



Date: 1/17/2024

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

10CFR Part 21 Final Notification: P21-12182023-FN, Rev. 0

Subject: Defect with Detroit Diesel/MTU Fuel Injectors P/N R5229660 Cat ID# 0001390618

Pursuant to §10CFR 21.21 (d)(3)(ii), Paragon Energy Solutions, LLC is providing this final notification of a potential defect associated with the Auxiliary Feedwater Pump Diesel Engine fuel injectors supplied to Constellation. This condition, if left uncorrected, could potentially cause a substantial safety hazard.

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#	Project Number	Serial #	QTY Supplied
Braidwood	01389979	PR23000356	2302008*, 2304001 thru 2304015	16
Byron	01384756	PR23000189	2302001 thru 2302016*	16
*S/N 2302008 was refurbished under both 01384756 and 0138979 Constellation purchase orders, but was ultimately installed at Braidwood				

The Detroit Diesel/MTU Fuel Injectors P/N R5229660 Cat ID# 0001390618 were supplied as indicated in the table above.

(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.

On November 17, 2023, Constellation provided Paragon with Constellation/Braidwood Root Cause Report associated with Issue Report # 4703982 and the associated failure analysis report documenting potential defects with some fuel injectors (Detroit Diesel/MTU Fuel Injectors PN R5229660 Cat ID# 0001390618) supplied to Braidwood. The defects identified included degraded sealing surfaces on some injectors at the fuel line connection points and a disintegrated body O-ring which allowed fuel oil to leak into the diesel lubricating oil system.

The injectors were provided to Paragon for refurbishment in accordance with the customer purchase orders referenced in section (ii) above with included scope to employ the use of the OEM Service Manual. The root cause investigation identified lack of clarity and detail in Paragon's mechanical repair process procedures when using OEM or other third-party vendors. This led the project team to incorrectly determine the procedure did not apply to the scope of these projects. While the OEM Service Manual was used to develop the Paragon repair and inspection procedures conducted at the third-party vendor, the procedures were only focused on critical parts replacement and inspection. A detailed as found condition inspection was not specified which would have identified the deficiencies in the sealing surfaces as a condition requiring repair in accordance with the acceptance criteria contained in the OEM Service Manual. Testing was focused on validating spray nozzle pressure criteria and did not consider any leakage criteria at the fuel line connections or body sealing surface (sealed via O-ring). The failure to identify and repair these deficiencies on the affected injectors allowed excessive fuel oil leakage, resulting in diesel lubricating oil system contamination levels above specified limits. On December 18, 2023, Paragon concluded our evaluation which determined this condition, if left uncorrected, could contribute to a substantial safety hazard and is reportable in accordance with 10CFR Part 21.

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

12/18/2023

(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.

- 1) Paragon has issued a return material authorization to Braidwood and has received all affected injectors supplied to them as stated above. - Complete
- 2) Paragon has informed Byron and recommended they monitor the affected diesel engine for symptoms of fuel oil contamination in the diesel lubricating oil per plant procedures. Paragon has not been notified of any similar problems associated with the injectors supplied to Byron as indicated above. - Complete
- 3) Paragon has provided awareness briefings to Mechanical Engineering and Quality Engineering teams on the issues associated with the refurbishment of these injectors. – Complete
- 4) A detailed review of in process and past mechanical repairs identified no repair plan issues or gaps, and each was reviewed and conformed to the customer PO requirements. - Complete
- 5) Paragon has investigated other areas of our core business (i.e., I&C and Electrical component repair processes) for similar weaknesses and determined the procedures governing these processes are very robust and adequately control the use of OEM or other third-party vendors performing repair services. - Complete
- 6) Mechanical Engineering will revise programmatic procedures to improve control over mechanical repair/refurbishment activities of safety related customer supplied items including detailed guidance necessary when using third party vendors in support of the process. – ECD 2/17/2024
- 7) Mechanical Engineering will conduct training on the revised procedure from action 4 above. – ECD 2/28/2024

(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.

It is recommended that Constellation Byron continue monitoring lubricating oil samples from the diesel engine having the affected injectors installed per plant procedures.

Sincerely,



Richard Knott

Vice President Quality Assurance

Paragon Energy Solutions LLC

817-284-0077

rknott@paragones.com

cc: Douglas VanTassell - CEO
Daniel Dale – COO