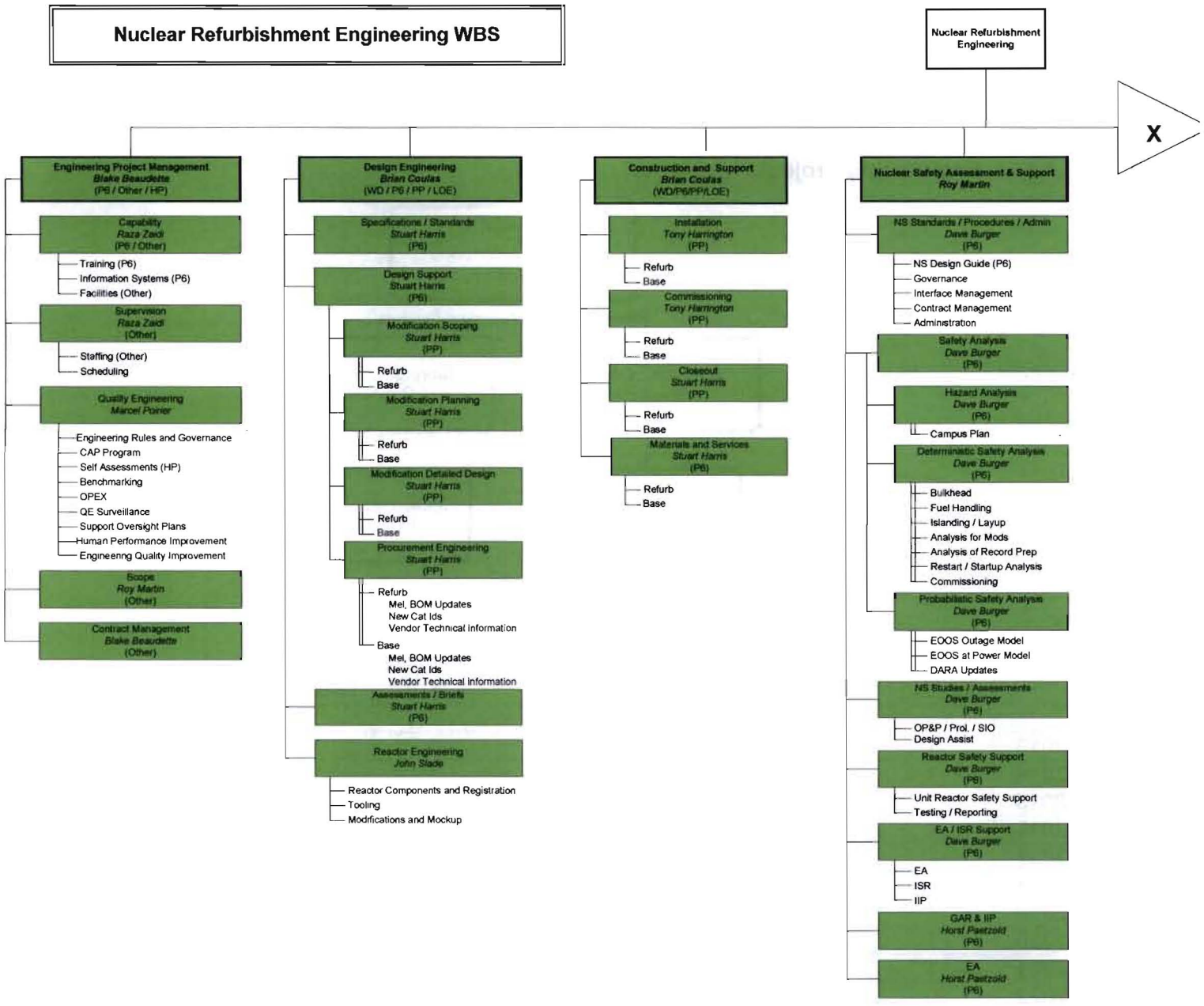
Sheet Number: 10	Revision Number: R000	Page: 24 of 25

Title:
DNGS REFURBISHMENT MANAGEMENT PLAN – REFURBISHMENT ENGINEERING

Figure 1a: Work Breakdown Structure



LEGEND	METRIC SOURCE	WBS PROGRESSION MAP
Project Functional Not funded by Refurb	P6 WD – Workdown Curve WU – Workup Curve PP - Passport Tempus Control Accounts HP – Human Performance Other LOE - Level of Effort	Beginning State → WBS Element Contains Activities → All Activities Moved into New WBS → New WBS Approved by Responsible Manager → End State: Project / Functional / Not funded by Refurb

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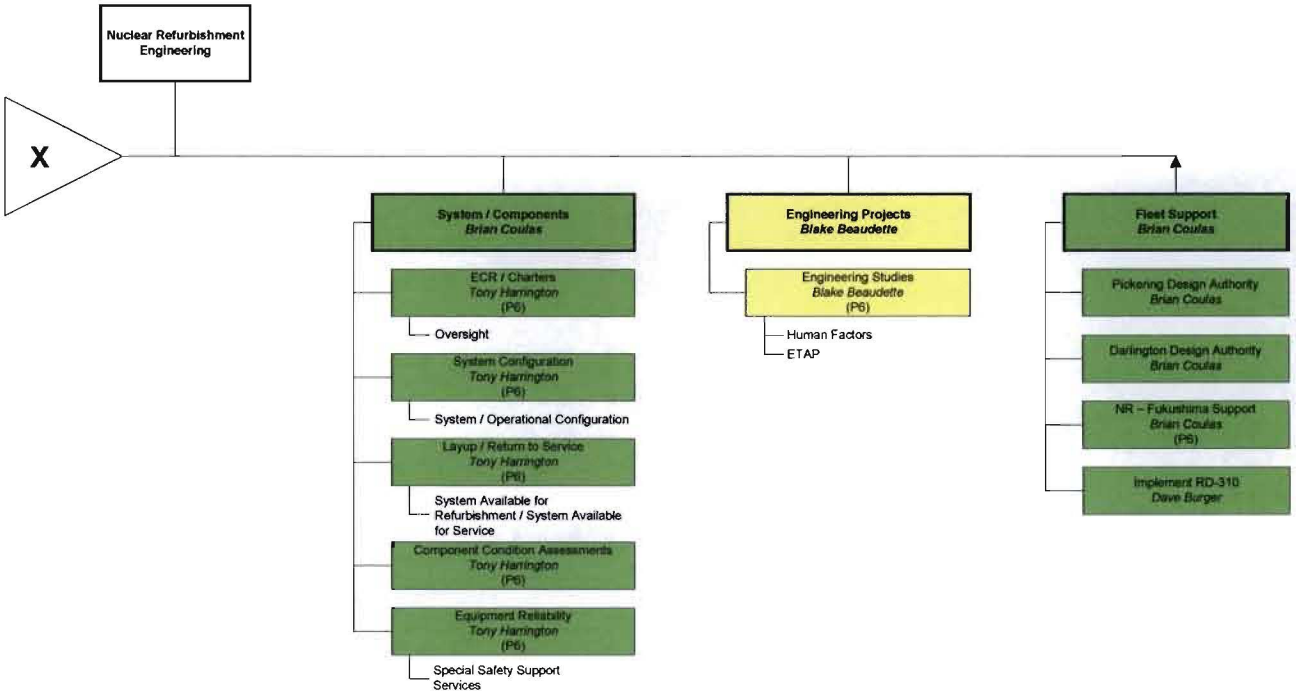
Sheet Number: 10	Revision Number: R000	Page: 25 of 25

Title:
DNGS REFURBISHMENT MANAGEMENT PLAN – REFURBISHMENT ENGINEERING

Figure 1b: Work Breakdown Structure

Nuclear Refurbishment Engineering WBS



LEGEND	METRIC SOURCE	WBS PROGRESSION MAP
Project Functional Not funded by Refurb	P6 WD – Workdown Curve WU – Workup Curve PP - Passport Tempus Control Accounts HP – Human Performance Other LOE - Level of Effort	Beginning State → WBS Element Contains Activities → All Activities Moved into New WBS → New WBS Approved by Responsible Manager → End State: Project / Functional / Not funded by Refurb