



**ENGINE SYSTEMS, INC.**

175 Freight Road  
Rocky Mount, NC 27804

Telephone: 252/977-2720  
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October 18, 2021

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555-0001

Subject: 10CFR21 Reporting of Defects and Non-Compliance -  
Engine Systems, Inc. Report No. 10CFR21-0132, Rev. 0

Pressure Regulator Valve, Nordberg P/N 1776 506

Dear Sir / Madam:

The enclosed report addresses a reportable notification on a pressure regulator valve, Nordberg P/N 1776 506.

A copy of the report has also been mailed to our affected nuclear customer.

Please sign below, acknowledging receipt of this report, and return a copy to the attention of Document Control at the address above (or, fax to number 252/446-1134) within 10 working days after receipt.

Yours very truly,

ENGINE SYSTEMS, INC.

Susan Woolard  
Document Control Coordinator

**Please let us know if ANY of your mailing information changes - name of recipient, name of company/facility, address, etc. Mark the changes on this acknowledgment form and send to us by mail or FAX to the number above.**

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RECEIVED: \_\_\_\_\_

DATE: \_\_\_\_\_

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**Report No. 10CFR21-0132**

Rev. 0: 10/18/21

**10CFR21 REPORTING OF DEFECTS  
AND NON-COMPLIANCE**

COMPONENT: Pressure Regulator Valve  
Nordberg P/N 1776 506

SYSTEM: Emergency Diesel Generator

CONCLUSION: Reportable in Accordance With 10CFR21

Prepared By: \_\_\_\_\_

*John Lin*

Engineering Manager

Date: \_\_\_\_\_

10/18/21

Reviewed By: \_\_\_\_\_

*Don Robert*

Quality Assurance Manager

Date: \_\_\_\_\_

10/18/21

REV	DATE	PAGE	DESCRIPTION
0	10/18/21		Initial issue.

**Pursuant to 10 CFR 21.21(d)(4), ESI is presenting the required information as follows:**

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

*John Kriesel  
Engineering Manager  
Engine Systems Inc.  
175 Freight Rd.  
Rocky Mount, NC 27804*

*Dan Roberts  
Quality Manager  
Engine Systems Inc.  
175 Freight Rd.  
Rocky Mount, NC 27804*

- (ii) Identification of the basic component supplied within the United States which fails to comply or contains a defect.

*Pressure Regulator Valve, Nordberg P/N 1776 506*

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

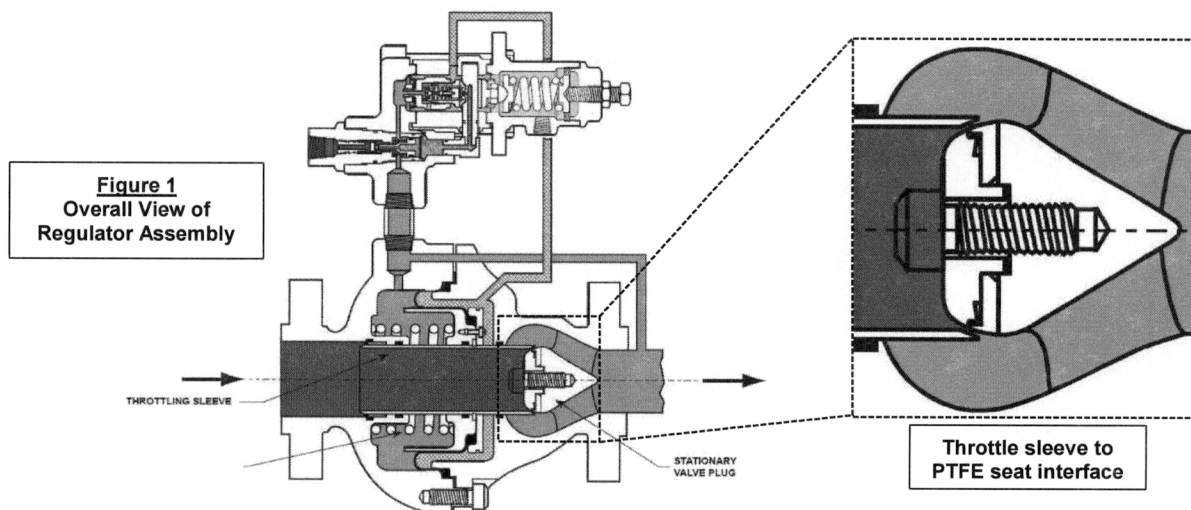
*Engine Systems Inc. (ESI)*

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

*A pressure regulator valve installed on an emergency diesel generator at Brunswick Nuclear Plant (BNP), did not properly regulate starting air pressure and allowed equalization of inlet pressure to the outlet. Subsequent investigation by ESI revealed a raised edge on the metal seating surface of the valve that caused the PTFE seat to tear. Equalization of starting air pressure is undesirable since it may inhibit operation the downstream starting air solenoid valve, thus compromising ability of the emergency diesel generator to start and support safety-related loads.*

*The valve is used at BNP to reduce 350 psig from the air receivers to 250 psig which will be used for engine starting and turbo jet assist. During standby conditions, there is no flow through valve. Admittance of starting air is controlled by a starting air solenoid valve that remains normally closed and opens upon receipt of a start signal. The solenoid valve is rated for a maximum differential pressure of 300 psi, therefore equalization of inlet pressure to the outlet may prevent the starting air solenoid valve from operating.*

*The pressure regulator valve is a Fisher brand assembly consisting of two main components: (1) the Type 310A main valve and (2) the Type 32A pilot. The flow of air travels through main valve. The pilot senses inlet and outlet pressures and provides feedback to open and close the main valve accordingly. In the main valve, air flows through a throttling sleeve and past a stationary valve plug. When air flow is no longer required, the throttling sleeve seats against the valve plug. The throttling sleeve is a metal tube with a tapered seat at one end. The valve plug contains a PTFE seat upon which the throttle sleeve seals. See Figure 1 below.*



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

August 20, 2021

(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.

*The extent of condition is this one part number (1776 506) supplied to one customer, Brunswick Nuclear Plant. ESI is unable to limit the condition to a specific batch or time frame, therefore any of the following valves may be affected:*

ESI IWO	Customer PO	Qty	S/N(s)	ESI C of C Date
3003234	00319437	4	18143228	8/14/2007
			18143227	
			18143229	
			18143226	
3004128	00356888	1	18463611	5/1/2008
3005043	00400589	2	18838327	2/23/2009
			18838329 <sup>(1)</sup> (later 18951000)	
3005733	00453448	2	19184569	11/17/2009
			19184570	
3008907	00586294	3	20400963	4/19/2012
			20400964	5/18/2012
			20400966	
3009934	00622136	1	20776484	9/7/2012
3010544	00644942	2	20776485	2/11/2013
			20776488	
3011506	685916	8	20776486	8/27/2013
			20776487 <sup>(2)</sup>	
			R000180559	9/26/2013
			R000180556	
			R000180558	
			R000180560	
			R000245080	11/25/2013
			R000245081	
3020679	3110953	4	R059015844	8/4/2020
			R059015845	
			R059015846	11/10/2020
			R059015847	
3021309	3119315	2	R059517688	1/15/2021
			R059517689	

<b>Total Qty</b>	<b>29</b>
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**Table 1: ESI Supply History of Pressure Regulator Valve P/N 1776 506**

Notes: (1) This valve is the subject of report 10CFR21-0132.

(2) This valve was returned with S/N 18838329, inspected successfully, and did not exhibit the same condition.

(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.

For Brunswick Nuclear Plant:

- *For regulators installed:*

*BNP should continue to monitor the outlet pressure from the regulator and verify the inlet and outlet pressures have not equalized. Though ESI performed functional testing on 100% of the regulators prior to shipment (which includes a downstream equalization test), it is believed that the in-service conditions which exercise the regulator with higher flow rates would quickly exacerbate the condition to a point at which failure would be readily apparent.*

- *For regulators in BNP inventory (not in service):*

*It is recommended that these regulators have an inspection performed either on-site or at ESI. This requires disassembling (splitting) the main valve body halves and removing the throttling sleeve/diaphragm assembly. A "feel" check is to be performed at the transition of the valve seat taper to the end of the sleeve for a smooth, rounded transition. No raised edge or burr is allowed. When this inspection is performed, the PTFE seat should also be inspected for signs of fretting or tearing. Any signs of abnormality are cause for rejection and the component shall be reworked.*

For ESI:

*ESI will add inspections to the dedication package for new and refurbished pressure regulator valves to verify a smooth, rounded transition at the valve seat of the throttling sleeve. This activity is underway and will be completed by November 15, 2021 and in all cases prior to future shipments.*

(viii) Any advice related to the potential 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.

*To aid in identifying the suspect components of the pressure regulating valve, photos depicting the areas of interest are provided on the following page.*

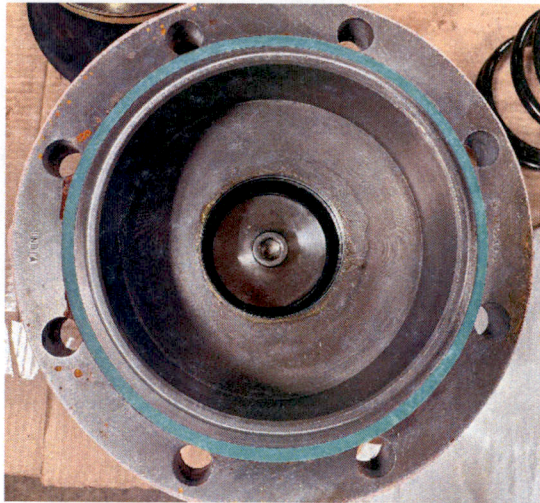


Photo 1: View of seat (center) installed in valve

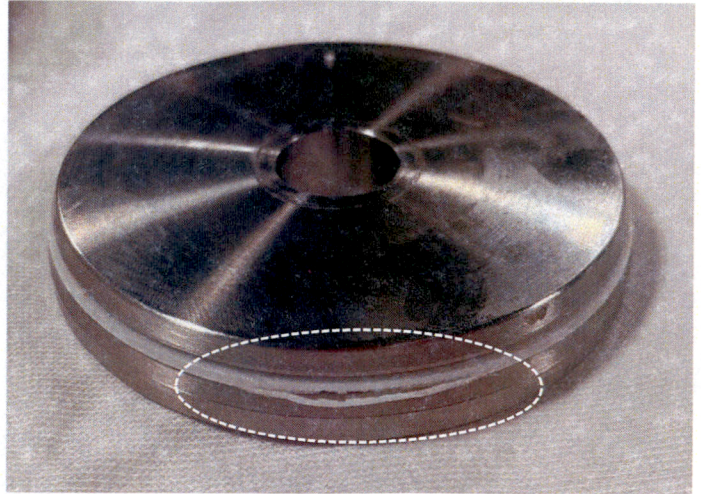


Photo 2: Seat removed, showing tear

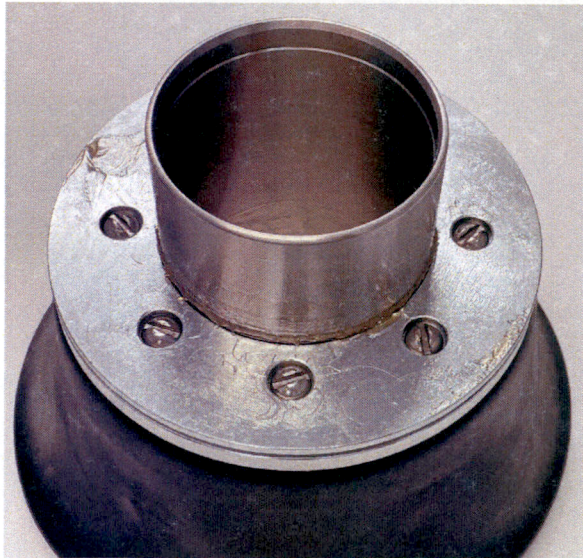


Photo 3: Throttle Sleeve

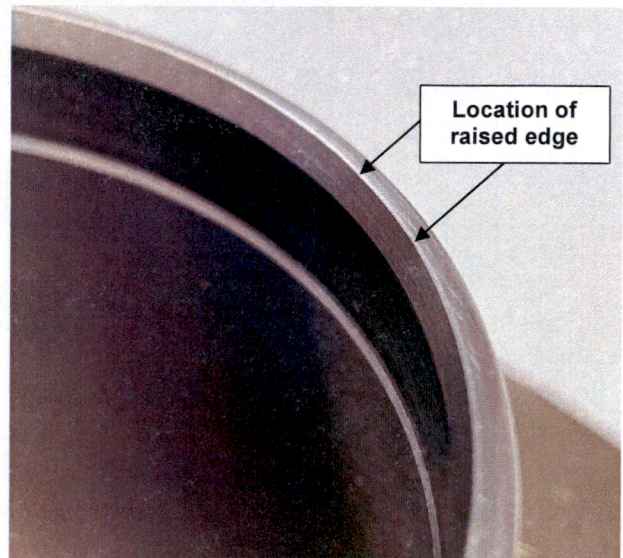


Photo 4: Seating surface



Photo 5: Good Seat - Smooth, rounded transition

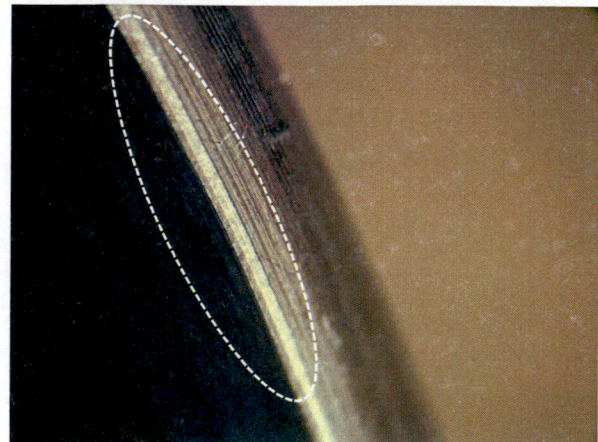


Photo 6: Bad Seat - Raised edge at transition