



Date: 02/25/2026

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

10CFR Part 21 Final Notification: P21-01282026-FN, Rev. 0

Subject: Defect with Schneider Electric Actuator Part Number MA-418-0-0-4

Pursuant to §10CFR 21.21(d)(3)(ii), Paragon is providing final notification of a defect associated with the Schneider Electric Actuator as noted in the table in section (ii) below

The following information is required per §10CFR 21.21 (d) (4).

(i) Name and address of the individual or individuals informing the Commission.

Richard Knott, Vice President Quality Assurance
Paragon Energy Solutions, LLC
7410 Pebble Drive
Ft. Worth, TX 76118

(ii) Identification of the facility, activity, or the basic component supplied for such facility or such activity within the United States which fails to comply or contains a defect.

Plant	Client PO#	Item ID#	Paragon Project #	Serial #	QTY
TVA Watts Bar	3026710	BRK393H	1701330	AN-1721B3363, 3365, 3366, 4563, 4567, 4568, 4573, 4583, 5711, 5713, 5723, 5726, 5734, 5735, 5736, 5754, 5756, 5758	18

(iii) Identification of the firm constructing or supplying the basic component which fails to comply or contains a defect.

Components were originally supplied by:

Paragon Energy Solutions, LLC
7410 Pebble Drive, Fort Worth Texas 76118

(iv) Nature of defect or failure to comply and the safety hazard which is created or could be created by such defect or failure to comply.

TVA experienced binding in several actuators used to operate dampers associated with Emergency Diesel Generator (EDG) Room Ventilation. Paragon conducted detailed failure analysis which confirmed precipitate particles (boron and potassium) from the lubricating oil collected in the space between the small motor rotor and stator and/or the internal gear train thus preventing rotation of the shaft connected to the damper actuating linkage. There are typically 4 actuators connected to operate sections of a single EDG ventilation damper. Failure of these actuators to operate the damper as designed could cause inadequate cooling of the EDG, and if left uncorrected could contribute to a safety hazard.

(v) The date on which the information of such defect or failure to comply was obtained.

01/26/2026

(vi) In the case of a basic component which contains a defect or fails to comply, the number and location of these components in use at, supplied for being supplied for, or may be supplied for, manufactured or being manufactured for one or more facilities or activities subject to the regulations in this part.

See section (ii) above.

(vii) The corrective action which has been, is being, or will be taken; the name of the individual or organization responsible for the action; and the length of time that has been or will be taken to complete the action.

Paragon entered this issue into our Corrective Action Program. Paragon conducted detailed failure analysis which confirmed precipitate particles (boron and potassium) from the lubricating oil collected in the space between the small motor rotor and stator and/or the internal gear train thus preventing rotation of the shaft connected to the damper actuating linkage. To date, Paragon has only confirmed this failure mode on some of the actuators supplied (date code AN-1721 - 21st week of 2017) as indicated in the table above. Paragon coordinated with the Original Equipment Manufacturer (OEM) Schneider Electric and their lubricating oil supplier (AMSOIL). AMSOIL identified a five-year shelf life related to the oil used in these actuators which had not been previously published by the OEM in the equipment literature. Once requested, the OEM specified a 5-year shelf life and 15-year service life. To bound the extent of condition, Paragon also reviewed industry operating experience related to past failures of these and similar actuators supplied by the OEM dating back to 1994 and did not identify any failures caused by lubricating oil breakdown. Paragon also conducted analysis of two actuators manufactured in 2016 and 2018 and did not identify oil breakdown. This evidence supports a conclusion that the extent of

condition can be limited to the actuators supplied in 2017 as indicated in the table in section (ii) above. Paragon suspects the OEM may have inadvertently used oil already showing degradation during the manufacturing run as a probable cause. However, we could not confirm with the OEM any potential deficiencies with the manufacturing processes or oil storage that would have contributed to this failure mode. As such our corrective action is focused on analyzing oil samples on new orders against the known criteria for new oil and defining shelf and service life based on learnings from our failure analysis. Corrective action to prevent recurrence includes:

- 1) Revise Commercial Grade Dedication Plan (CGD-MA418-1) to include this failure mode and an oil analysis critical characteristic with appropriate acceptance criteria to ensure new actuators do not show signs of oil breakdown. (Paragon Engineering– ECD 3/15/2026)
- 2) Issue Technical Bulletin to document recommendations for shelf-life (5 years) and service life (15 years with regular cycling of the actuator) based on the information gathered from this failure analysis for licensees to incorporate into preventive maintenance programs. (Paragon Engineering – ECD: 3/15/2026)
- 3) Complete dedication to the revised CGD for current in progress orders. (Paragon Operations – ECD: 4/15/2026)

(viii) Any advice related to the defect or failure to comply about the facility, activity, or basic component that has been, is being, or will be given to purchasers or licensees.

Paragon recommends TVA continue to operate each actuator per station preventive maintenance frequencies. Operation of installed actuators should maintain adequate mixing of the lubricating oil for installed actuators.

Sincerely,



Richard Knott
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Paragon Energy Solutions LLC
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cc: Douglas VanTassell - CEO
Daniel Dale – COO