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N-FORM-11597-R000*

Scope of Work

(This document does not preclude the ES MSA, COIR or Other Contractual requirements)

1. Project Overview

Project #: 16-31555 **Project Title:** Darlington Heavy Water Management Building West Annex

Facility: Darlington **Document #:** NK38-SOW-38000-10011 **Revision #** 001

Problem Statement/Background:

The Heavy Water Management Building (HWMB) West Annex with Heavy Water (D2O) drum handling capability is required to provide additional D2O storage on site to support the Darlington Refurbishment. The HWMB West Annex is also required to facilitate Tritium Removal Facility (TRF) and DNGS operation improvements.

OPG retained the Contractor to perform the engineering, procurement and construction of the HWMB West Annex as further described in NK38-SOW-38000-10011 (the D2O Project). In April 2017, OPG paused the work on the D2O Project prior to the Contractor completing the full scope of work to perform a review of the most economical option to complete the remaining work. OPG and the Contractor agreed on terms for the Contractor to complete the remaining work on the D2O Project and documented this agreement in Minutes of Settlement entered into in June 2017.

This Scope of Work (SOW) defines the remaining work on the D2O Project that the Contractor must completely finish in order to perform the D2O Project (the D2O Remaining Work).

To meet the needs of Darlington Refurbishment the Contractor must ensure that the HWMB West Annex storage facility is substantially complete construction by December 31, 2018, completes Available for Service (AFS) milestone no more than 45 days following commissioning completion milestone and will ensure project final completion milestone is within 120 days following AFS complete milestone.

2. Scope Overview

Description of Work:

The Contractor is required to complete all remaining engineering, planning, procurement, construction, pre-commissioning check-out and test, review operating manual Technical Procedure Action Requests (TPARs) prepared by OPG and prepare draft maintenance manual (TPARs) and, closeout work to complete the work described in Scope of Work documents NK38-SOW-38000-10011 and, as necessary to meet the requirements set out in the Master Engineering Changes (MECs) 88528, 118880, 118632, 119821 and 119824, the associated Engineering Change (EC) packages, the associated Modification Design Requirements documents, and otherwise as required ensure the West Annex HWMB is entirely finished, fully functional, and fit for its intended purpose. For certainty, the Contractor is required to perform all remaining work described in NK-38-SOW-38000-10011 R000 except, and to the extent, of any express conflict with this revision of the scope of work (NK38-SOW-38000-10011 R001).

Appendix A provides a summary of the estimated status and remaining work in respect of each EC. However, this summary is for information purposes only and does not limit the Contractor's scope of work as describe above.

The Contractor's scope of work also includes performing all work expressly or implicitly described in the Project Change Notices (PCNs) listed in Appendix B and the Engineering Change Requests listed in Appendix C, and all of the Contractor's responsibilities set out in COIR N-COI-00120-00001 and the associated COIR List of Deviations.

The Contractor must also perform all modification work in accordance with N-PROC-MP-0090 and associated governance. The Contractor must complete all planning, scheduling and execution of all fieldwork in accordance with N-PROC-MA-0022 (work shall be planned and scheduled; i.e. work order tasks developed and set to "Ready" in AS7, in the Station IPG plan a minimum of 12 weeks prior to scheduled tie-in work week), and all other work expressly or implicitly required by OPG governance performing engineering, procurement and construction work of a similar nature to the D2O Remaining Work to deliver an entirely finished, fully functional facility that is fit for its intended purpose.

Contracting Services Required: Engineering, Procurement and Construction

Contractor/Owner Interface Requirements: ☒ As per ES MSA COIR (N-COI-00120-00001) unless otherwise stated on the List of Deviations

ES MSA Work Request #: ES 639

*Associated with N-MAN-00120-10001-SCOPE, Nuclear Projects Scoping Process

☐ Non-ES MSA vendor to be used (See remainder of SOW for details).

Online/Outage: Online **Specify Outages (If Applicable):** _____

Work Location: Inside Protected Area

Work will take place primarily in the unzoned area directly west of the existing Tritium Removal Facility and Heavy Water Management Building (TRF/HWMB). Work will also take place inside the TRF/HWMB. This includes Zone 3 work, with rubber areas required for radioactive work (i.e. for tie-ins to Heavy Water systems).

3. Approvals

	Signature	Date
Prepared by: C. Banica Section Manager, OPG P&M		2018-FEB-28
Reviewed by: D. Marjanovic Manager, Design Eng.		01-MAR-2018
Approved by: A. Colella Manager, Projects		2018-FEB-28

4. Description of Engineering Work

Contract Engineering Services Required:

☐ **NO (Remainder of this section is not applicable)**

☒ **YES (Check all Applicable Engineering Services and Complete Remainder of this section)**

Conceptual Engineering:	☐ YES	☒ NO
Modification Planning:	☒ YES	☐ NO
Detailed Engineering:	☒ YES	☐ NO
Procurement Engineering Support:	☒ YES	☐ NO
Installation/Commissioning Support:	☒ YES	☐ NO
Available for Service & Project Closeout Support:	☒ YES	☐ NO
Other Engineering/Technical Support:	☒ YES	☐ NO

Additional Comments/Details:

The Contractor is required to complete all engineering deliverables for the HWMB West Annex, including detailed design, preparation of material specifications. For all engineered equipment and other procured equipment components, the Contractor will prepare and submit system design manuals (ref: N-PROC-MP-0065, Preparation and Revision of System Design Manuals), compile and submit Original Equipment Manufacturers (OEMs) Installation, Operating & Maintenance manuals (ref. N-STD-AS-0014, Requirement for Technical Procedures) and prepare and issue TPARs for mechanical maintenance and control maintenance procedures (ref. N-PROC-AS-0028, Development Review And Approval Of Technical Procedures). The Contractor will also prepare and issue detailed commissioning specifications, third party reviews, provide procurement support, provide field construction support and complete design package closeout as described in NK38-SOW-38000-10011, R000 & R001, and the MECs, ECs, MDRs, governance and PCNs described in section 2 above and otherwise as required ensure the HWMB West Annex is entirely finished, fully functional, and fit for its intended purpose.

Appendix A provides an overview of the design EC status as of April 2017 and is for information purposes only. The list below summarizes some of the key deliverables identified in the governance that the Contractor is accountable to provide. This list is not exhaustive.

Miscellaneous Engineering Deliverables per N-PROC-MP-0090 include items such as:

- Maintain and update Design Plan for Master ECs
- Revision of previously completed documents to incorporate new information related to vendor material information and/or constructability review (constructability review updates pending OPG approval)
- Maintain up to date Issues Tracking File (ITF) and progress closure of outstanding issues
- Design manual preparation, changes/addendums to existing design manuals (See ECs 127515 and 127514)
- Detailed Commissioning Specifications (DCS)
- Including West Annex equipment into the OPG Master Equipment List (MEL).
- Updates for any documents identified by Document Scoping Checklist
- Final TSSA Registration for systems
- Provide material substitution (i.e. DBOM update) to suit purchasing or field needs
- Incorporate Field Changes into Design EC Revision prior to system energization for commissioning
- Review OPG prepared commissioning reports and prepare, review and approve AFS Reports, in accordance with N-PROC-MP-0090, including verification that all commissioning results meet the specified design requirements
- Management and close-out of Design ECs

For any intent design changes, all previously completed design phases (conceptual engineering, modification planning, detailed engineering) of the work shall be reassessed and evaluated for impact in accordance with N-PROC-MP-0090. The assessment and evaluation shall be completed by the Contractor and concurrence from OPG shall be obtained by the Contractor prior to design approval. Any intent design changes and work required to comply with N-PROC-MP-0090 is the responsibility of the Contractor and is part of the Contractor's scope of work. "Intent design change" is defined in N-PROC-MP-0090.

The Contractor is responsible for managing the Issue Tracking Files (ITFs) for MECs 88528, 118880, 118632, 119821 and 119824 and shall update all issues identified in these ITFs. This includes but is not limited to:

- Work with OPG to identify all stakeholders and, associated target need dates to close ITF open items
- Following-up with all issue owners to ensure timely completion of required actions
- Obtain dispositions from owners of ITF open issues
- Input the dispositions into the ITF for all open issues
- For issues which have an impact on any Stakeholder, follow-up with the stakeholder to confirm the disposition is acceptable and can be closed prior to closing the issue

For equipment, components and materials, the Contractor shall complete all activities identified in N-PROC-MP-0090, as required, prior to installation completion. This includes, but is not limited to:

- Verify Vendor Technical Documents (VTDs) meet OPG requirements in accordance with N-PROC-MP-0078
- Submit VTDs for OPG review
- Manage Stakeholder review of VTDs
- Revise technical specification as required
- Issue VTDs in Asset Suite
- Incorporate vendor information into design ECs, including updates to Asset Suite panels (i.e. MEL, EBOM, PMIDs, etc.)

5. Description of Procurement Work

Contract Procurement Services Required: ☒ **YES (Complete remainder of this section)**

☐ **NO (Remainder of this section is not applicable)**

Procurement Responsibility: All materials procured by Contractor.

Miscellaneous Materials, Tools and Equipment: Provided by Contractor.

Additional Comments/Details:

Scope of Work

The Contractor must provide all Goods, materials, tools, equipment and services required to complete the D2O Project as per the approved designs to completely perform this scope of work. This includes the supply of all required commissioning spares as well as the provision of critical spare parts lists and commissioning spare parts lists to OPG or as otherwise required to complete the D2O Project.

As part of the work completed to-date, OPG has provided to the Contractor all "free-issue" material. However, OPG will continue to provide all welding consumables in accordance with the Worksheet.

The Contractor will ensure that it meets the requirements of N-GUID-00680-10000 "EPC Review and Purchase Receipt Document Acceptance Process Guideline for Field Installed Items and Spare Parts".

The Contractor will prepare and execute an in-storage and in-situ maintenance and inspection program for all materials and equipment purchased by the Contractor and all materials and equipment transferred into the Contractor's care, custody, or control by OPG during the course of the D2O Project (ref: ES-MSA, Schedule 13, Free Issue Material, Section 2.1 (d), Contractor's Obligations). The Contractor will develop, issue and execute a Materials Management Plan for the storage and handling all materials and equipment in the Contractor's care, custody, or control to prevent damage, deterioration or loss, all in accordance with the Contractor's materials and equipment storage and handling quality program.

6. Description of Construction and Commissioning Work

Contract Construction/Commissioning Services Required:

☒ **YES (Complete remainder of this section)**

☐ **NO (Remainder of this section is not applicable)**

Construction and Commissioning Strategy:

The Contractor is responsible to complete all remaining installation planning (Asset Suite AS7 Work Order task assessing and scheduling related to all station tie-in scope, prepare and update all remaining Comprehensive Work Packages (CWPs), provide temporary power packs in excess of the ten (10) power packs originally supplied by OPG, complete all remaining construction and pre-commissioning activities, provide training and documentation and other work required to make the facility Available for Service (AFS), including work described in all Project Change Notices (PCNs) listed in Appendix B and Engineering Change Requests (ECRs) listed in Appendix C, and otherwise as required ensure the HWMB West Annex is entirely finished, fully functional, and fit for its intended purpose. The Contractor's scope of work also includes all required site specific training and onboarding and the provision of vendor specific on site support and training to complete equipment start-up/commissioning, operation and maintenance training of OPG personnel as documented in PCN045 & PCN093; ref: N-COI-00120-00001, section 4.64.

Tie-Ins/HWMB Relocates:

The table below summarizes the status of main tie-ins to the existing station services/systems. However, this summary is for information purposes only and does not limit the Contractor's obligation to complete all tie-ins as otherwise required.

The Contractor is responsible to complete all remaining installation planning (Asset Suite AS7 work order task assessing and scheduling) and construction work associated with all outstanding engineering change packages. OPG will provide, having regard to the Contractor's plan, the installation work plans for station system alignment, work protection permit application, radiation protection support, and work coordination with OPG staff (with the exception of coordinating with OPG Radiation Protection, which is the Contractor's responsibility and for which in all cases the Contractor will provide a minimum of 48 hours notice prior to any radiation protection support being required). The Contractor must follow N-PROC-MA-0022 and must properly, plan, schedule and coordinate its execution of the tie-ins with OPG through OPG's Work Controls group to align with the Darlington Station's Work Controls schedule. The Contractor will ensure work order tasks are set to "Ready" and scheduled in Asset Suite, AS7, a minimum of 12 weeks prior to tie-in planned early start date. In addition, the Contractor will give OPG at least one week written notice prior to the tie-in planned early start date informing OPG of its readiness prior to proceeding with the tie-in work. Following receipt of this notice, OPG will provide, in accordance with OPG's previously issued installation work plans, work protection permits, work coordination with OPG staff (excluding OPG Radiation Protection), and other support expressly set out in the work plans. If OPG does not provide such support, the Contractor will be entitled to an equitable change in the work to the extent that such change to the tie-in work is solely caused by OPG not providing the agreed support and provided the Contractor has performed its obligations related to the tie-in work.

The Contractor is responsible to drain lines (i.e. any hold up in lines that cannot be drained under normal operating procedures) following isolation by OPG. Where tritium is present during the tie-in work, the Contractor will ensure that the associated work is completed in rubber areas and in accordance with OPG radiation protection practices and governance. All areas of the TRF/HWMB are "Zone 3".

Where OPG supplies installation work plans related to the tie-in work, the Contractor will review, provide input and, acting reasonably, acknowledge the plans are acceptable by signing-off on them. These work plans are for the purpose of planning and coordinating activities between OPG and the Contractor, but do not replace elements of the Contractor's QA program (such as, but not limited to, Comprehensive Work Packages, Inspection Test Plans, etc.) or otherwise limit the Contractor's obligations to completely and properly perform its scope of work.

For the tie-ins and relocations listed below, the Contractor is also accountable to prepare and issue the associated Commissioning Reports.

EC#	Design EC Title	Discipline	Field Status	Notes
121327	Reconfiguration of the D2O Cleanup System	MECH	Not started	To be executed in this contract scope. Likely rubber area.
120405	Tie-in to D2O Cleanup System	MECH	Not started	To be executed in this contract scope. Likely rubber area.
120401	Tie-in to Moderator D2O Supply	MECH	Not started	To be executed in this contract scope. Likely rubber area.

120402	Tie-in to PHT D2O Supply/Transfer System	MECH	Completed	Close-out activities are part of this contract scope.
120408	Tie-in to Upgrader System	MECH	Partially completed	Removal of NV620 and close-out activities are part of this contract scope
120427	Tie-in to Domestic Water System	MECH	Completed	Close-out activities are part of this contract scope
120428	Tie-in to Demineralized Water	MECH	Completed	Part B and Part C tie-ins are part of this contract scope
120426	Tie in to Transfer Sewage System	MECH	Cancelled	Cancelled – not in Contractor's scope
EC#	**Design EC Title**	**Discipline**	**Field Status**	**Notes**
120720	Tie-in to Fire Protection Water	MECH	Not started	To be executed in this contract scope
120557	Tie-in to Breathing Air	MECH	Completed	Close-out activities are part of this contract scope.
120784	Tie-in to Active Drainage	MECH	Started	To be executed in this contract scope
120421, 120422, 120423, 120424	FINAL PROCESS SYSTEM TIE-INS (Downgraded D2O Transfer System, Feed & Product System, D2O Cleanup System, Upgrader System Part B, DIOTS Part B)	MECH	Not started	To be executed in this contract scope
120488 120489 120483	Tank control System, Tank Level Control, DCU4	I&C	Not started	To be executed in this contract scope
120351	Fire Detection	I&C	Not started	To be executed in this contract scope
120492	FAAGM and FAATM	I&C	Not started	To be executed in this contract scope
120452	Relocation of Mechanical Lines in Loading Bay	MECH	Completed	
120577	Relocation of Elec/IC Lines in Loading Bay	ELEC	Partially completed	Remaining work and closeout to be executed in this contract scope
120400	TMOD Yard Drainage	CIVIL	Partially completed	Remaining work and closeout to be executed in this contract scope
120340	PMOD Relocation of SG Cable Duct	ELEC	Partially completed	Remaining work and closeout to be executed in this contract scope
120341	Relocation of TRF loading dock roof/condensate and underground Line	MECH	Partially completed	Remaining work and closeout to be executed in this contract scope
120670	RELOCATION OF GAS SERVICES INSTRUMENTATION	I&C	Partially completed	Remaining work and closeout to be executed in this contract scope

Note, as part of work completed to-date, OPG has provided all temporary power requirements, including 10 power packs, as needed to satisfy all OPG commitments in this regard. The provision of any additional temporary power is the responsibility of the Contractor.

Pre-Commissioning by the JV

The COIR outlines OPG's and the Contractor's respective pre-commissioning and commissioning responsibilities. These responsibilities may be further described in the associated Detailed Commissioning Specification (DCS) for each EC. The Contractor's scope of pre-commissioning work includes all work that is necessary or reasonably incidental to the performance of all activities described in this section.

Pre-Commissioning activities are the responsibility of the Contractor and will be performed to verify that the Contractor's work meets the D2O Project design and quality requirements and otherwise, as required, to ensure the HWMB West Annex is entirely finished, fully functional, and fit for its intended purpose. The Contractor will ensure that all equipment, systems, facilities and works are capable of being performance tested during commissioning.

As part of pre-commissioning, the Contractor must:

- Prepare and issue Inspection and Test Plans (ITPs) that describe and document the requirements of the construction verification / pre-commissioning activities. ITPs will reference applicable test procedures and standards, testing attributes and acceptance criteria, and will identify and document OPG and authorize inspection agency (AIA) witness and documentation tasks. Each ITP will require OPG approval to implement and

close-out, unless otherwise waived by OPG. Pressure boundary ITPs will be signed off by the TSSA.

- Perform post implementation dynamic testing, adjustment, and balancing (as applicable) of building services, specifically fire protection (DECs 120351 & 120615), building services including telephone/LAN, public address, building doors, hoists & water heaters (DECs 120349, 120352, 121147 & 127532), building plumbing (DEC 120588), building ventilation/HVAC systems (DECs 120494 & 121323) in accordance with ITPs and third party system performance testing requirements.
- Perform hydrostatic/pneumatic tests and leakage checks. The Contractor will guarantee adherence to OPG FME practices and procedural requirements

Pre-commissioning construction check-out and test requirements (pre-operational testing activities) shall be aligned with N-GUID-09701-10019 "NR Check Out and Test Requirements", to ensure construction, workmanship and materials are satisfactory prior to commencing energizing activities.

The Contractor will also perform all incidental work as required to perform its pre-commissioning obligations, including:

- Utilization of existing temporary construction power, as required, for pre-commissioning activities. When permanent power is required to progress the Contractor's pre-commissioning activities, the Contractor will be responsible for integrating their pre-commissioning activities into OPG's commissioning work plans.
- Providing proof of valid calibrations for relevant equipment (e.g. relief valves) before turn-over to OPG.
- Providing Instrument Calibration Sheets (per COIR, Section 4.46 & 4.84) to OPG.
- Ensuring that settings of all equipment (e.g. travel stops for valves) and instrumentation are in accordance with design and manufacturer's specs.

Without limiting the Contractor's obligations to correct defective work, the Contractor will provide trades and technical staff to support correction of any deficiencies encountered during commissioning by OPG staff.

Commissioning

In accordance with the Minutes of Settlement and the D2O Amendment Agreement pursuant thereto, OPG may award the Contractor all or part of the commissioning work that OPG originally intended to self-perform when it first awarded the D2O Project to the Contractor. The scope of this commissioning work, along with its schedule and applicable commercial terms will be further detailed and agreed to by OPG and the Contractor under a separate agreement.

OPG will initially perform light water commissioning to flush and leak check the process systems, as applicable, prior to introducing and commissioning with low curie heavy water. OPG intends to perform the light water commissioning activities utilizing the Contractor's Lock Out, Tag Out work protection process. The Contractor will be required to train and qualify OPG commissioning personnel to utilize the Contractor's Lock Out, Tag Out work protection process to support this work.

7. Specific Details of Work to be Performed

Modification Design Requirements:

☒ **Complete**

Reference MDR and Modification Outline (if available):

NK38-MDR-38000-10003, MODIFICATION DESIGN REQUIREMENTS FOR DARLINGTON HEAVY WATER MANAGEMENT BUILDING WEST ANNEX PMOD
NK38-MDR-38000-10004, Buried Services relocation
NK38-MDR-38000-10005, Construction Power, Construction Trailers
NK38-MDR-38000-10001, Ground Water Dewatering system

☐ **MDR Not Available**

Technical/Performance Details:

Refer to Appendix A – list of Design EC Status for additional details.

NOTE: See Section 16 for references.

8. Other Information

This document does not preclude the ES MSA, COIR or Other Contractual requirements.
Contents of the MDR shall NOT be duplicated in this section.

Other:

Refer to NK38-SOW-38000-10011 R000 for other relevant information for this section 8.

Software/Firmware:

The Contractor must consult with specialized OPG groups (e.g. software specialists, LAN and phone specialists) during DEC reviews. Single Point of Contacts can be provided, if required.

Regulatory and Permitry:

The Contractor will prepare drafts of all correspondence to the Regulator where required by governance to support the project and respond to any questions from the Regulator as they relate to the execution of the D2O Storage Project. The Contractor will prepare and submit all draft correspondence to OPG's Darlington Regulatory Affairs SPOC for processing. Refer to Desk Top Guide for the Preparation of Regulatory Correspondence and associated procedural references; N-PROC-RA-0047, N-PROC-RA-0053, N-PROC-RA-0006, I-INS-00500-10001.

Regulatory and Permitry:

The Contractor will support pressure vessel inspections by TSSA and OPG inspection staff, as required.

Operational and Maintenance:

In consultation with OPG's Operations and Maintenance groups, the Contractor will review draft Operating Manual TPARs prepared by OPG and, the Contractor will prepare draft maintenance procedure TPARs) (CMPs and MMPs) to facilitate OPG's development or revision of operation and/or maintenance procedures for the HWMB West Annex. The Contractor will ensure that its draft operating and maintenance TPARs include accurate information based on the original equipment manufacturer manuals.

Correction or Replacement Work

The Contractor is responsible for correction of Defective Work in accordance with the ES MSA. For clarity, the scope of work does not include any correction or replacement of defects (whether patent or latent) in the HWMB West Annex exterior basement concrete dyke walls that were constructed by OPG's previous contractor and which existed but may not have been apparent at the time the site was turned over to the Contractor (January 2016) and for which OPG has not already agreed to pay the Contractor to correct defects which were apparent prior to amending the D2O Purchase Order to implement the Minutes of Settlement. Similarly, without limiting the Contractor's responsibilities, including in respect of maintenance, for Free Issued Materials under the ES MSA, the scope of work does not include any correction or replacement of defects (whether patent or latent) in any OPG Free Issued materials which existed at the time the Free Issued Materials were issued by OPG to the Contractor. If the Contractor discovers any such defects, the Contractor will promptly notify OPG and OPG may, at its sole and absolute discretion, request the Contractor to correct, in which case OPG shall issue an owner-initiated Project Change Authorization in accordance with s. 7.1(a) of the ES MSA directing the Contractor to perform the corrective work as additional scope.

NOTE: This section provides guidance only. The responsibility resides with the vendor to include all conditions that may apply to the project.

9. Schedule

Schedule Constraints/Requirements:

AFS and Final Completion dates established in the Level 2 schedule are contingent upon OPG's commissioning completions. Dates will adjust accordingly, relative to the agree to time line of Available for Service (AFS) at 45 days following commissioning completion and Final Completion 120 days following AFS.

Need Dates:

Description	Date
Construction Substantial Complete	December 31, 2018
For major milestone	See approved Level 2 Schedule

10. Meetings and Communications

☒ As per ES MSA Worksheet unless stated otherwise on the List of Deviations.

☒ Other (Provide Details Below)

Meeting/Communication	Frequency/Timing	Objective
Kick-off Meeting	Within 5 business days of PO award	Review SOW, Contact List
Progress team meetings.	Weekly	Review project status and challenges. Includes cost/schedule review and performance metrics
Construction Team Meeting	Daily	Review field issues, support required, review recovery plans when applicable

*Associated with N-MAN-00120-10001-SCOPE, Nuclear Projects Scoping Process

3 Week and Schedule Readiness Look Ahead meetings	Weekly	Review schedule readiness of planned work s to "make work ready" (i.e. verify CWPs are current and issued for construction, all material is staged and ready for installation, all tools necessary to execute the work are available at the job face, resources are planned and committed to support installation plan, installation pre-reqs are in progress without delay or complete, work coordination with other field work is complete, installation plan has been reviewed and finalized, work area has been walked down to verify work interferences are identified and eliminated and/or addressed prior to commencing work, etc.) and ensure work is executed as planned without delay

11. Training and Qualification

The Contractor will ensure that all site workers meet OPG training qualifications as per N-TQD-510-00001 (Supplemental BTU Direct Hire And Contract Management Training and Qualification Description). All required training is included in the Contractor's scope of work to complete the project.

Vendor training for engineering supplied equipment is to be provided as defined in PCN045 and PCN093

12. Quality Assurance Program

☒ See Section 2 of the ES MSA Worksheet.

☒ Other (Provide Details Below)

Comments/Details:

The quality program is to be in accordance with N286-05 and applicable elements

13. Applicable Laws, Standards and Codes

Refer to NK38-SOW-38000-10011 R000.

14. OPG Procedures and Standards

Refer to requirements in NK38-SOW-38000-10011 R000, which include:

- Contractor deliverables shall comply with CSA N293 (fire protection/detection) in civil/architectural design, including interior finishes (epoxy coatings, etc.)
- Contractor should follow the intent of N-GUID-09701-10021, "Nuclear Refurbishment Construction Completion Declaration", prior to energizing any systems. The Contractor and OPG will mutually agree on the applicability, process and methods used to satisfy the intent of this guide.
- Timing, contents and quality of material HDOCs (history documents) shall comply with N-PROC-MP-0078, N-PROC-MP-0089 and follow N-GUID-00680-10000 "EPC Review and Purchase Receipt Document Acceptance Process Guideline for Field Installed Items and Spare Parts. Refer to COIR, Section 5.18
- Valve Packing Data Sheets (VPDS) shall be completed per requirements in N-PROC-MA-0038 and guidelines in NK38-CORR-04940-0626882.
- N-GUID-00120-10128,"Guideline for the Content Review and Acceptance of Installation History Dockets".

15. Other

16. References

Reference #	Document Name	Document #
	Refer to NK38-SOW-38000-10011 R000	

17. Appendices

Appendix A – EC Design Status
Appendix B – Project Change Notices Approved by OPG
Appendix C – Engineering Change Requests

Also refer to NK38-SOW-38000-10011 R000.

Appendix A – EC Design Status

EC	MEC	DEC Title	Discipline	EC Rev	Status	Engineering Status (for information only)
120226	118880	0-69040-DESIGN-DNGS REMOVAL OF TRF TRAILERS (T37) AND REROUTING OF FIBRE OPTIC CABLE	Elect		Closed	Not Applicable
120340	118880	0-57500-DESIGN-RELOCATION OF BURIED SERVICES AND SG CABLE DUCT BANK	Elect	2	Released	-Planned EC revision to incorporate FICs. -Close any ITF items. -Submit accepted vendor documents to OPG. - Complete EC work as per COIR, MDR.
120341	118880	0-79110-DESIGN-RELOCATION OF THE UNDERGROUND INACTIVE DRAINAGE LINE 79110-W6APAB	Mech	3	H/APPR	-EC submitted for acceptance (Update required) - Complete EC work as per COIR, MDR.
120343	118880	0-23800-BUILDING DESIGN, ARCHITECTURAL AND STRUCTURAL, INCLUDING OFFICE DESIGN	Civil	3	Released	- Planned EC revision is required to incorporate new FICs. - Revise EC as required to ensure fire code compliance (e.g. resolve firestop issue; comply with OPG INS document on fire stop) - Revise EC as required to address precast concrete side panel excessive gaps. - Finalize building 3-D computer models and submit to OPG - Subsequent EC revision (as required) prior to AFS. - Design Manual - Accept and submit subcontractor documents (e.g. shop drawings) to OPG - Complete EC work as per COIR, MDR.
120345	118880	0-23840-DESIGN FOR NEW BOX DRAIN	Civil	N/A	Canceled	Not Applicable
120349	118880	0-60220-DESIGN-DNGS HWMB WEST ANNEX TELEPHONE SYSTEM AND LAN	I&C	2	Released	- EC revision is required to incorporate comments/input by OPG CIO group - EC revision to incorporate FICREQs and outstanding ITF items. (e.g. DCS and MEL/EBOM are not yet fully complete) - Complete EC work as per COIR, MDR.
120351	118880	0-67870-DESIGN-DNGS HWMB WEST ANNEX FIRE DETECTION SYSTEM	I&C	1	H/APPR	- EC revision is ready for issuance and OPG acceptance as 3rd party review is complete. - EC revision as required to incorporate FICREQs after OPG acceptance. (Also to resolve items in ITF) - Prepare/Revise DM. - Vendor documents (and concession) to be finalized. - Revise Tech Sheet NK38-TSI-67870-10002 - MEL/EBOM to be finalized -EC Release and Design Completion Assurance

120352	118880	0-60215-DESIGN-DNGS HWMB WEST ANNEX PUBLIC ADDRESS SYSTEM	I&C	2	Released	- EC revision is required to incorporate changes per CCR/FHA. - EC revision to incorporate FICREQs and outstanding ITF items. - EC revision to add the 1 hour rate cables for the PA system per CSA N293, Sec. 7.2.1.13.1 - Prepare/Revise DM. - Complete EC work as per COIR, MDR.
120353	118880	0-15200-DESIGN EC FOR RELOCATION OF YARD DRAINAGE (CSP)	Civil	3	Closed	Not Applicable
120364	118880	0-84141-DESIGN-CUT & CAP OF UNDERGROUND 6" AIR LINE	Mech	1	Closed	Not Applicable
120365	118880	0-84141-DESIGN-CUT & CAP OF UNDERGROUND 8" WATER LINE	Mech	1	Closed	Not Applicable
120366	118880	0-84141-DESIGN- CUT & CAP OF UNDERGROUND CONSTRUCTION 12" STEAM & 3" CONDENSATE RETURN LINES	Mech	1	Closed	Not Applicable
120369	118880	0-78110-DESIGN-REMOVAL OF THE UNDERGROUND MISC. FIRE PROTECTION	Mech	0	Closed	Not Applicable
120400	118632	0-15200-DESIGN-TMOD FOR RELOCATION OF YARD DRAINAGE 450MM AND 600MM DIAMETER CORRUGATED STEEL PIPE (CSP)	Civil	3	Approved	- Planned EC revision is required to incorporate new FICs. - Subsequent EC revision (as required) prior to AFS. - Remove TMOD - Complete EC work as per COIR, MDR.
120401	119824	0-38110-DESIGN-MECH-TIE-IN TO/FROM MODERATOR D2O SUPPLY SYSTEM	Mech	2	Approved	- EC submitted for acceptance, OPG to approve the EC - Close ITF issues - Submit model files - Submit accepted vendor documents - Complete EC work as per COIR, MDR.
120402	119824	0-38110- DESIGN-MECH -TIE-IN TO/FROM PRIMARY HEAT TRANSPORT D2O SUPPLY/TRANSFER SYSTEM	Mech	3	Closed	
120404	119824	0-72100-DESIGN-MODIFICATION OF LPSW LINE 0-72100-L921-W30A	Mech	3	Closed	Not Applicable
120405	118880	0-38410-DESIGN-MECH-TIE-IN TO/FROM D2O CLEANUP SYSTEM	Mech	2	Released	- EC revision (as required) prior to AFS - Submit model files - Submit accepted vendor documents - Complete EC work as per COIR, MDR.

120406	118880	0-38110-DESIGN-TIE-IN TO TRF OUTGOING AND INCOMING TANKS	Mech	5	Released	- EC revision (as required) prior to AFS - Submit model files - Submit accepted vendor documents - Complete EC work as per COIR, MDR.
120408	118880	0-38430-DSGN-MECH-TIE-IN TO UPGRADER SYSTEM	Mech	6	Released	-EC revision is in progress to remove 0-38430-NV620 from Design as per OPG request (Rework) - Complete EC work as per COIR, MDR.
120415	118632	0-57500-DESIGN-TEMPORARY RELOCATION OF SG CABLE DUCT BANK	Elect	2	Installed and AFS'd.	- Remove TMOD - Complete EC work as per COIR, MDR.
120421	88528	0-38110-DESIGN-D2O TANKS, PIPING & EQUIPMENT FOR D2O SUPPLY (PHT/MODERATOR) IN HWMB WEST ANNEX	Mech	5	Released	- Address the concern raised by OPG following review of EC R05 on main relief valves RV1200 & RV1201 (added to ITF), which provide overpressure protection for pump discharge headers, that the RV discharges back to the pump suction. - EC revision (as required) prior to AFS, incorporate FICREQs, and address ITF issues. - Finalize stress models and 3D CAD model and submit final files and approved design reports to OPG -Submit approved vendor drawings, Concession Applications Reports, FAT Reports, IOMs, Reliability Reports, and Recommended Spare Parts Lists. - Finalize Design Manual - Finalize EBOM (e.g. spare parts) - Complete EC work as per COIR, MDR.
120422	88528	0-38110-DESIGN-D2O TANKS, PIPING & EQUIPMENT FOR TRF FEED AND PRODUCT	Mech	3	Released	- EC revision (as required) prior to AFS, incorporate FICREQs, and address ITF issues. - Finalize stress models and 3D CAD model and submit final files and approved design reports to OPG - Finalize Design Manual - Finalize EBOM (e.g. spare parts) -Submit approved vendor drawings, Concession Applications Reports, FAT Reports, IOMs, Reliability Reports, and Recommended Spare Parts Lists. - Complete EC work as per COIR, MDR.
120423	88528	0-38500-DESIGN-D2O TANKS, PIPING & EQUIPMENT FOR DOWNGRADED IN HWMB WEST ANNEX	Mech	3	Released	- EC revision is required to remove previously deleted valve V631 from Flow Diagram NK38-DRAW-38500-10007 - EC revision (as required) prior to AFS, incorporate FICREQs, and address ITF issues. - Finalize stress models and 3D model and submit final files to OPG - Finalize Design Manual - Finalize EBOM (e.g. spare parts) -Submit approved vendor drawings, Concession Applications Reports, FAT Reports, IOMs, Reliability Reports, and Recommended Spare Parts Lists. - Complete EC work as per COIR, MDR.

120424	88528	0-38410-DESIGN-D2O TANKS, PIPING & EQUIPMENT FOR D2O CLEAN UP IN HWMB WEST ANNEX	Mech	4	Released	- EC revision (as required) prior to AFS, incorporate FICREQs, and address ITF issues. - Finalize stress models and 3D CAD model and submit final files and approved design reports to OPG - Finalize Design Manual - Finalize EBOM (e.g. spare parts) -Submit approved vendor drawings, Concession Applications Reports, FAT Reports, IOMs, Reliability Reports, and Recommended Spare Parts Lists. - Complete EC work as per COIR, MDR.
120426	118880	0-79120-DESIGN-TRANSFER OF SEWAGE FROM WEST ANNEX TO EXISTING HWMB INCLUDING TIE IN TO THE EXISTING SEWAGE SYSTEM	Mech	N/A	Canceled	Not Applicable
120427	118880	0-72700-DESIGN-SUPPLY OF DOMESTIC WATER TO THE WEST ANNEX INCLUDING TIE IN TO THE EXISTING STATION DOMESTIC WATER	Mech	4	Released	- EC revision (as required) prior to AFS (Multi-Phase EC) -Submit accepted vendor documents to OPG - Complete EC work as per COIR, MDR.
120428	118880	0-74250-DESIGN-SUPPLY OF DEMINERALIZED WATER TO THE WEST ANNEX INCLUDING TIE IN TO THE EXISTING STATION DEMINERALIZED WATER	Mech	4	Released	- EC revision (as required) prior to AFS (Multi-Phase EC) - Address ITF issues (In particular, EC revision required on V1530) - Finalize MEL/EBOM -Submit accepted vendor documents to OPG - Complete EC work as per COIR, MDR.
120448	118880	0-39340-DESIGN-MECH-TIE-IN TO TRF FEED AND PRODUCT	Mech	3	Closed	Not Applicable
120452	118880	0-73680-DESIGN-MECHANICAL MODIFICATIONS TO THE LOADING BAY	Mech	3	Closed	Not Applicable
120471	88528	0-23840-DESIGN-SEISMIC DIKE	Civil	8	Released	- Planned EC revision has been issued. - Accept and submit vendor documents (e.g. shop drawings) to OPG - Subsequent EC revision (as required) prior to AFS and ensure ITF issues are resolved. - Collaborate with OPG to finalize path forward on epoxy coating and water ingress. - Design Manual - Finalize computer models and submit to OPG - Complete EC work as per COIR, MDR.

120472	118880	0-53800-DESIGN-DNGS HWMB WEST ANNEX NORMAL POWER SUPPLY	Elect	0	Released	- Vendor Documents preparation (add OPG document number and references) and OPG Acceptance. - MEL Update. - ETAP Calculation Update to add latest vendor information. - Design Manual Completion. - Close ITF items - Revise specifications - Complete EC work as per COIR, MDR.
120474	118880	0-53300-DESIGN-DNGS HWMB WEST ANNEX BACKUP POWER SUPPLY	Elect	1	H/APPR	-AS7 Hold for Approval. -MEL update completed. -Design package accepted. Additional documents needed as per N-LIST-01300-10000 – Contractor will arrange meeting with OEM and OPG to clarify missing VTDs necessary for the safe operating and maintenance of this equipment. -Final report for Third Party Review not complete -Close ITF items - Vendor Documents and concession submission - Revise specifications - Finalize MEL/EBOM - Diesel generator and fire suppression training, including training materials - Complete EC work as per COIR, MDR.
120475	118880	0-53300-DESIGN-DNGS HWMB WEST ANNEX UNINTERRUPTABLE POWER SUPPLY (UPS)	Elect	1	Released	- Vendor Documents OPG Acceptance. Preparation have been completed and waiting for OPG final review. - MEL Update. - Design Manual Completion. - Closed ITF items - EC revision to incorporate vendor information - UPS training, including training materials - Complete EC work as per COIR, MDR.
120476	118880	0-57684-DESIGN-DNGS HWMB WEST ANNEX BUILDING (BLDG #41) GROUNDING	Elect	3	Released	-EC revision to incorporate lightning protection design -Planned EC revision to incorporate FICs -Close any ITF items. -Input to Design Manual - Complete EC work as per COIR, MDR.
120477	118880	0-57484-DESIGN-DNGS HWMB WEST ANNEX CABLE TRAYS	Elect	1	Released	-Planned EC revision to incorporate FICs. This included embedded parts design update and OLW update of cable routings. -Close any ITF items. - Complete EC work as per COIR, MDR.
120478	118880	0-53300-DESIGN-DNGS - HWMB WEST ANNEX 600V MOTOR CONTROL CENTRES (MCC) POWER AND CONTROL DISTRIBUTION SYSTEM	Elect	1	Assigned	- Vendor Documents preparation (add OPG document number and references) and OPG Acceptance. - MEL Update. Spare parts CID to be completed by OPG PE. Spare parts list to be accepted by OPG. CID to be created for spare parts. - Design Manual Completion. - Closed ITF items - Revise specification - Complete EC work as per COIR, MDR.

120479	118880	0-56000-DESIGN-DNGS HWMB WEST ANNEX LIGHTING AND RECEPTACLES	Elect	1	Assigned	OPG acceptance of CDS for design review of design package for EC revision. (EC revision) -Close any ITF items. -Finalize MEL/EBOM - Complete EC work as per COIR, MDR.
120480	118880	0-60230-DESIGN-DNGS HWMB WEST ANNEX MAINTENANCE COMMUNICATION SYSTEM	I&C	N/A	Canceled	Not Applicable
120481	118880	0-62321-DESIGN-DNGS HWMB WEST ANNEX PERSONNEL, HAND AND FOOT MONITORS	I&C	2	Released	- EC revision as required to incorporate FICREQs and outstanding ITF items. - Prepare/Revise DM. - Accept and submit vendor documents to OPG - EBOM to be finalized. - Complete EC work as per COIR, MDR.
120483	118880	0-69791-DESIGN-DNGS HWMB WEST ANNEX EXISTING COMPUTER SYSTEM TIE-INS	I&C	2	Released	- EC revision is required to incorporate all other DECs changes per current scope (we were waiting to finalize all DECs first). - EC Revision to incorporate FICREQs and outstanding ITF items. - Correction to MEL required - Complete EC work as per COIR, MDR.
120485	88528	0-60000-DESIGN-DNGS HWMB WEST ANNEX ACTIVE/INACTIVE DRAINAGE AND D2O LIQUID RECOVERY PUMP CONTROLS	I&C	1	Released	- Provide I&C Input to 120463 Process Design Manual. - EC Revision to incorporate FICREQs and outstanding ITF items. - Accept and submit vendor documents to OPG - MEL/EBOM to be finalized - Complete EC work as per COIR, MDR.
120488	88528	0-63811-DESIGN-DNGS I&C FOR WEST ANNEX D2O SUPPLY AND TRF FEED & PRODUCT SYSTEM	I&C	2	Approved	- Provide I&C Input to 120421 Process Design Manual. - EC Revision to incorporate FICREQs and outstanding ITF items. - Provide I&C Input to process TPAR for EC120421. - Revise incorrect NK38-CALC-38000-10003 (and ICS as result-EC revision). - EC revision to replace incorrect fittings in approved (by previous design agency) DEC. - Revise Technical Specification because OTEK meter (specified by OPG) is not meeting SPEC. - Submit vendor documents to OPG - MEL/EBOM to be completed - Complete EC work as per COIR, MDR.
120489	88528	0-63841-DESIGN-DNGS I&C FOR WEST ANNEX D2O CLEANUP AND DOWNGRADED TANK SYSTEM	I&C	2	Approved	- Provide I&C Input to 120424 Process Design Manual. - EC Revision to incorporate FICREQs and outstanding ITF items. - Provide I&C Input to process TPAR for EC120423. - EC revision to replace incorrect fittings in approved (by previous design agency) DEC. ECR pending OPG approval. - Submit vendor documents to OPG - MEL/EBOM to be completed - Complete EC work as per COIR, MDR.

120491	88528	0-67989-DESIGN-DNGS HWMB WEST ANNEX FIXED GASEOUS EFFLUENT MONITORING	I&C	0	Released	- EC revision is required to incorporate cold finger addition. ECR pending OPG approval. - EC Revision to incorporate FICREQs and outstanding ITF items. - Obtain Code Classification (see ITF) and if required, register design. - Revise Technical Specification for Cold Finger. - Prepare new DM. - Submit vendor documents to OPG - Finalize MEL/EBOM - Complete EC work as per COIR, MDR.
120492	88528	(SCI 62341/62330) DEC for FAATM and FAAGM	I&C	2	Released	- EC Revision to incorporate FICREQs and outstanding ITF items. - Prepare/Revise DM. - Update specifications - Submit vendor documents to OPG - MEL/EBOM to be finalized - Complete EC work as per COIR, MDR.
120493	88528	0-63861-DESIGN-DNGS HWMB WEST ANNEX D2O LEAK DETECTION SYSTEM (BEETLES)	I&C	2	Released	- EC Revision to incorporate FICREQs and outstanding ITF items. - Prepare/Revise DM. - MEL/EBOM to be finalized - Submit accepted documents to OPG - Complete EC work as per COIR, MDR.
120494	88528	0-67369-DESIGN-DNGS HWMB WEST ANNEX VENTILATION CONTROL SYSTEM	I&C	0	Released	- EC revision is required to incorporate snow stop and charcoal filters (after Snow Stop vendor complete design). - EC Revision to incorporate FICREQs and outstanding ITF items. - Prepare new DM. - Update specifications and calculations - Submit vendor documents and concessions to OPG - Finalize MEL/EBOM - Complete EC work as per COIR, MDR.
120523	88528	0-38910-DESIGN-D2O DRUM HANDLING AND CLEANING DNGS HEAVY WATER MANAGEMENT BUILDING WEST ANNEX	Mech	1	Released	- Revision to OPR is in progress - Final registration with TSSA is pending - Submission of Closing Memo with Final Registration. - Address the issues OPG Operations identified with Drum handling tooling, specifically the Vacuum Heeling Tool, and make the necessary design changes. (not currently in Contractor's scope) - Add filters on Drum handling permanent piping to catch any potential hot particles. - Ensure OPG is properly consulted with respect to all design changes - Submit vendor documents to OPG - Finalize piping model and submit final files to OPG - EC full release required after TSSA Final Registration - Address ITF issues - Design Manual needed - Finalize MEL/EBOM - Complete EC work as per COIR, MDR.

120557	118880	0-75130-DESIGN-BREATHING AIR SUPPLY TO HWMB WEST ANNEX INCLUDING TIE-IN TO THE EXISTING BREATHING AIR SYSTEM	Mech	2	Released	- EC revision is required prior to AFS - Submit accepted vendor documents to OPG - Complete EC work as per COIR, MDR.
120577	118880	ELEC/IC MODIFICATIONS TO THE LOADING BAY	Elect	2	Released	Planned EC revision to incorporate FICs. -Close any ITF items. -Input to DM update - Complete EC work as per COIR, MDR.
120588	118880	0-72700-DESIGN-DNGS HEAVY WATER MANAGEMENT BUILDING WEST ANNEX BUILDING PLUMBING SYSTEM, EMERGENCY SHOWER, AND EYE WASH SYSTEM	Mech	2	Released	- EC Revision (as required) prior to AFS - Submit vendor documents to OPG - Finalize MEL/EBOM EC work - Complete per COIR, MDR.
120615	118880	0-78110-DESIGN-DNGS HEAVY WATER MANAGEMENT BUILDING WEST ANNEX FIRE PROTECTION STANDPIPE AND HOSE CABINETS	Mech	1	Approved	- Design in progress to incorporate TPR comments - Stakeholder concurrence/acceptance with design EC revision - Submit vendor documents to OPG - Finalize model and send files to OPG - TSSA final registration and EC re-release - Finalize MEL/EBOM - CNSC notification - Complete EC work as per COIR, MDR.
120616	118880	0-78230-DESIGN-DNGS HEAVY WATER MANAGEMENT BUILDING WEST ANNEX FIRE PROTECTION SPRINKLER SYSTEM	Mech	1	To be Canceled	CNSC approval required - finalize FHA and CCR
120643	118880	0-79110-DESIGN-DNGS HEAVY WATER MANAGEMENT BUILDING WEST ANNEX INACTIVE PLANT DRAINAGE	Mech	2	Released	- EC revision is required prior to AFS - Submit vendor documents to OPG - EC revision related to 74250-V1530 (see EC 120428) and removing connection from HWMB-WA Active Drainage System to LPSW (SCR# N-2017-00491). - Finalize MEL/EBOM - Complete EC work as per COIR, MDR.
120670	119824	0-67550-DESIGN-RELOCATION OF GAS SERVICES INSTRUMENTATION	I&C	1	Released	Resolve ITF issues Turnover/Closeout is required - Complete EC work as per COIR, MDR.
120719	118880	0-73680-TIE-IN TO THE EXISTING TRF & D2O MANAGEMENT BUILDING STEAM & CONDENSATE SYSTEM	Mech	4	Closed	Not Applicable
120720	118880	0-78110-DSGN-TIE-IN TO THE EXISTING FIRE PROTECTION WATER SUPPLY DISTRIBUTION SYSTEM	Mech	3	Released	- EC rev issued for AFS - Submit accepted vendor documents to OPG - Prepare draft CNSC notification - Complete EC work as per COIR, MDR.

120784	118880	0-79710-DSGN-ACTIVE PLANT DRAINAGE SYSTEM AND D2O LIQUID RECOVERY TIE-IN	Mech	4	Released	- EC Revision is in progress to incorporate FICs issued. - EC Revision (as required) prior to AFS - Submit vendor documents and concessions to OPG - Finalize pipe models and submit files to OPG - Finalize MEL/EBOM - Complete EC work as per COIR, MDR.
120906	118880	0-28000-DESIGN FOR CAUSEWAY CONNECTING THE WEST ANNEX TO THE EXISTING LOADING DOCK	Civil	1	Released	- Planned EC revision is required to incorporate new FICs. (and to resolve ITF open items such as changes for fire code compliance) - Accept and submit vendor documents (such as shop drawings) to OPG - Subsequent EC revision (as required) prior to AFS. - Design Manual - Complete EC work as per COIR, MDR.
121133	118880	0-75160-DESIGN-DNGS HEAVY WATER MANAGEMENT BUILDING WEST ANNEX INSTRUMENT AND SERVICE AIR SUPPLY	Mech	2	Released	- Modification is required to add instrument air take-off line to VRD skid blower seals (blower seals changed to positive pressure seals to eliminate fugitive emissions). Will require additional regulating valve, relief valve, ISO valves, and pipe/tube to FD and Piping drawings. - Re-register (if required) per changes above. - Registration and CRN of components to be checked (OPEX) - Submit vendor documents and concessions to OPG - Finalize Design manual - Finalize MEL/EBOM - Complete EC work as per COIR, MDR.
121146	88528	0-23850-DSGN-D2O MANAGEMENT BUILDING WEST ANNEX VARIOUS PLATFORM DESIGNS	Civil	2	Released	- Planned EC revision is required to incorporate new FICs. - Accept and submit subcontractor documents (such as shop drawings) to OPG - Subsequent EC revision (as required) prior to AFS. - Design Manual - Complete EC work as per COIR, MDR.
121147	88528	0-23800-DSGN-D2O MANAGEMENT BUILDING WEST ANNEX HOIST BEAM AND HOISTING DEVICE DESIGN	Civil	1	Released	- Planned EC revision is required to incorporate new FICs. - Accept and submit vendor documents (such as manuals and drawings) to OPG - Subsequent EC revision (as required) prior to AFS. - Design Manual - Complete EC work as per COIR, MDR.
121318	88528	0-63830-DESIGN-NEW D2O VAPOUR RECOVERY SYSTEM	I&C	1	Released	- Provide I&C input to 121319 Process Design Manual - EC revision to incorporate vendor design changes and missing equipment - EC Revision to incorporate FICREQs and outstanding ITF items. - I&C Input to revisions of Technical Specifications. - Submit vendor documents and concessions to OPG - Finalize MEL/EBOM - Complete EC work as per COIR, MDR.

121319	88528	0-38300-DSGN- NEW D2O VAPOUR RECOVERY SYSTEM	Mech	2	Assigned	- Leak test to be completed for Vapour Recovery Dryer blower - Revision to drum drying piping in progress to isolation pressure regulating valve and isolation valve. - Final registration of relief valve discharge piping (design press. 200 psig) was noted as being required (not identified by previous design agency). First submission was not accepted by TSSA who required more clarity. Revision to submission letter is in progress. Potential revisions to FD required to clarify design condition boundaries to address TSSA comments. - Submit approved vendor drawings, approved Concession Applications Reports, FAT Reports, IOMs, Reliability Reports, and Recommended Spare Parts Lists. EC changes may be needed on concessions and OPG comments on vendor skid. - EC revision to address ITF designs items - EC revision to release design holds. - Finalize Design manual - Complete MEL/EBOM - Complete EC work as per COIR, MDR.
121320	88528	0-73870-DSGN- CHILLED WATER SYSTEM	Mech	1	Assigned	- EC Revision is in progress to incorporate final vendor information and Finalize piping routing. - Review of history file is in progress - Revision to stress analysis is in progress - MEL / BOM update is in progress - Submit vendor documents and concessions to OPG. - Update specification - EC revision to include addressing ITF open items. - Finalize Design Manual - Complete EC work as per COIR, MDR.
121322	88528	0-23880-DSGN- RADIATION SHIELDING	Civil		To Be Canceled	- Provide online moderator D2O transfer line shielding as required (in lieu the building radiation shielding per original design).

121323	88528	0-73680-DESIGN HWMB WEST ANNEX HEATING VENTILATION AND AIR CONDITIONING SYSTEM	Mech	2	Assigned	- Finalization of piping connection to HVU-5 per Vendor information and completion of piping stress report (HVU-5 Vendor JCI did not provide piping from heating coil to terminal point outside of unit, currently being addressed by Aecon's sub-contractor (Culliton) to provide JV with piping orientation and terminal points so piping can be finalized) - Finalization of piping connection to Vertical Flooded Heat Exchanger and completion of piping stress report (Maxi-Therm did not provide nozzle allowable loadings to JV in order to confirm acceptability of piping and supports, still awaiting these loads) - Revising Causeway space heater design (including piping and supports) due to addition of CMU wall (2nd fire rated roll up door required due to removal of sprinkler system). - Addition of drain valve and tubing to Exhaust Stack for draining water accumulated from rain/snow. - Submit vendor documents and concessions to OPG. - Update specification - EC revision to include addressing ITF open items. - Finalize commissioning spec, design manual - Complete MEL/EBOM - Complete EC work as per COIR, MDR.
121326	118880	0-67516-DESIGN-DNGS HWMB WEST ANNEX IA/SA COMPRESSORS	I&C	2	Released	- Provide I&C input to 121323 Process Design Manual - EC revision to incorporate cable changes - EC Revision to incorporate FICREQs and outstanding ITF items. - I&C Input to revisions of Technical Specifications. - Submit vendor documents to OPG - Registration and CRN of components to be checked (OPEX). - Check for root valves on instruments (OPEX) - Finalize MEL/EBOM - Complete EC work as per COIR, MDR.
121327	88528	0-38410-DESIGN-RECONFIGURATION OF D2O CLEAN UP SYSTEM FOR HWMB	Mech	2	Approved	FD NK38-FOH-38410-0001 needs to be corrected as the line with V655 connecting to Line 9 is physically on the other side of the Line with V57. - Submit vendor documents to OPG - Submit model files - Complete EC work as per COIR, MDR.
121447	88528	0-23840-DSGN-D2O MANAGEMENT BUILDING WEST ANNEX CONCRETE TOPPING SLAB AT EL 87.0M AND STORAGE TANK ANCHORAGE DETAILS	Civil	2	Released	- Planned EC revision is required to incorporate new FICs. - Collaborate with OPG to finalize path forward on floor epoxy. - Subsequent EC revision (as required) prior to AFS. - Design Manual - Complete EC work as per COIR, MDR.
121579	118880	0-79110-DSGN-TIE-IN TO INACTIVE PLANT DRAINAGE	Mech	4	Closed	Not Applicable

		(ROOF/CONDENSATE)				
121736	119821	0-53000-DESIGN-TMOD FOR CONSTRUCTION POWER AND CONSTRUCTION TRAILERS INCLUDING TELEPHONE, PA, LAN & FIRE DETECTION TIE-INS	Elect	4	Released	- TMOD removal (per ECC process) when directed by OPG
121805	88528	0-67387-DSGN - I&C AND POWER FOR CHILLED WATER SYSTEM	I&C	0	Released	- Provide I&C input to 121320 Process Design Manual - EC revision to incorporate vendor design changes and missing equipment - EC Revision to incorporate FICREQs and outstanding ITF items. - Revisions of I&C/Elec Technical Specifications. - Submit vendor documents and concessions to OPG - Finalize MEL/EBOM - Complete EC work as per COIR, MDR.
121835	119821	0-72710-DESIGN-CONSTRUCTION WATER TIE-IN FOR HWMB WEST ANNEX (TMOD)	Mech	2	Released	- EC revision (as required) prior to AFS - TMOD removal when no longer needed - Complete EC work as per COIR, MDR.
122210	119824	0-75550-DSGN-RELOC. OF THE ARGON TANK & LINE 75550-L901-A1 1/2ATC	Mech	6	Closed	Not Applicable
122212	119824	0-75510-DSGN-RELOCATION OF THE OXYGEN TANK AND UNDERGROUND LINE 75510-L701-O2ATC	Mech	8	Closed	Not Applicable
122222	118632	TMOD SG FUEL OIL TANK FOAM FIRE SUPPRESSION SYSTEM TEMPORARY CONNECTION (TMOD)	Mech	4	Closed	Not Applicable
123123	122797	0-12320-TMOD-DNGS HEAVY WATER MANAGEMENT BUILDING WEST ANNEX TEMPORARY CONSTRUCTION DEWATERING SYSTEM	Mech	2	Installed and AFS'd.	TMOD removal by OPG
123130	88528	0-23840-BURIED PIPE CHASE BETWEEN HWMB / TRF AND WEST ANNEX	Civil	2	Released	- Planned EC revision has been issued. - Accept and submit subcontractor documents (e.g. shop drawings) to OPG Contractor to update EC package documenting materials and methods used to address pipe chase ground water leaks at the east and west construction joints and thru cracks in the pipe chase walls, roof and floor - Subsequent EC revision (as required) prior to AFS and ensure ITF issues are resolved. - Design Manual - Finalize computer models/calculations and submit to OPG - Complete EC work as per COIR, MDR.

123678	123676	0-28000-TMOD FOR D9 AREA TRAILER COMPLEX	Civil	1	H/APPR	- Planned EC revision is required to incorporate new FICs. For Reference Only – not in Contractor's scope - TMOD removal by OPG
123679	123676	0-53000-TMOD FOR CONSTRUCTION TRAILER POWER AND SERVICES INCLUDING TELEPHONE, PA & FIRE DETECTION TIE-INS	I&C	4	Released	For Reference Only – not in Contractor's scope - TMOD removal by OPG.
124052	119824	0-75540-DESIGN-TRITIUM REMOVAL FACILITY HELIUM SUPPLY SYSTEM LINE RELOCATION	Mech	3	Closed	Not Applicable
124304	118632	0-57140-DESIGN-DNGS HWMB WEST ANNEX (i.e. dewatering system) HEAT TRACING	Elect	3	Released	For Reference Only – not in Contractor's scope TMOD removal by OPG.
124819	118880	0-69891-DESIGN-UPDATE DCU 4 CONFIGURATION FOR NEW D2O STORAGE I/O	Computer	2	Closed	Not Applicable
125434	118880	0-67870-DESIGN-DNGS HWMB WEST ANNEX FIRE ALARM TIE IN	I&C	2	Released	- EC revision to be completed to incorporate FHA changes - Prepare/Revise Design Manual - Complete EC work as per COIR, MDR.
127218	118880	0-53800-DESIGN-DNGS HEAVY WATER MANAGEMENT BUILDING WEST ANNEX CABLE DUCT	Elect	3	Closed	Not Applicable
127532	118880	0-56000-DSGN-DNGS HEAVY WATER MANAGEMENT BUILDING WEST ANNEX MISC. BLDG ELECTRICAL AND I&C (DOORS, HOIST, WATER HEATER, ETC)	Elect	0	Released	-Planned EC revision is required to add power and control for the new causeway door. (new scope not started). -Planned EC revision to incorporate FICs. -Close ITF items. -Finalize MEL/EBOM - Input to Design Manual - Complete EC work as per COIR, MDR.
129058	118880	0-53500-DESIGN-DNGS HWMB WEST ANNEX 120/208V NORMAL/BACKUP POWER DISTRIBUTION SYSTEM	Elect	1	Approved	- Planned EC revision to incorporate FICs. - Close any ITF items. -Finalize MEL/EBOM - Complete EC work as per COIR, MDR.
133014	118632	0-78330-DSGN-SG FUEL OIL TANK FOAM FIRE SUPPRESSION SYSTEM TEMPORARY CONNECTION (TMOD) FOR INSTALLATION OF EC 123130	Mech	1	Closed	Not Applicable
133064	119821	0-53000-DESIGN-ELECT TMOD TEMPORARY POWER FOR D20 TRANSFER FROM HWMB TO	Elect	0	Approved	To be cancelled

		WEST ANNEX STORAGE TANKS				
133065	119821	0-38000-DESIGN-MECH TMOD FOR D20 TRANSFER FROM HWMB TO WEST ANNEX STORAGE TANKS	Mech	0	H/APPR	To be cancelled
133066	119821	0-63800-DESIGN-I&C TMOD FOR D20 TRANSFER FROM HWMB TO WEST ANNEX STORAGE TANKS	I&C	0	Assigned	To be cancelled
135082	118880	0-53800-DESIGN-DNGS HEAVY WATER MANAGEMENT BUILDING WEST ANNEX CABLE DUCT FROM EXISTING MH1010 TO THE WEST ANNEX BUILDING	Elect	0	Released	-Planned EC revision to incorporate FICs. -Close ITF items. - Complete EC work as per COIR, MDR.
135347	88528	0-38000-TMOD-DNGS-HEAVY WATER MANAGEMENT BUILDING WEST ANNEX - WEATHER ENCLOSURE	Civil	0	Closed	Not Applicable
137109	88528	0-63830-DESIGN-SOFTWARE DESIGN FOR NEW D2O VAPOUR RECOVERY SYSTEM (EC 121318)	Computer	0	In-Progress	- Complete AS7 for DEC submission - Prepare SRN for Ventilation Dryer - Prepare Digital Component Configuration Data Sheets (DCCDS) - Issue Software Forms - Submit manufacturer documents - Complete Cyber Essential Asset Identification and Classification - Complete EC work as per COIR, MDR.
137110	88528	0-38910-DESIGN-SOFTWARE DESIGN FOR WEIGH SCALES (EC 120523)	Computer	0	Approved	- Accept and submit manufacturer document to OPG - Release EC - Complete EC work as per COIR, MDR.
137115	88528	0-62341/62330-DESIGN-SOFTWARE DESIGN FOR FAATM AND FAAGM SYS'S (EC 120492)	Computer	0	H/APPR	- Resubmit EC with previously missing information - Address other RDL documents (such as component configuration sheets, Software Procurement Planning, Software Quality Assurance Requirements) - Complete EC work as per COIR, MDR.
137116	88528	0-67989-DESIGN-SOFTWARE DESIGN FOR DNGS HWMB WEST ANNEX FIXED GASEOUS EFFLUENT MONITORING (EC 120491)	Computer	0	H/APPR	- EC submitted for acceptance, OPG to approve the EC - Accept and submit manufacturer documents to OPG - Resolve software categorization checklist & results for heat tracing controller - Complete Cyber Essential Asset Identification and Classification - Complete EC work as per COIR, MDR.

137120	88528	0-60000-DESIGN-SOFTWARE DESIGN FOR HWMB-WA DRAINAGE AND D2O CONTROL SYSTEMS (EC 120485/120488/120489)	Computer	0	In-Progress	- Complete AS7 for DEC submission - Prepare SRNs - Issue Software Forms - Prepare Digital Component Configuration Data Sheets (DCCDS) - Complete Cyber Essential Asset Identification and Classification - Complete EC work as per COIR, MDR.
137121	88528	0-67369-DESIGN-SOFTWARE DESIGN FOR VENTILATION CONTROL SYSTEM (EC 120494)	Computer	0	In-Progress	- Complete SMP/SRN - Complete AS7 for DEC submission - Issue Software Forms - Prepare Digital Component Configuration Data Sheets (DCCDS) - Complete EC work as per COIR, MDR.
137134	118880	0-56000-DESIGN-SOFTWARE DESIGN FOR DOORS (EC 127532)	Computer	0	H/APPR	- EC submitted for acceptance, OPG to approve the EC - Submit subcontractor documents - Complete EC work as per COIR, MDR.
137136	118880	0-67516-DESIGN-SOFTWARE DESIGN FOR DNGS HWMB WEST ANNEX IA/SA COMPRESSORS (EC 121326)	Computer	0	H/APPR	- EC submitted for acceptance, OPG to approve the EC - Submit subcontractor documents - Complete EC work as per COIR, MDR.
137137	118880	0-67387-DESIGN-SOFTWARE DESIGN FOR CHILLED WATER SYSTEM (EC 121805)	Computer	0	H/APPR	- EC submitted for acceptance, OPG to approve the EC - Submit subcontractor documents - Software categorization - Complete EC work as per COIR, MDR.
137138	118880	0-53300-DESIGN-SOFTWARE DESIGN FOR BACKUP POWER SUPPLY (EC 120474)	Computer	0	In-Progress	- Fire Panel Categorization - Update SMP/SRN - Complete AS7 for DEC submission - Issue Software Forms - Prepare Digital Component Configuration Data Sheets (DCCDS) - Complete Cyber Essential Asset Identification and Classification - Complete EC work as per COIR, MDR.
137139	118880	0-53300-DESIGN-SOFTWARE DESIGN FOR NORMAL POWER SUPPLY (EC 120472)	Computer	0	H/APPR	- EC submitted for acceptance, OPG to approve the EC - Submit subcontractor documents - Categorization for Switchgear Time Relay software - Complete EC work as per COIR, MDR.
137140	118880	0-53300-DESIGN-SOFTWARE DESIGN FOR UPS (EC 120475)	Computer	0	H/APPR	- EC submitted for acceptance, OPG to approve the EC - Submit subcontractor documents - Cyber Essential Asset Identification and Classification - Complete EC work as per COIR, MDR.
137141	118880	0-67870-DESIGN-SOFTWARE DESIGN FOR FIRE DETECTION SYSTEM (EC 120351)	Computer	0	In-Progress	- DEC completion following NK38-PLAN-67870-10008 subject to ECR that is pending OPG approval - Complete EC work as per COIR, MDR. - Contractor to follow up with OPG Computer Engineering Department to coordinate

						turnover of SDV file, which will need updating by the Fire Detection System OEM.
139323	118880	0-53300-DESIGN-SOFTWARE DESIGN FOR 600V MCC (EC 120478)	Computer	0	In-Progress	- Prepare SMP/SRN - Complete AS7 for DEC submission - Issue Software Forms - Prepare Digital Component Configuration Data Sheets (DCCDS) - Complete EC work as per COIR, MDR.
127514	118880	DESIGN MANUAL UPDATES FOR HWMB, WEST ANNEX- MEC 118880	DM	0	In-Progress	Prepare design manuals
127515	88528	DESIGN MANUAL UPDATES FOR HWMB, WEST ANNEX, MEC 88528	DM	0	In-Progress	Prepare design manuals

Appendix B – Project Change Notices (PCNs)

PCN001	3rd Party Civil Engineering Support	Phase 1
PCN002	Piping in HWMB Milestone Change	Phase 1&2
PCN003	TRF Interferences & Design Deficiencies	Phase 1&2
PCN004	Change in Engineering Manager (Not Applicable to PO Amendment)	Phase 1
PCN005	Dike Wall Deflection Monitoring	Phase 1
PCN006	Over Pressure Protection & Cable Riser Design Deficiency	Phase 1&2
PCN007	Requirement Traceability Matrix	Phase 1&2
PCN008	Fueling and Rental Cost for Temp Power	Phase 1
PCN009	HVAC System - Steam supply to VFHX	Phase 1&2
PCN011	Tank Unloading	Phase 1
PCN011	Change in JV Project Manager (Not Applicable to PO Amendment)	Phase 1
PCN012	Change in Field Engineering Manager (Not Applicable to PO Amendment)	Phase 1
PCN013	HVAC System - Filtration Units	Phase 1&2
PCN014	West Annex Stack Monitor Technical Specification	Phase 1
PCN016	SCR Delay Time Sep 2015 to July 2016	Phase 1
PCN017	TRF Box Drain Piping Changes	Phase 1
PCN020	Redesign cables between Skid and Main Control Panel - Vapor Recovery Dryer	Phase 1&2
PCN022	D2O Temporary Power from T-11	Phase 1
PCN024	Quick Disconnect Couplings Removal	Phase 1
PCN025	SCR Delay Time Jul 26, 2016 to Sep 30, 2016	Phase 1
PCN032	Transformer Roof Slope	Phase 1
PCN033	FAATM design change	Phase 1
PCN036	ECR 628411-0000-67516-48EC-0001 – Instrument Air, rework and schedule delays were incurred as a result of client review process.	Phase 1
PCN037	D2O Storage Tank Nozzle Load Reconciliation	Phase 1
PCN039	Active and inactive Drainage System	Phase 1
PCN040	Temporary Construction Power to PA Trailers	Phase 1
PCN041	D2O Leak Detection System	Phase 1
PCN047	Additional window lights and fire protection	Phase 1&2
PCN050	ECRs 628411-0000-38000-40EC-0002 & 45EC-0015 – 2D & 3D models discrepancy for West Annex Building	Phase 1&2
PCN056	ECR 628411-0000-56000-47EC-0001 – Building Electrical Services (EC 127532)	Phase 1
PCN060	Additional engineering effort with Stack Monitoring system	Phase 1
PCN061	Transformer Slope Roof and Auto PIPE Licenses	Phase 1
PCN062	Active Inactive Drainage and D2O Liquid	Phase 1
PCN064	Removing Class 6 Angles on Class 3 Supports at TRF Building	Phase 1&2
PCN085	Demineralized Water System	Phase 1&2
PCN086	Active Inactive Drainage and D2O Liquid Recovery Systems, TRF Feed Product, D2O	Phase 1
PCN087	Grounding - Station Grid	Phase 1
PCN099	US Dollar VS Canadian Dollar Delta exchange Rates	Phase 1
PCN100	ECR 628411-0000-53300-47EC-0006 R00 – 600V MCC	Phase 1&2
PCN015	Chilled Water System, Electrical system, Instrumentation and Controls	Phase 1 & 2

PCN018	Construction activities for ECR 628411-0000-57400-47EC-001	Phase 2
PCN019	As found Buried Commodities and interferences at Pipe Chase and Causeway area	Phase 1
PCN023	RFRISA 600V Receptacles	Phase 1
PCN026	Beam pocket concrete cracking and temporary shoring	Phase 1
PCN027	Duct openings on concrete wall in basement	Phase 1
PCN028	Construction activities for ECR 628411-0000-38000-45EC-0008 – SCR N-2015-20027	Phase 1&2
PCN030	Construction activities for FICREQ09 on EC120479	Phase 2
PCN034	ECR 628411-0000-38000-45EC-0016 – Duct Changes Errors & Discrepancies refer to Internal RFIs and 6FICs	Phase 2
PCN035	ECR 628411-0000-23840-41EC-0001 – Seismic Dike (Top Slab)	Phase 1
PCN043	ECR 628411-0000-00000-45EC-006 – COMS Action Fire Foam under Pipe chase	Phase 1
PCN044	Pipe support issue for supports using HSS posts	Phase 1&2
PCN045	D2O Vendor Training	Phase 2
PCN053	Construction Activities for adding Hoists in Seq 13 Steel – COMs review meeting	Phase 2
PCN055	Caps for Spare Nozzles on Tanks – EC 120421 & 120422 & 120423	Phase 2
PCN057	ECR 628411-0000-57500-47EC-0001 – Underground Cable Ducts, Manholes & Trenches (EC120340)	Phase 2
PCN063	ECR 628411-0000-73680-45EC-0001 – Davit Crane per OPG COMs meeting request	Phase 2
PCN066	Tank being plumb due to Uneven Slab	Phase 1&2
PCN067	Adjustment of the Contract Price and Project Completion Date	Phase 1&2
PCN068	NA engineering and construction activities cost on FIC 406	Phase 1
PCN071	Missing Penetration due to Other Design Agency – EC 120471	Phase 1
PCN072	Beverages and Food Delivery to RFRISA	Phase 1
PCN074	Replacing HDG Electrical Components	Phase 1
PCN076	SCR – Delay/Lost Time Work (From October01/2016 – December 31/2016	Phase 1
PCN078	Damage to waterproofing on the West Annex	Phase 2
PCN079	ECR 628411-0000-53300-47EC-0005 R01 600V Distribution System	Phase 2
PCN081	ECR 628411-0000-67989-48EC-0004 – Stack monitoring Pin Cart requirements	Phase 2
PCN082	ECR 628411-0000-56000-47EC-0002 – Cable Tray Design from Existing HWMB to HWMB West Annex	Phase 1&2
PCN083	Stairwell #1 below EL100 built 40mm out of location	Phase 2
PCN088	ECR 628411-0000-38000-45EC-0021 EC 120421, 422, 423 &424 Rev 04 – Vents and Drains missing in drawings	Phase 1&2
PCN092	ESMSA COIR requirements for History Dockets	Phase 2
PCN093	D2O Vendor Training – CCI Thermal Training	Phase 2
PCN095	Waste Management BWXT Tank Bunk Disposal	Phase 1
PCN096	Relocating from RFRISA and Six Pack to East Warehouse and D9 Area	Phase 1
PCN101	Cleaning of Liquid Recovery Drains – SCR N-2016-07942 – Excluded by the Contractor; re: Phase 2 SOW	Phase 1
PCN102	Replacing Frozen Hose – Dewatering System	Phase 1
PCN103	SCR N-2016-14215 Silica Mandatory Training	Phase 2
PCN104	ECR 628411-0000-38000-40EC-0005 – HWMB West Annex Fire Protection Systems	Phase 1
PCN105	CFVS Support	Phase 1
PCN107	Cable Tray and Supports Modifications – EC 120477	Phase 1&2
PCN108	Rejected by OPG and Cancelled by Contractor during Phase 1 work	Phase 1

PCN109	ECR 628411-0000-53300-47EC-0003 Standby Diesel Generator – additional Vendor cost	Phase 1&2
PCN110	ECR 628411-0000-53300-47EC-0008 Switchgear Assembly – additional Vendor cost	Phase 1
PCN111	ECR 628411-0000-53300-47EC-0007 – MCC – Annunciator Panels	Phase 2
PCN112	Excluded from Contractor's SOW per Settlement Agreement	Phase 1
PCN113	Excluded from Contractor's SOW during Phase 1	Phase 1
PCN114	Cold Finger	Phase 2
PCN115	D2O Project Escalation	Phase 2
PCN116	Fire Alarm Detection Software for the HWMB West Annex	Phase 2
PCN117	Epoxy coating for WA basement	Phase 2
PCN118	ECR 628411-0000-60000-48EC-0005 Extra work and delay due to resolution to Drop in Anchor	Phase 2
PCN119	Additional Electrical Scope – ECs 120494, 121805, 120491, 121318	Phase 2
PCN120	Scaffolding & Skip Box on TRF Roof	Phase 1
PCN121	ECR 628411-0000-62341-48EC-0002 – 0-2341/62330 Design FAATM & FAAGM System	Phase 2
PCN122	Exterior cable tray 120472r0 FicReq-02 FIC-609 sequence 19	Phase 2
PCN123	Instrumentation tubing - Fittings Vs. Welding	Phase 2
PCN124	VPDS to Fire Protection Tie - VPDS 0-78110-V552	Phase 2
PCN125	ECR 628411-0000-62330-48EC-0002 - CAT ID for FAAGM	Phase 2
PCN126	ECR 628411-0000-67516-48EC-0002 Software Categorization	Phase 2
PCN127	ECR 328411-0000-79710-45EC-0001 KSB Pumps - Lifting Lugs (PO # 628411-K79710-52BX-0001)	Phase 1
PCN128	Door for Office Beside Alok's East Warehouse	Phase 1
PCN129	ECR 628411-0000-53300-47EC-0009 R00 - Schneider PO Rev 02	Phase 1
PCN130	ECR 628411-0000-53300-47EC-0010 R00 Additional Spare Breaker	Phase 2
PCN131	JV to Procure 4 Valves on EC 120421 - Rev 005	Phase 2
PCN133	DEC 120351 - Fire Protection Cabling	Phase 2
PCN134	ECR 628411-0000-60220-48EC-0002 - HWMB WA Telephone System and LAN	Phase 2
PCN135	Additional impact on FIC A00004-120483-FIC-01/628411-0000-00000-64FC-0668 on EC 120483	Phase 2
PCN137	Changing the Flex Conduit from FT1 to FT4 - Chilled Water System	Phase 2
PCN138	Moving of the Filters at F-7	Phase 1
PCN139	Bentley Auto Pipe Nuclear Select Software Renewal	Phase 2

Appendix C – Engineering Change Requests

ECR 628411-0000-53300-47EC-0010 R01 - 13.8kV Full Spare Vacuum Breaker
ECR 628411-0000-60220-48EC-0002 - HWMB WA Telephone System and LAN