

From: [Richard Knott](#)
To: [Hoc, HOO X](#)
Cc: [Douglas VanTassell](#); [Tighe Smith](#)
Subject: [External_Sender] Part 21 Interim Notification
Date: Friday, October 31, 2025 7:11:29 AM
Attachments: [ATT00001.txt](#)
[Interim Report P21-10112025-INT NRC Final.pdf](#)

Good morning,

Please see attached interim report provided per 10CFR Part 21 section 21.21(a)(2). Paragon requires more time to complete the failure analysis related to the reported battery failures. We estimate completing the analysis on or before 12/15/2025. During our ongoing evaluation we also identified the Duke Oconee Nuclear Station was not included in the list of potentially affected Licensees.

I confirm that no proprietary, legally privileged, and/or confidential information is included in the attached notification.

Please contact me if you have any questions or concerns.

Best Regards,
Richard

Richard Knott
Vice President, Quality Assurance

(518)450-9706 (C) | www.ParagonES.com



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10/31/2025

To: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555
Fax Number (301)816-5151

10CFR Part 21 Interim Notification: P21-10112025-INT Rev 0

Subject: Potential Deviation Related to Stryten (formally GNB) N&M Series Flooded Batteries Installed in 24VDC, 48VDC, 125VDC and 250VDC Station Battery Strings Need for Additional Analysis

Pursuant to 10CFR 21.21 (a)(2), Paragon Energy Solutions, LLC is providing this interim notification of ongoing analysis for Part 21 reportability associated with Stryten (GNB) Station Batteries.

Condition being evaluated:

On October 11th, 2025, Paragon reported (NRC EN# 57981) failure conditions experienced at Constellation Quad Cities Clean Energy Center and Calvert Cliffs Clean Energy Center. Quad Cities experienced positive post separation from three cells in a safety related battery string at the post seal nut region. The first was identified while replacing a cell after trouble shooting abnormal fluctuations in DC bus voltage following isolation of the connected battery charger. After replacement and upon initiation of the subsequent service discharge test, an adjacent cell positive post separated, resulting in a localized fire near the post. The third cell failed while conducting maintenance to replace the battery string. More recently, in September 2025, Constellation Calvert Cliffs Clean Energy Center reported separation of a positive post from a cell upon initiation of a service test discharge resulting in electrical arcing at the cell post area. The affected battery cells have been in service for 14 years and 11 years respectively. This phenomenon only affects the positive posts on the battery.

Paragon is currently conducting an extensive failure analysis and has not yet identified a defect in the cell post seal design or manufacturing process. More time is necessary to complete the failure analysis; however, the current postulated cause of the post separation is due to a corrosion mechanism. Creep corrosion (a long-term corrosion mechanism), leading to the onset of nodular corrosion in the threaded region of the positive post can occur in flooded lead-acid batteries. Post seal integrity, stresses applied to the post, and elevated temperature above recommended values can all contribute to the accelerated corrosion and premature post failures identified.

Date when evaluation is expected to be complete: 12/15/2025.

See attached list for Licensees utilizing the affected N&M series batteries.



Paragon recommends the following for affected Licensees:

1. For In-service Batteries: (See attached pictures for examples of the conditions below)
 - a. Indication of nodular corrosion is often visible in advanced stages, and Paragon is recommending impacted licensees perform an inspection of their batteries for nodular corrosion.
 - b. While performing the inspection for nodular corrosion, identify conditions that could add unnecessary stress to the cell positive posts such as:
 - Verify intercell cabling is properly supported such that the weight of the cables is not supported by the post alone.
 - Verify proper alignment of intercell connector plates and cells.
 - c. During individual cell float voltage measurements (per Manufacturers Instruction Manual and IEEE-450), if abnormally high float cell voltage is measured, Paragon recommends the condition be evaluated in accordance with IEEE 450:2020 C.3.2 to determine if compromised cell post integrity is contributing to the abnormal measurement.
 - d. Documented cell deficiencies and anomalies, along with pictures, are requested to be sent to Paragon at Batteries@Paragones.com. Paragon can assist the station with inspection and evaluation of the conditions of the batteries. For emergent issues please call 865-888-6853.
2. For Sites Planning Replacement:
 - a. Licensees preparing for battery installation/replacement are recommended to contact Paragon and arrange for our team to perform an internal inspection below the positive post seal nut to validate post seal integrity prior to release from the station warehouse or once the battery cells are staged for installation.
 - b. Once the post seal verification inspection is complete, Paragon considers new batteries will perform their safety function once installed and maintained in accordance with the Manufacturer's Manual, IEEE-450:2020, and Reg Guide 1.129 Rev 4.
3. For optimal battery service life, maintain battery room temperature in the recommended range of 75F to 77F.
4. When performing intercell torque checks, ensure proper torque values are applied.

Based on the analysis completed to date, the observed failure mode takes several years to advance to the point of failure. For in-service batteries, the inspections recommended above enable the Licensees to identify suspect cells and allow for corrective action prior to reaching the point of individual cell failure such that the battery system will perform for the intended service life.



Paragon is standing by to assist affected Licensees with questions and concerns regarding this notification.

Regards,

Richard Knott

Vice President Quality Assurance

Paragon Energy Solutions

817-284-0077

rknot@paragones.com



List of Licensees Utilizing Affected Battery Models

Paragon has supplied Class 1E and/or commercial grade batteries to the plants identified below. All installations are GNB/Stryten batteries/cells supplied under the Paragon Quality Assurance Program since 2005. It is recommended that plants also consider installations of M and N Series batteries that have been approved for service life extension beyond the 20-year qualified life recommendation or supplied by alternate suppliers.

Site	Battery/Cell Model
Ameren	
Callaway	NCN-13S, NCN-23S
Arizona Public Service (APS)	
Palo Verde	NCN-33, NCN-33S
Constellation	
Calvert Cliffs	NCN-15, NCN-21, NCN-21S, NCN-27
Dresden	2-MCX-5, NCN-21, NCN-21S, NCN-27
Fitzpatrick	NCN-35
Ginna	NCN-21
LaSalle	NCN-17, NCN-17S, NCN-27, NCN-27S, 2-MCX-5
Nine Mile Point	NCN-35, NCN-35S
Quad Cities	2-MCX-5, NCN-21, NCN-21S, 2-MCX-05, MCX-05
Dominion	
Millstone	NCN-11S, NCN-27, NCN-27S, NCN-35, NCN-35S, NCX-35
NextEra Energy	
Seabrook	NCN-35S
Duke	
Brunswick	NCX-9S, NCN-17, NCN-17S
Carolina Power & Light	NCN-17
Catawba	NCN-9, NCN-21, NCN-27
H.B. Robinson	NCN-15
McGuire	NCN-27
Oconee	NCN-27S
Entergy	
River Bend	NCN-29S, NCN-29S, NCX-35S
Florida Power & Light (FPL)	
Turkey Point	NCN-17, NCN-17S, NCN-25, NCN-25S, NCN-27, NCN-27S
Vistra	
Beaver Valley	NCX-29S, NCX-33S, NCX-35S
Comanche Peak	NCN-17, NCN-17S, NCN-27, NCN-27S
Davis Besse	NCN-21, NCN-21S



Site	Battery/Cell Model
South Texas Nuclear Operating Company (STPNOC)	
South Texas Project	NCN-17, NCN-17S, NCN-27
Bruce Power	
Bruce Power	MCX-09S, MCX-13S, NCN-27, NCN-27S, NCN-35, NCN-35S
Siemens/Bruce Power	MCX-13, NCN-27
KHNP	
Hanbit	NCN-11S, NCN-33S
Kori	NCN-11S, NCX-17S, NCN-21S, NCN-25, NCX-27, NCX-31, NCX-31S, NCN-33S, NCX-35
OPG	
OPG	NCN-23

Note: The “S” suffix is an administrative designator only. The design and manufacturing of cells with or without the “S” is the same.

Visual Inspection Conditions Requiring Further Evaluation

During battery system visual inspection, attention should be given to the following conditions.

Positive Post Corrosion Indications – Figures 1 thru 4 below provide visual indicators of corrosion in the post seal area.



Figure 1

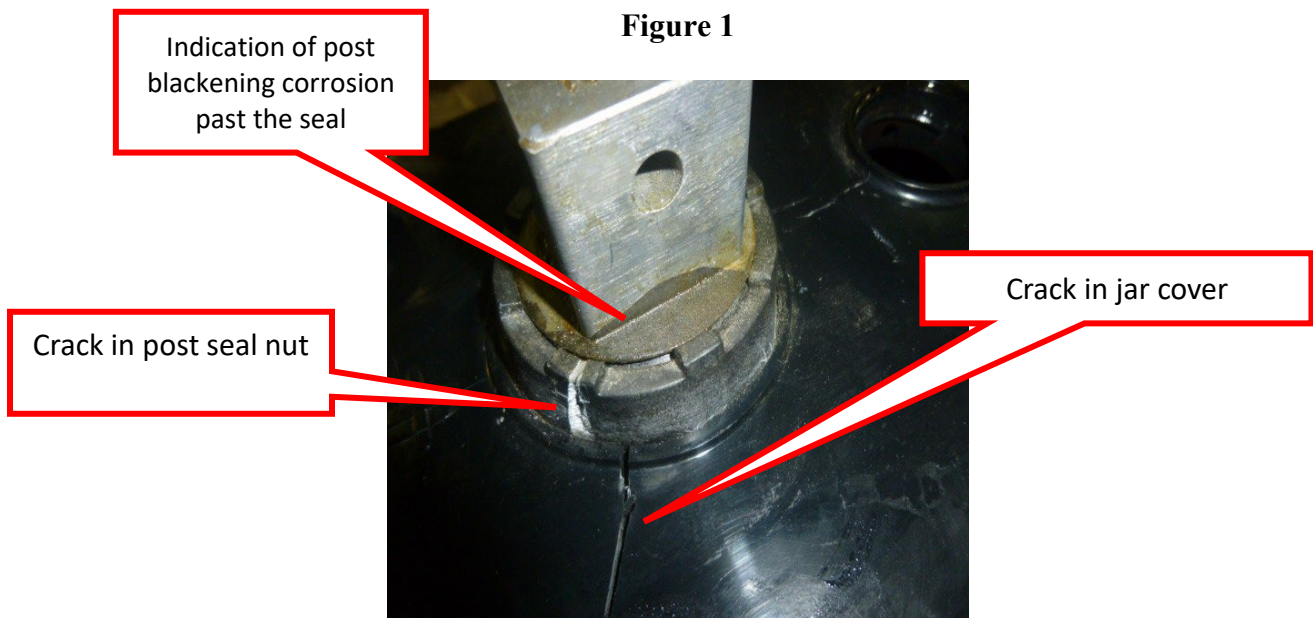


Figure 2

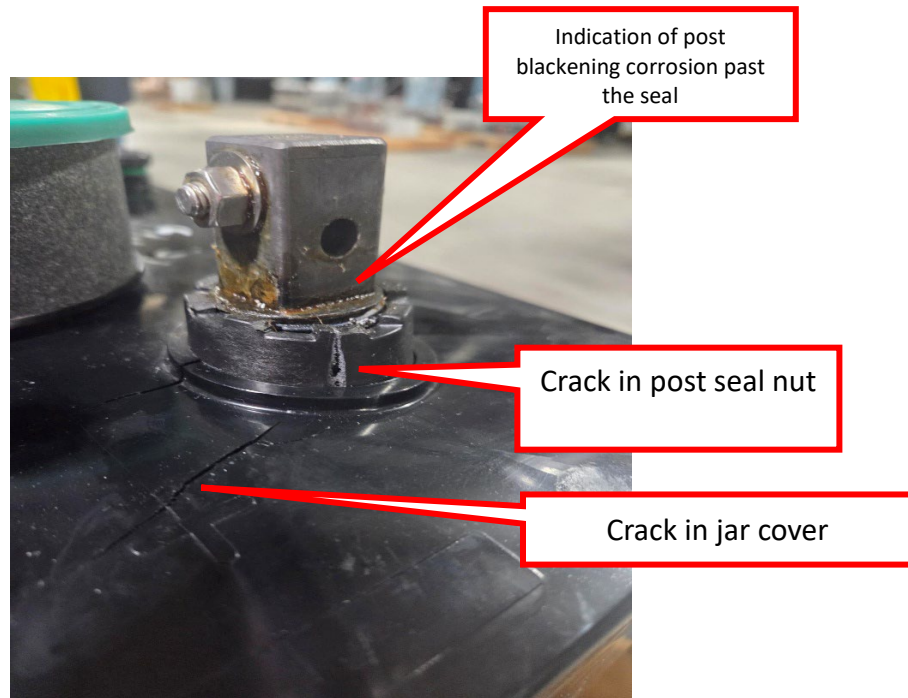


Figure 3

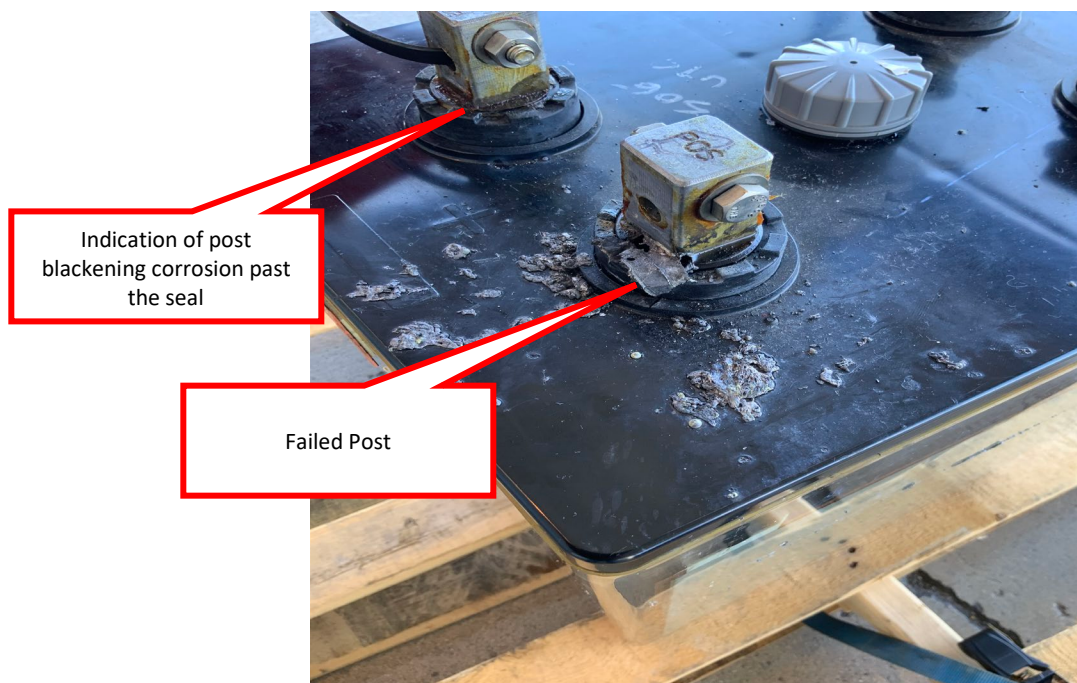


Figure 4



Battery Cabling Support – intercell/tier battery cabling should be well supported with sufficient bend radius to minimize post stress.



Figure 5. Unsupported Inter-Tier Cabling



Cell Alignment – Cells should be arranged in the racks to prevent unwanted misalignment which could contribute to stress at the battery terminal post.

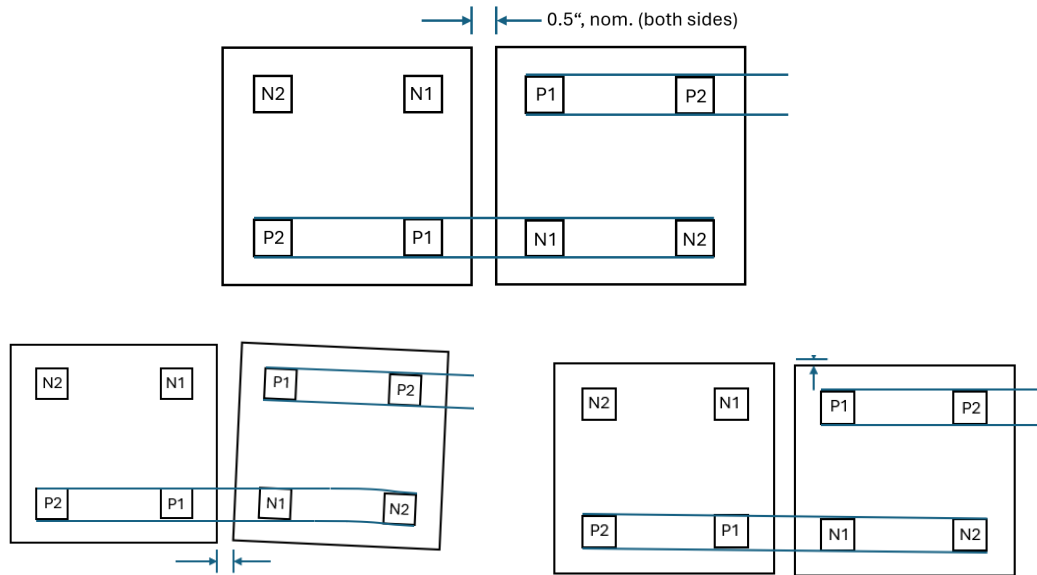


Figure 6: (Top) Ideal Cell Alignment, (Bottom Left) Unwanted, Rotated Cell Alignment, (Bottom Right) Unwanted, Shifted Cell Alignment