Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

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STATUS REPORT ON POWER REACTORS

This document summarized the status of the Power Reactor Facilities as of April 24, 2026.

RAPPORT D'ÉTAPE SUR LES CENTRALES NUCLÉAIRES

Ce rapport résume le rapport d'étape sur les centrales nucléaires en date du 24 avril 2026.

Signed on / Signé le
May 12, 2026 | 12 mai 2026

Viktorov, Alexandre

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Directeur général, Direction de la réglementation des centrales nucléaires

Canada

1. Power Reactors Status as of April 24, 2026

1.1 Bruce A and B

Operational Status
Unit 1 is at Full Power
Unit 2 is at Full Power
Unit 3 is Shut Down for Major Component Replacement (MCR)
Unit 4 is Shut Down for Major Component Replacement (MCR)
Unit 5 is at Full Power
Unit 6 is at Full Power
Unit 7 is at Full Power
Unit 8 is at Full Power
Licensing
Power Reactor Operating Licence expires on September 30, 2028.
Comments
The Unit 3 MCR project started in March 2023 and remains on schedule. • On February 16, 2026, CNSC staff released regulatory hold point 1 (RHP-1), allowing Bruce Power to load fuel. Fuel load was completed on March 7, 2026. • Removing the Guaranteed Shutdown State (RHP-2) is scheduled for the beginning of May 2026. • Request to increase reactor power above 1% (RHP-3) is under review; a decision is expected in mid-May 2026. The Unit 4 MCR project started in February 2025 and remains on schedule. • Pressure tubes and calandria tubes have been removed. • Inspections of the calandria are in progress. • Preparations for steam generator replacement are in progress. Unit 5 MCR is scheduled to begin in November 2026.
Event Notifications and Updates
A discovery issue was identified regarding the installation of Hilti anchors at the Bruce NGS A and B; further information is provided to the Commission in a separate memorandum submitted to the CNSC Registry and attached to this status update.
Actions from previous Commission meetings
None

1.2 Darlington

Operational Status
Unit 1 is at Full Power
Unit 2 is at Full Power
Unit 3 is shut down for D2631 Planned Maintenance Outage
Unit 4 is shut down for D2641 Forced Outage
Licensing
Power Reactor Operating Licence 13.01/2045 came into effect on December 19, 2025, following an amendment to allow installation of Target Delivery System (TDS) on additional units. TDS to be installed on Unit 3 in Spring 2026.
Comments
Darlington refurbishment is now completed. Unit 4 was taken offline on April 12, 2026, due to indications of a hydrogen leak into the generator stator cooling water (SCW) system on the secondary, non-nuclear, side of the station. Work to determine the source of the hydrogen leak is ongoing.
Event Notifications and Updates
On April 17, 2026, a worker performing a walkdown in the powerhouse on Unit 3 tripped and fell over a hose and sustained two fractures to their arm. The worker was transported to the hospital and received a cast. The worker has since returned to work. OPG actions included emphasizing job site drills for workers, taking time to evaluate hazards and to raise awareness of them. CNSC staff followed up by performing field visits and attending Ministry of Labour, Immigration, Training and Skills Development (MLITSD) site activities. MLITSD investigated the event, and no order was issued to OPG.
Actions from previous Commission meetings
None

1.3 Pickering

Operational Status
Unit 1 is shut down and transitioning to Safe Storage
Unit 2 is in a Safe Storage State
Unit 3 is in a Safe Storage State
Unit 4 is shut down and transitioning to Safe Storage
Unit 5 is at Full Power
Unit 6 is at Full Power
Unit 7 is at Full Power
Unit 8 is shut down for a planned maintenance outage

Licensing
Power Reactor Operating Licence expires on August 31, 2028. OPG is authorized to operate Units 5-8 until December 31, 2026, up to a maximum of 305,000 equivalent full power hours. The CNSC will hold a 2-part public hearing to consider an application from OPG to refurbish Units 5-8 and renew the licences for the Pickering NGS and Pickering Waste Management Facility for a 10-year period. The 2-part hearing will take place in the National Capital Region on June 23, 2026, and in Ajax, Ontario during the week of October 5, 2026.
Comments
Unit 8 was shut down for a planned maintenance outage on March 19, 2026, which is currently ongoing.
Event Notifications and Updates
None
Actions from previous Commission meetings
None

1.4 Point Lepreau

Operational Status
The Unit is shut down for a Planned Outage.
Licensing
Power Reactor Operating Licence expires on June 30, 2032.
Comments
The unit was shut down on April 10, 2026, for a planned maintenance outage that is expected to last 119 days.
Event Notifications and Updates
None
Actions from previous Commission meetings
None

1.5 Darlington New Nuclear Project – Licence to Construct

Construction Status – DNNP-1
Major construction work in progress: • Reactor building (RB) shaft excavation has been completed. The Diaphragm Plate Steel Composite (DP-SC) Basemat has been assembled (in the pre-assembly building) and successfully craned into the RB shaft on April 22, 2026. (Figures 1-4)

- Blasting work for the horizontal tunnel in the Condenser Cooling Water (CCW) launch shaft was halted due to MLITSD Stop Work Orders issued on April 9, 2026. Further details are provided under Event Notifications and Updates.
- On-going foundation work continues for the power block buildings. The Turbine Building is progressing with formwork installation. Rebar and Anchor bolt installation is progressing at the Control Building.

Licensing

DNNP Power Reactor Construction Licence expires on March 31, 2035.

Status of OPG's progress toward each regulatory hold point (RHP):

- RHP-1: Installation of the RB foundation.

  CNSC staff completed its assessment of OPG's request to remove RHP-1, concluding that OPG met the pre-requisites established by the Commission. On March 30, 2026, the CNSC's Executive Vice President and Chief Regulatory Operations Officer consented to remove RHP-1, allowing for the installation of the Reactor Building foundation and subsequent Reactor Building construction.

- RHP-2: Installation of the Reactor Pressure Vessel (RPV) (OPG target date is Calendar Q3 2027). Prior to the removal of RHP-1, 5 commitments were deferred from RHP-1 to RHP-2.

  Status: 53 open, 0 closed, 53 total.

- RHP-3: Fuel-Out Commissioning (OPG target date is Calendar Q1 2028).

  Status: 8 open, 0 closed, 8 total.

Darlington New Nuclear Project – Licence to Operate Application

On March 25, 2026, CNSC received an application from OPG for a licence to operate Unit 1, which included a Class 1B Low & Intermediate Level Waste Storage Structure (L&ILWSS).

Comments

None

Event Notifications and Updates

Two stop-work orders were issued by MLITSD to Aecon on April 9, 2026. The order applied specifically to the Condenser Cooling Water (CCW) launch shaft work area. Work elsewhere on the site was not affected. One order was related to the launch shaft stair tower, and the other was related to the launch shaft tower crane. Details of each order are as follows:

1) Stop Work Order on use of the launch shaft Stair Tower

- Ontario Regulations O.Reg 213/91, s 286 (1) requires a sheath around the stair tower, such that if a worker fell while on the stairs they would not fall off the stair tower.
- The netting that was installed on the stair tower prior to April 9th did not meet this requirement.

- To address this order, a new mesh sheath has been installed around the launch shaft stair tower.
- Following a site visit on April 17, 2026, MLITSD removed this order.

2) Stop Work Order on launch shaft Tower Crane

- Ontario Regulation O.Reg 213/91, s 287 (1), (3) requires that a plank lining be install around all sides of the stair tower which could be exposed to a load lifted by the tower crane.
- Aecon conducted a reassessment of the stair tower to confirm it could support the addition weight of the planks, prior to proceeding with modifications.
- In the interim, Aecon requested a release of the stop work order based on the installation of engineered barriers which limit the travel of the tower crane, such that it would not be able to move a load in the vicinity of the stair tower even if requested by the operator. The MLITSD did not accept this interim measure.
- This stop work order remains in effect at this time. Updates obtained by CNSC staff (as of April 23, 2026) indicate that the planking will be completed by May 1, 2026.

CNSC staff remain in communication with the MLITSD inspectors and monitor the status of corrective actions through attendance of project meetings and updates from OPG.

Actions from previous Commission meetings
None

1.6 Construction activities at the DNNP Site

Figure 1: CNSC inspectors conducting a walkdown of the exclusion area prior to basemat lift (Source CNSC staff, April 2026)

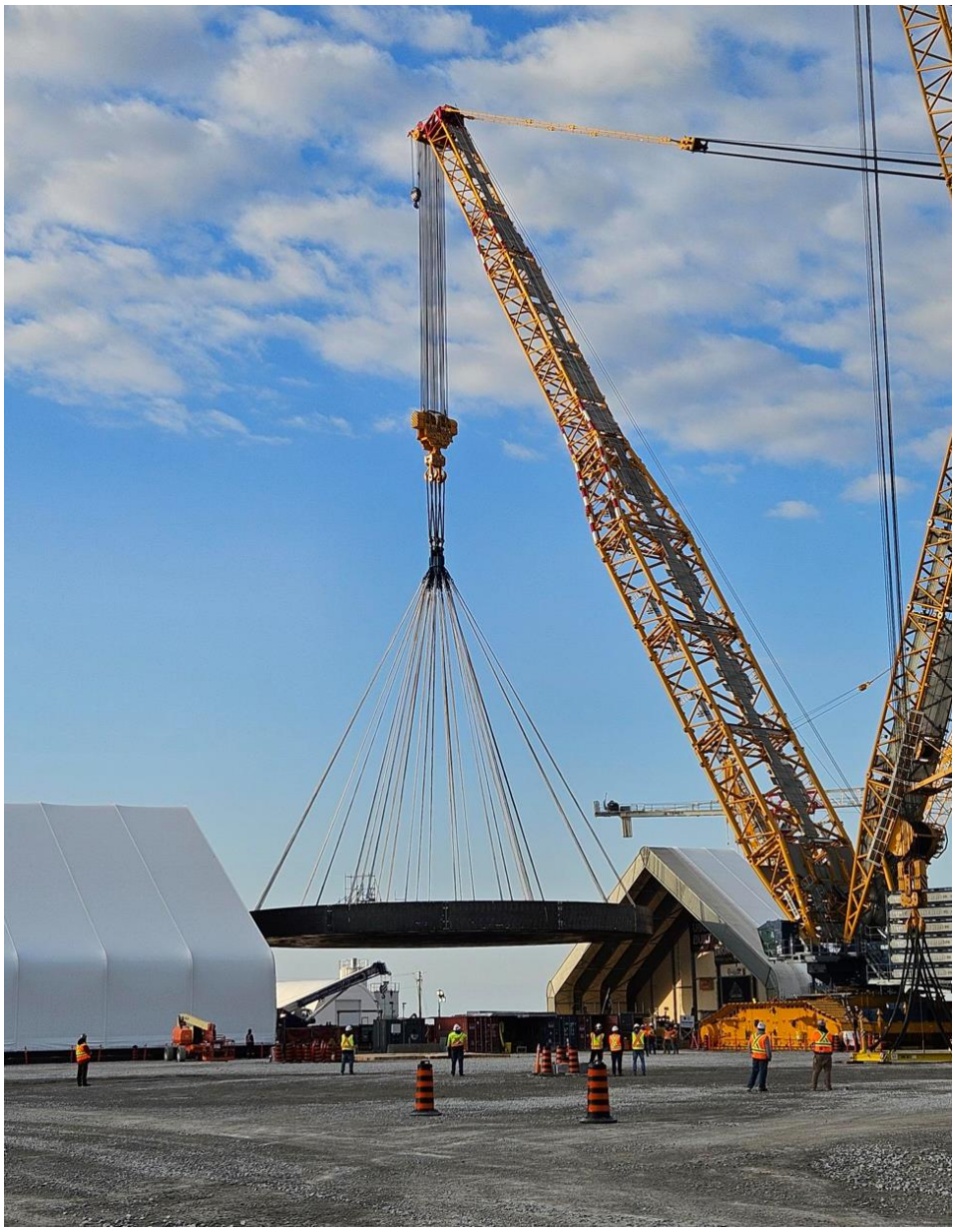

Figure 2: Basemat being hoisted out of the Pre-assembly building (Source CNSC staff April 2026)

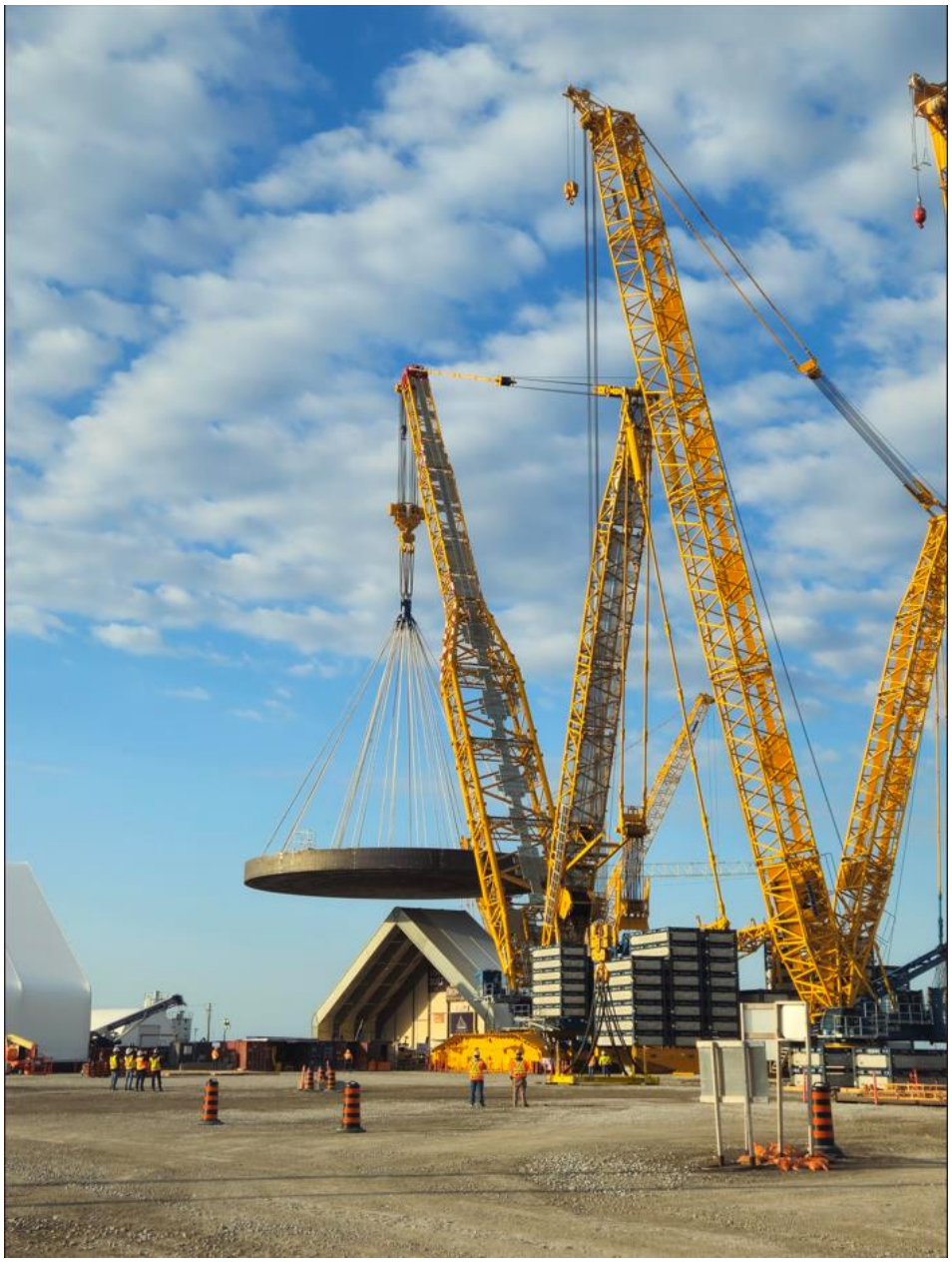

Figure 3: Basemat being hoisted over the Pre-assembly building (Source CNSC staff April 2026)

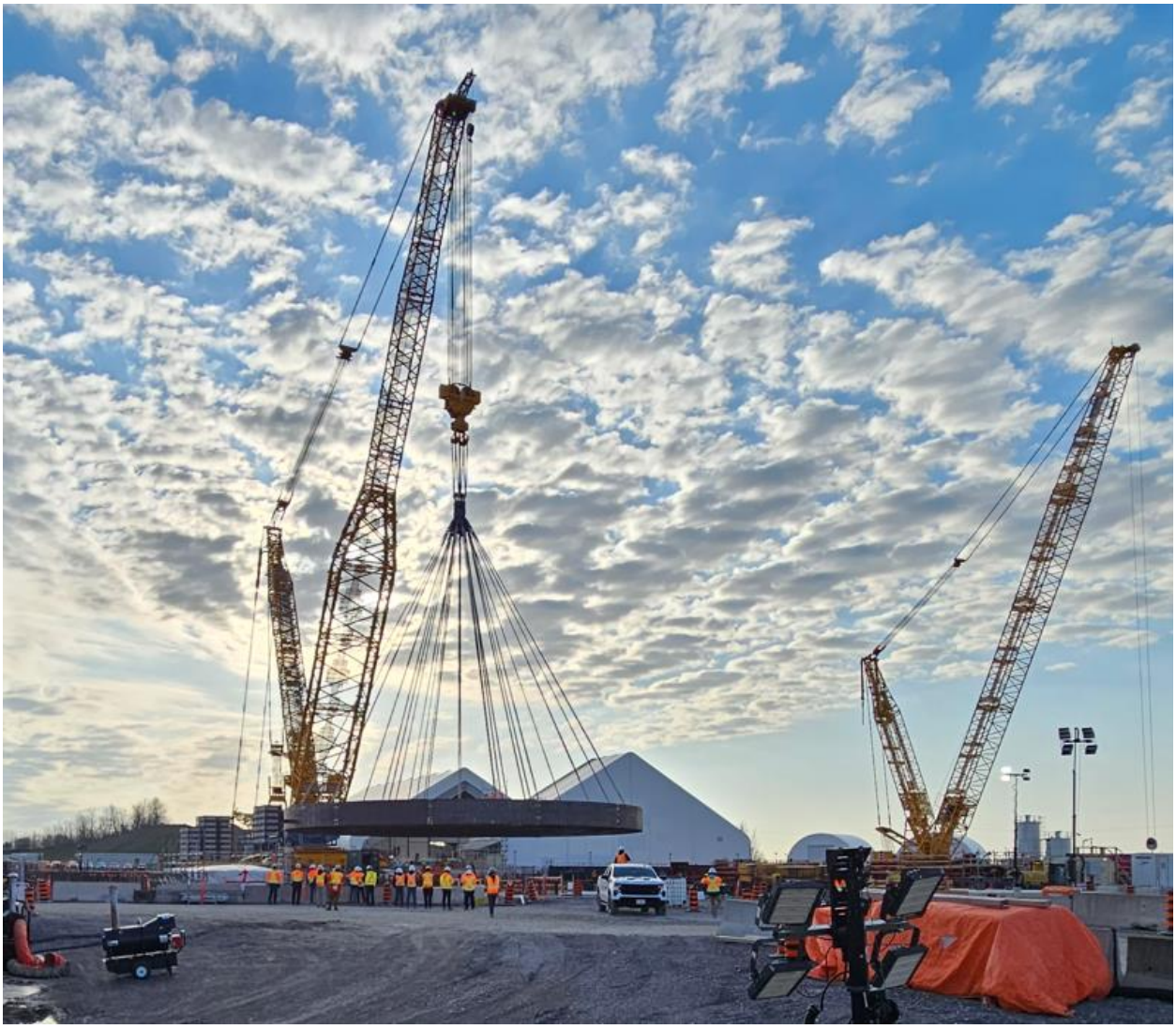

Figure 4: Basemat being hoisted into the RB shaft (Source CNSC staff April 2026)

Appendix A: Memorandum to the Commission - Hilti Anchor concerns at Bruce Power

MEMORANDUM NOTE DE SERVICE

To
A
Candace Salmon
Commission Registry

Security Classification: **Unclassified / Non classifié**
Our File: 3779UC3NXORX-1883431929-1402
Fully releasable ATIP: Yes / oui

From
De
Dr. Alexandre Viktorov
Director General, Directorate of Power Reactor Regulation

Subject
Objet
Installation Deficiencies Associated with Hilti Anchors at Bruce Power/Déficiences liées à l'installation d'ancrages Hilti à Bruce Power

ISSUE

CNSC staff identified improper installation, through a whistleblower's confidential report, of Hilti anchors used to support the Temporary Replacement Emergency Water System (TREWS) project at Bruce B Nuclear Generating Station (NGS). These deficiencies prompted a broader extent-of-condition review of Hilti anchors at both Bruce A and B NGS to determine potential safety and operability implications.

PURPOSE

The purpose of this memorandum is to inform the Commission of:

- Concerns regarding improper installation of Hilti anchors affecting TREWS, and extent-of-condition review at Bruce A and B NGS.
- CNSC staff's conclusions regarding the operability of TREWS at Bruce B NGS, as well as in-service systems at Bruce A and B NGS, while corrective actions remain in progress.

As the whistleblower investigation is ongoing and being conducted by CNSC staff, this memorandum is limited to operability concerns related to the TREWS project and other affected systems with Hilti anchors installed at Bruce A and B NGS. The conclusions of the whistleblower investigation will be addressed through a separate process.

BACKGROUND

In March 2025, CNSC staff were made aware, through a whistleblower's confidential report, of potential improper installation of Hilti [1][OBJ] associated with TREWS at Bruce B NGS. The concern related to whether the anchors were installed in accordance with the manufacturer's instructions and specifications.

[1] Hilti anchors are mechanical fastening devices used to securely attach components (such as piping) to concrete or masonry, particularly where high load capacity, seismic resistance, or safety-critical performance is required.

The TREWS project was initiated by Bruce Power in November 2020 to support continued operation while addressing aging and inspection challenges associated with the Emergency Water System (EWS) piping (both buried and above ground), which is approaching the end of its service life. Once commissioned, TREWS will provide an alternate source of make-up water supply to safety related loads, including the boilers, vault coolers, and irradiated fuel bay.

The main EWS header runs underground along the north side of the station. The existing buried piping is difficult to inspect due to its depth and proximity to other safety related structures, such as pressure relief ducts and buried Emergency Power System (EPS) cables. Inspection and replacement or repair of this buried piping is expected to take several months.

As the EWS is a seismically qualified system, TREWS also must meet equivalent seismic and safety requirements. The TREWS design includes hose runs and temporary above ground piping that must be anchored to the ground to satisfy seismic and safety requirements. The whistleblower's concerns related specifically to the installation of Hilti anchors to ensure proper piping restraint and support. The primary design objective of these restraints/supports is to properly transfer loads to the supporting structures and prevent pipe whip, thereby maintaining pressure boundary integrity.

DISCUSSIONS

Summary of Event

In March 2025, CNSC staff received an external complaint regarding deficiencies with work being performed on TREWS, specifically the installation of Hilti anchors (HDA-P) supporting 8-inch rigid hoses. The work involved mapping out the holes using the support plates, drilling holes into the concrete, setting the anchors in place using a Hilti-specific tool to undercut the anchor bolt head at the bottom of the hole, and finally installing the pipe support baseplate. See Figures 1, 2 and 3 showing various TREWS piping with supports/restraint brackets.

Figure 1: Picture showing TREWS piping connection to EWS distribution header

Figure 2: Picture showing TREWS piping with tie-in restraints located outside of Bruce B

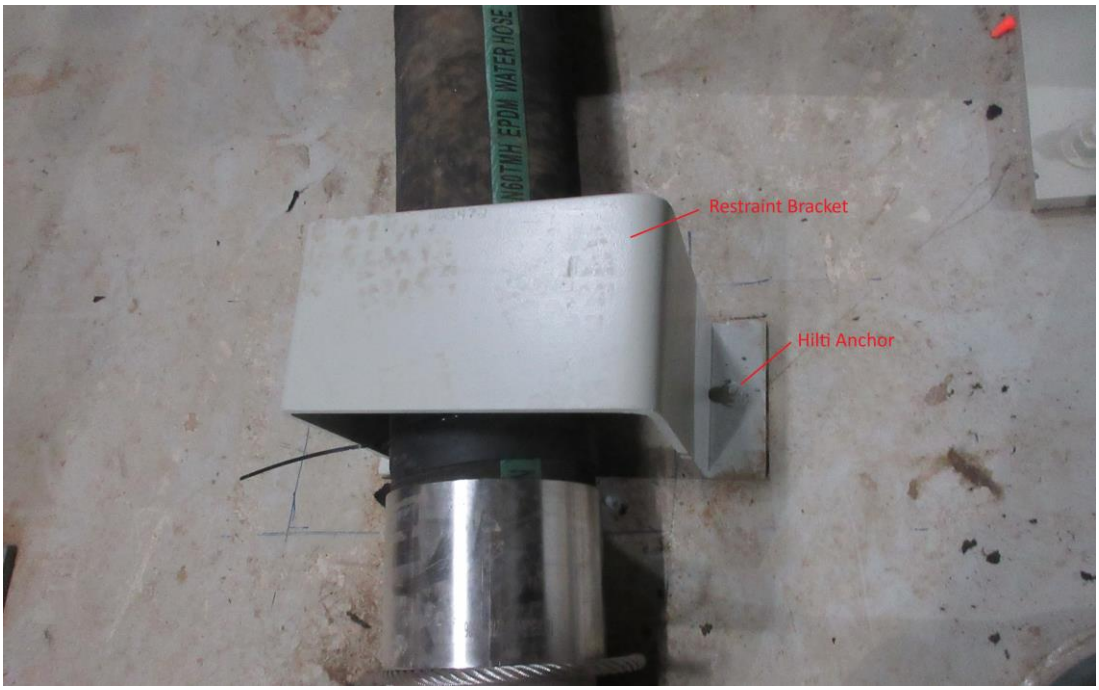

Figure 3: Figure showing TREWS piping with restraint bracket and anchor

The external complaint alleged that approximately 10-15 anchors used to secure the hoses were improperly installed, as the manufacturer's installation instructions were not initially included in the work package and were only applied several months after the work had begun.

In response to the allegations, CNSC staff conducted a staged fact-gathering process, which included the following activities:

- April and July 2025 – independent CNSC staff walkdowns of TREWS
- September 2025 – interviews with Bruce Power staff, and observation of anchor installation practices
- February 2026 – technical engagement between CNSC and Bruce Power civil engineering technical staff, as well, with Hilti representative

During this fact-gathering process, Bruce Power also initiated an engineering evaluation of the anchors and supports installed under TREWS to address CNSC staff's concerns. This engineering evaluation was completed in December 2025. The purpose of the evaluation was to determine whether the anchors that were installed incorrectly were technically acceptable with some variances, or if a repair/replacement strategy is needed. During this engineering review there were similar concerns with the installation of Hilti Kwik Bolt TZ2 (the difference between these two types of anchors is in the way it expands into the concrete – HDA-P undercuts the concrete while Kwik Bolt TZ2 uses an expansion sleeve). The engineering evaluation identified the following types of variances:

- Depth of embedment variances of installed anchors
- Inadequate baseplate installations – lack of full contact with base concrete
- Anchor spacing variances – deviations for anchor spacing dimensions (anchor to anchor, and anchor to edge of plate)

- Anchor size and model variances
- Abandoned cavities in proximity to anchors

The engineering evaluation assessed acceptability for the identified variances and, where adequacy could not be established, recommendations were provided to ensure the design intent is preserved and the requirements are met. The evaluation also concluded that a full-scope inspection was not required. The required corrective actions included replacement of 20 Kwik Bolt TZ2 anchors, repair of 12 HDA-P anchors, and restoration of 13 improperly installed baseplates to proper condition.

CNSC staff's findings

At the time of inspection in September 2025, CNSC staff could not independently confirm compliance with manufacturer installation requirements as critical installation features could not be observed (i.e., the features were underneath the plates). Bruce Power further stated that the primary quality control measure relied on confirming that the specified torque was achieved on the nut, and documented in accordance with the inspection and test plan (ITP). CNSC staff confirmed that the torque specification was achieved in the ITPs that were reviewed.

CNSC staff did observe evidence of rework in several areas, attributable to difficulties encountered by workers in aligning anchors with the steel baseplates due to rebar interactions during installation; several abandoned holes had been backfilled with cement. Some non-conformances remained, including instances where baseplates were not flush with the ground.

See Figure 4 for an image of the baseplate with Hilti anchors; It was noted that several anchors had varying lengths of exposed thread.

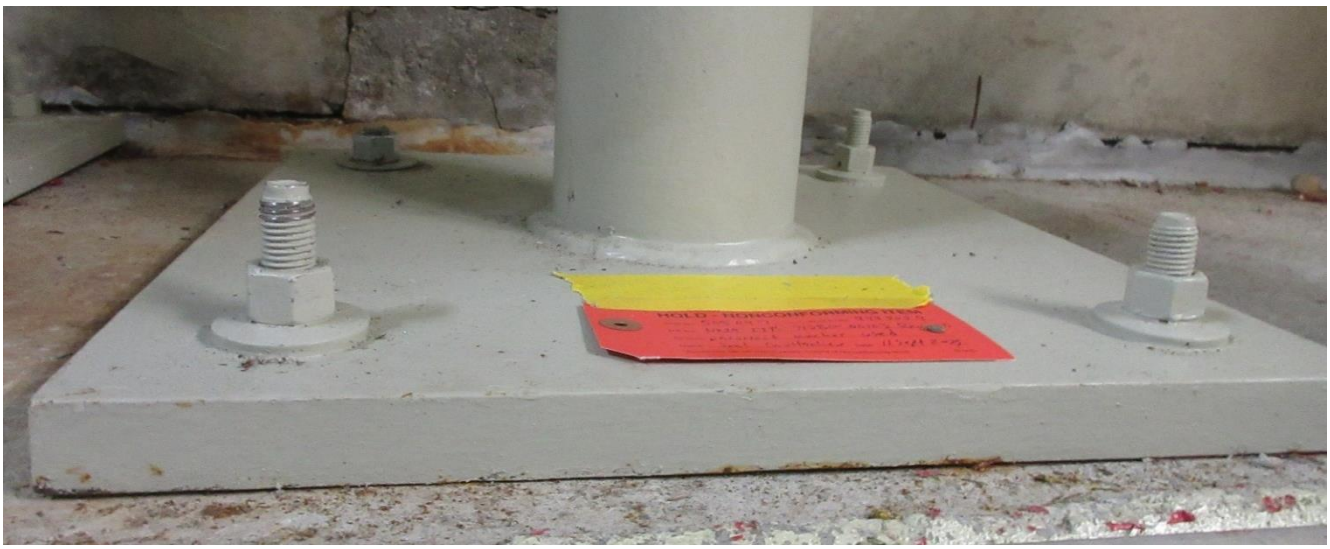

Figure 4: Figure showing anchors with varying lengths of exposed thread sticking out of the baseplate

Figure 5: Cut anchor that was not used due to issues with the location of another anchor; the bracket was relocated.

Following the completion of the engineering evaluation in December 2025 and subsequent technical discussions between CNSC and Bruce Power staff in February 2026, CNSC staff's review determined that Bruce Power did not provide sufficient evidence/technical justification to substantiate the claim that the observed installation variances were within the applicable Hilti manufacturer specifications. CNSC staff concluded that the engineering evaluation relied mainly on field measurements and engineering judgement, rather than physical confirmation through the removal of the baseplate.

To address CNSC staff's concerns, Bruce Power initiated removal of additional baseplates to permit visual examination of the installed anchors in March 2026. Bruce Power also contacted Hilti to clarify installation requirements, which identified additional steps beyond torque verification. These steps included confirming that all dust and debris were removed from the drilled hole prior to the anchor placement, as well as visually verifying the presence of the red indicator on the anchor thread to confirm that the required embedment depth has been achieved. Figure 6 below provides the manufacturer's diagram illustrating the visual inspection criteria for the red stripe for properly installed anchors (HDA-P and HDA-T [Note: HDA-T anchors are not used for the TREWS program]).

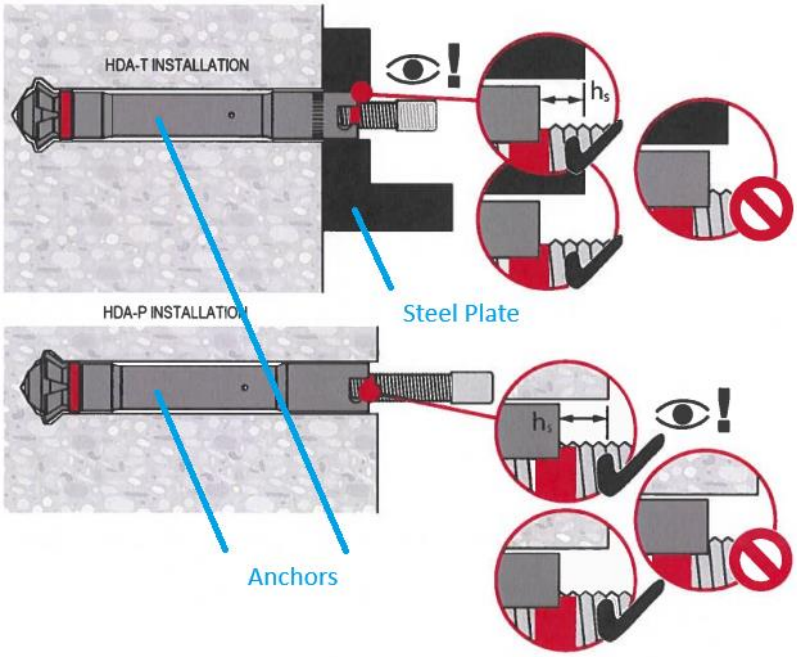

Figure 6: Manufacturer's diagram illustrating the visual inspection criteria for properly installed anchors

As these Hilti specified steps had not been consistently completed, and visual examinations identified anchors that did not meet installation requirements, Bruce Power withdrew the initial engineering evaluation and initiated corrective actions. Bruce Power further indicated that it would undertake the necessary corrective actions, which include extending the verification of condition to all HDA-P and Kwik Bolt TZ2 anchors on TREWS and submitting a revised technical submission to CNSC staff in support of declaring TREWS to be Available for Service (AFS).

Corrective Actions Taken by Bruce Power

To address identified deficiencies, Bruce Power initiated the following short-term corrective actions:

- Convening the Corrective Actions Review Board (CARB), the organization's highest level investigative review process.
- Assessing the extent of condition of previously installed Hilti anchors across all Bruce A and B NGS.
- Initiating a 48-hour Technical Operability Evaluation (TOE), which is required when a Structure, System, or Component (SSC) important to safety is determined to be degraded, non-conforming or unavailable. This is to ensure that the station continues to operate within its safe operating envelope (SOE). This 48-hour TOE was followed by a 7-day TOE to ensure that the affected anchors will be inspected and repaired as required.

In addition, Bruce Power conducted a nuclear safety culture-focused review to assess whether questioning attitude was in place and to determine why workers were unwilling or unable to raise installation concerns, as well as whether those concerns, when raised, were adequately recognized and addressed by management.

Specific actions taken by Bruce Power for TREWS Hilti Anchors

In March 2026, Bruce Power extended its inspection scope to include all anchors associated with the TREWS project, representing approximately 580 anchors in total. Each anchor will be assessed on a case-by-case basis, beginning with visual inspection. Bruce Power also committed to conducting a defined percentage of pull tests to full design load. The details of the corrective actions taken will be provided through the CARB process.

As part of these corrective actions, Bruce Power engaged Hilti directly to provide technical support and oversight. Hilti representatives have been mobilized to the site to deliver installation training. All Bruce Power installers are now required to be trained and qualified by Hilti personnel, with training provided only by appropriately qualified instructors. This training emphasizes critical installation steps, including drilling requirements, embedment depth, hole preparation, anchor setting, and post installation verification.

In parallel, Bruce Power is strengthening work control measures by developing detailed, written procedures governing Hilti anchor installation. Previously, manufacturer instructions were primarily referenced using pictorial guidance. The revised procedures would clearly document each installation step in writing, including drill bit selection, required depth, installation sequence, and acceptance criteria. Critical steps and verification requirements would be explicitly identified to ensure consistent and compliant installation.

Finally, Bruce Power is developing a comprehensive remediation schedule to remedy non-compliant anchors, which is planned to be completed by the end of October 2026. If Bruce Power determined that remediation of a specific anchor cannot be performed safely while the unit is operating, that work would be deferred and scoped into the next planned outage.

Actions taken by Bruce Power for Extent of Condition Review

Bruce Power performed an extent of condition review to assess the broader use of Hilti anchors across Bruce A and B NGS. A review of procurement issuance records identified approximately 3500 anchors issued outside of the TREWS project. These anchors were mapped to their end use within Bruce A and B NGS, confirming that approximately 50 percent had been installed (the other 50% are not in use). Of the anchors that were installed, the majority were used for rigging or fall arrest applications. As a precautionary measure, the use of these anchors for hoisting activities has been suspended.

The extent of condition review further identified approximately 220 anchors potentially associated with in-service systems, of which approximately 110 were installed. Inspections identified non-conformances in certain in-service installations, which were found in the following systems:

- Bruce A – Low Pressure Service Water, Common Service Water, Feed Circuit, Maintenance Cooling, D2O Collection, Containment Filtered Venting and Active Liquid Waste
- Bruce B – Low Pressure Service Water, Containment Filtered Venting, Emergency Water

To support operability determinations through the initial 48-hour TOE, Bruce Power applied a conservative evaluation approach that assumed the anchors were absent and assessed whether system

failure could occur due to loss of ultimate tensile capacity. Design basis loads were explicitly considered in these evaluations. The 48-hour TOE used fitness-for-service criteria rather than construction code compliance (i.e., to demonstrate that pressure boundary integrity is maintained after an event such as seismic, wind or accident induced loads). Where system integrity could be demonstrated under conservative assumptions, the systems would then be deemed acceptable.

The conclusion of the initial 48-hour TOE was that, although degraded conditions existed due to improperly installed anchors, there were no operability concerns under either normal or transient conditions for the impacted systems. Bruce Power confirmed that pressure boundary integrity could be maintained. Subsequently, within the 7-day TOE, Bruce Power took the necessary actions to inspect all affected anchors and repair any that did not meet the fitness-for-service criteria. The 7-day TOE was closed on April 10, 2026.

Based on the information provided to date (including the 48-hour and 7-day TOEs), CNSC staff conclude, while degraded anchors may reduce load-carrying capacity and can lead to increased piping stress and displacement, there is sufficient margin to maintain pressure boundary integrity.

Nuclear Safety Culture Assessment

Bruce Power's nuclear safety culture review identified a generally strong willingness among staff to raise concerns and effective supervisory engagement. However, the review also identified areas for improvement related to awareness and consistent use of the formal concern-raising process. In addition, Bruce Power noted concerns that some vendors may be reluctant to report issues due to perceived impacts on vendor performance scorecards.
While Bruce Power attributed these observations primarily to gaps in training and knowledge rather than a systemic nuclear safety culture weakness, CNSC staff note that elements of these issues remain under review in the context of the ongoing investigation.

CNSC STAFF REGULATORY OVERSIGHT AND NEXT STEPS

CNSC staff will continue to conduct regulatory oversight to ensure that the issues associated with the installation of Hilti anchors at Bruce A and B NGS are adequately resolved. The following items outline CNSC staff's planned compliance and oversight activities with the approximate timeframe:

- Near Term (Next few months)
    - Review Bruce Power's revised technical submissions, including corrective actions endorsed through the CARB, to confirm that all identified installation deficiencies are fully addressed.
    - Finalize the outcome of the CNSC investigation related to the external complaint, including documenting conclusions and any resulting regulatory decisions.
- Medium to Longer Term (Fall 2026)
    - Follow up on the effectiveness of corrective actions arising from the 48-hour and 7-day TOEs.

- Verify that corrective actions for TREWS anchors are satisfactorily implemented prior to any declaration of AFS.
- Conduct inspections, as required, to confirm field implementation and sustained compliance with manufacturer installation requirements, work control processes, and the outcomes of the Bruce Power's final investigation results.

These activities will ensure that corrective actions are both effective and sustained.

CONCLUSIONS

CNSC staff conclude that the improperly installed anchors in TREWS do not represent an unacceptable risk, as TREWS is not currently in service. TREWS will not be permitted to enter into service until CNSC staff are satisfied that all concerns with the Hilti anchors have been fully addressed.

For Hilti anchors associated with in-service systems, CNSC staff conclude that, based on the information provided to date, including the results of the 48-hour and 7-day TOEs, there are no operability concerns at Bruce A and B NGS at this time.

CNSC staff will continue regulatory oversight as described in the section on CNSC Staff Regulatory Oversight and Next Steps.

As previously stated, the whistleblower investigation is ongoing and being conducted by CNSC staff. Accordingly, this memorandum is limited to operability concerns related to the TREWS project and other affected systems with Hilti anchors installed at Bruce A and B NGS. The conclusions of the whistleblower investigation will be addressed through a separate process.

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