ATTACHMENT – C
Work Planning Instructions
EC 361965, Rev. 00

EC NO.: **EC 361965, Rev. 000**

EC TITLE: **Remediation of Tritium Contaminated Groundwater in the Vicinity of Vacuum Breaker #1**

STATION: **Braidwood**

SYSTEM CODE: **Circulating Water (CW)**

Discipline (WGI)	Originator	Reviewer
Electrical (E)	G. Nelson	I. Khan
Mechanical (M)	B. Acas	E. Stukas
Structural (S)	S. Dutta	D. Dickinson

1. EC Description:

Three remediation wells are being installed on Braidwood Station property to remediate a groundwater tritium plume. The groundwater became contaminated with tritium when Vacuum Breaker #1 (VB #1) malfunctioned in the past. The contamination was recently discovered but over the intervening years, the plume has migrated away from VB #1. The intent of the remediation effort is to remove the contaminated water and drop the concentration of tritium to below the Lower Limit of Detection (LLD). If samples from a particular well reach LLD, the pump for that well could be shutoff. Once all three wells are producing clean water, the remediation effort will be terminated. The duration of the effort is projected to be approximately two years.

The wells will be located approximately 600' east-northeast from Blowdown Line Vacuum Breaker #1. The discharge from each of the wells will be routed underground to an above ground location where they will be metered, sampled and then connected together into a common discharge line. The common line will be routed underground, penetrate the Vacuum Breaker #1 (VB #1) vault and tie into an existing test tap (Valve 0CW090) to be discharged into the Circulating Water (CW) Blowdown Line 0CW09C-48.

At the above ground location where the discharge piping from the wells will join together, a concrete slab will be installed. The piping configuration on the slab will contain flow meters, throttling valves and other appurtenances including a compositor for obtaining samples of the water. The above ground piping will be heat traced. Power for the instrumentation and heat tracing will be supplied from offsite power. The cabling for the offsite power will be direct buried with the piping where possible.

2. Plant Mode(s) Applicability:

Installation of this design change may be performed with Unit 1 and Unit 2 in any Mode.

0CW090 - Blowdown Line ball valve shall be out-of-service CLOSED when installation work is being performed. Should the Station determine that ball valve is not leak tight; the Blowdown Line 0CW09C-48 shall be removed from service for valve replacement.

Non-intrusive pre-fabrication of piping and valves may be performed at any time as determined by Station personnel.

3. Installation Details:

The following is a general outline of installation sequencing. Applicable plant drawings and sketches have been included in Tab 3 of this package and provide the necessary details for the installation of the design change. The work analyst may add to or deviate from this sequence based on plant conditions, accessibility, etc.

Basic Construction Scope:

3.1 Shop-pre-fabrication of piping spools with valves, flanges and fittings, etc. may be performed to the greatest extent possible, minimizing the time spent in the confined space of the vault and possible out-of-service time for the Blowdown Line.

3.2 Conestoga-Rovers & Associates (CRA) will determine the location of Recovery Wells RW-5, RW-6 and RW-7 and install them. EC361965-M-SK03 sketch provides the general location of these wells and associated piping with approximate lengths. Install riser piping from the submerged pumps to the HDPE piping interface location, a minimum of 4' below grade.

3.3 Install new 8' by 18' concrete pad to be located between RW-5 and RW-6 as indicated on sketches EC361965-M-SK02.

3.4 Install the new carbon steel piping and supports on the new pad used to meter, sample and combine the flow from the three wells, as indicated on sketches EC361965-M-SK01 and EC361965-M-SK02.

3.5 Install heat tracing and insulation to all above ground piping, and pipe buried to a depth of 4'.

3.6 Install the 2" HDPE underground piping from each of the three recovery wells RW-5, RW-6, and RW-7 to the new pad location per sketch EC361965-M-SK03.

3.7 Install the 3" HDPE underground piping from the pad location to VB#1 as indicated on sketch EC361965-M-SK03. The underground 3" line near the VB#1 location shall be mounded over with additional fill to increase the depth of the cover.

3.8 Requirements of SA-AA-114, "Confined Space Entry", must be adhered to for entry into the Vacuum Breaker vault.

3.9 Core hole in VB#1 vault in accordance with the drawings included in Tab 3. The core hole shall be located above the membrane currently installed in the vault.

3.10 Install carbon steel piping, flanges, and fittings along with the stainless steel check valves in VB#1 vault in accordance with the drawings included in Tab 3.

3.11 Any welding shall be performed in accordance with applicable Exelon procedures.

3.12 Apply prime and finish paint coats on all carbon steel piping and structural steel.

3.13 Provide 480 Volt three-phase power feed from offsite power distribution system. Install 3/c direct buried power cable from a disconnect switch at the transformer pole (located south of VB #1) to the well sample pad.

3.14 Sketch EC361965-E-SK01, Panel Schematic Diagram, has the configuration for the main breaker, distribution transformer, panel board, and the control circuit devices for the well pump system. Install devices in one common enclosure to be supplied by installer.

3.15 Install two cables in ¾" PVC conduit from the control panel at the pad to the existing Alarm Agent device at Vacuum Breaker #1 per Notes 1 and 2 on sketch EC361965-E-SK01.

3.16 Install conduit and wiring for heat trace circuits to exposed pipe.

3.17 Install conduit and wiring for 120 Volt circuits to the sampler device, lights, and receptacles per sketch EC361965-E-SK01. Installer may organize circuits and use spare breakers as necessary to achieve best field installation configuration. Field route all conduit.

3.18 Install ground connections per sketch EC361965-E-SK01.

3.19 Installer shall perform power cable insulation integrity tests and control circuit checkout to assure proper functionality of control devices.

3.20 Any work required to install this design change, with equipment out-of-service, shall be performed as expeditiously as possible.

3.21 FME procedures shall be applied for all open systems.

3.22 The requirements of CC-AA-501-1027, HU-AA-101 and HU-AA-1211 shall be applied.

Note: The Station Radiological Department has determined that the concentrations of tritium that may be encountered in the performance of the remediation work are insignificant and that no radiological measures (i.e. RWP, dosimetry or protective clothing) are required.

4. Special Installation Sequencing:

Installation sequencing is to be determined by the work analyst. The following is a general outline of installation sequencing. See applicable drawings and sketches for further details. This outline is provided for guidance only and may be deviated from where appropriate by work analyst. Some of these activities mentioned in this section are already discussed in previous Section 3 for Installation and Removal and repeated here for the clarity.

4.1 Before performing the activities per this EC, coordinate with Operations Department for Clearance Orders (system out-of-service requirements).

4.2 Contact ComEd for new load from Offsite power.

4.3 Concrete slab must be poured at least 7 days prior to installing equipment on the pad.

4.4 Core hole location for the HEDP pipe will be established after the installation of the steel pipe.

4.5 The sealing of the vault penetration shall not be performed until the installation of the piping is complete.

5. Engineering Instructions requiring Work Order Tasks:

5.1 Perform an Operations Briefing – assigned to Installer

5.2 Perform an Installer's walkdown (with Installer and Design Engineering) – assigned to Design Engineering.

5.3 Acceptance of test results – assigned to System Engineering.

5.4 Develop a SPP for testing of temporary well remediation equipment – assigned to System Engineer.

6. Engineering Restraint Items and Unverified Assumptions:

There are no unverified assumptions associated with this engineering change.

7. Impact of Pending or Related Modifications and Temporary Modifications:

This engineering change must be coordinated with EC 361017 – "Evaluation of the Interim Remedial Action Pumping System from the Exelon Pond through the Water Blowdown System".

8. Configuration Change Package (EC) Classification:

This engineering change is classified as Non-Safety Related and Non-Seismic.

9. Applicable Installation Codes and Specifications:

All work shall be performed in accordance with the latest revision of the following specifications and documents or other applicable approved Exelon procedures for the Braidwood Station:

9.1 ANSI B31.1.0, Power Piping Code, 1973 Edition, Summer 1975 Addenda.
9.2 AWWA C901, Polythene (PE) Pressure Pipe and Tubing ½" through 3" for water services
9.3 BwSC 2200-1, Field Coating Procedure
9.4 CC-AA-501, Exelon Nuclear Welding Program
9.5 CC-AA-501-1003, Exelon Nuclear Welding Program Visual Weld Acceptance Criteria
9.6 CC-AA-501-1008, Exelon Nuclear Welding Program Welding General Requirements
9.7 CC-AA-501-1027, Hot Work Precautions and Safety Practices

9.8 NSWP-E-05, "Grounding of Electrical Equipment"
9.9 NSWP-M-02, Fabrication and Installation of Piping and Tubing
9.10 NSWP-S-02, Non Shrink Grout Installation and Inspection
9.11 NSWP-S-05, Concrete Expansion Anchors (CEAs)
9.12 AWS, American Welding Society Standards
9.13 MA-AA-716-008 Foreign Material Exclusion (FME) Program
9.14 NSWP-M-02 Fabrication and Installation of Piping and Tubing
9.15 NSWP-M-04 Pipe Support Installation and Inspection
9.16 NSWP-S-06 Core Drilling
9.17 L-2739 Piping System Installation
9.18 HU-AA-101 Human Performance Tools and Verification Practices
9.19 HU-AA-1211 Briefing – Pre-Job, Heightened Level of Awareness, Infrequent Plant Activity and Post-Job Briefings
9.20 SA-AA-114 Confined Space Entry
9.21 SPP 06-003, Special Plant Procedure

10. Procurement/Materials Engineering Requirements:

All materials required for this modification are considered as commodity and therefore the Engineering Change Material List (ECML), Attachment "H" of procedure # CC-AA-103 is not provided. However, a Bill of Material was previously provided.

11. Testing Requirements:

Specific testing requirements for the portion of the design that includes permanent plant equipment are included in CC-AA-107, Attachment 1 included in Tab 5 of this EC. The temporary equipment (well pumps, piping, slab mounted equipment, etc.) will be tested by the System Engineer via a SPP.

12. Other Pertinent Information

If you have any questions or comments regarding this engineering change, please contact David Ibrahim at extension 2402.