



ENGINE SYSTEMS, INC.

175 Freight Road
Rocky Mount, NC 27804

Telephone: 252/977-2720
Fax: 252/446-1134

March 20, 2020

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. 10CFR21-0129, Rev. 0

Test Stand Deficiency – EMD Fuel Injectors
P/N H40084720

Dear Sir / Madam:

The enclosed report addresses a reportable notification on a test stand deficiency for EMD fuel injectors, P/N H40084720.

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

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

IE19
NRR

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.

93

RECEIVED: _____

DATE: _____



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Report No. **10CFR21-0129**
Rev. 0: 03/19/20

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

SUBJECT: Test Stand Deficiency – EMD Fuel Injectors
P/N H40084720

SYSTEM: Emergency Diesel Generator

CONCLUSION: Reportable in Accordance With 10CFR21

Prepared By: *Jia Lin*
Engineering Manager

Date: 3/19/2020

Reviewed By: *Dan Robert*
Quality Assurance Manager

Date: 3/19/2020

20

REV	DATE	PAGE	DESCRIPTION
0	03/19/20		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
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(ii) Identification of the basic component supplied within the United States which fails to comply or contains a defect.

EMD fuel injector, P/N H40084720.

(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.

The endurance test stand utilized for new EMD fuel injectors was found to contain a deficiency that may damage injectors during the testing process. There is a potential for the actuating stem of the endurance test stand to strike the injector follower off center, creating side loading that results in inadvertent rubbing between the follower and body. The condition is exacerbated by a lack of continuous lubrication from the test stand. Over the 2-hour test duration, the running surface of the follower scores and metal particles are introduced into the top end of the injector. The migration of these particles through the injector could initiate a seizure.

An improperly functioning fuel injector could affect the load carrying capability of the diesel engine. An EMD 645 engine will typically tolerate one inoperable cylinder and maintain rated load; however multiple inoperable cylinders (as in the case of multiple injector failures) will further decrease engine output and likely prevent the engine from carrying its required load. This adversely affects the ability of the emergency diesel generator set to perform its safety-related function.

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

February 14, 2019

(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.

All new P/N H40084720 injectors supplied by ESI have been through the 2-hour endurance test and are considered suspect. There are qty 240 new P/N H40084720 injectors shipped on safety-related orders as shown in Table 1 on the following pages.

ESI Order	Customer	Customer PO Number	Qty Shipped	C of C Date	Serial Numbers			
3017814	Energy Northwest - Columbia	351170	40	8/29/2018	B1820004	B1820022	B1820051	B1820061
					B1820009	B1820023	B1820052	B1820062
					B1820010	B1820024	B1820053	B1820067
					B1820012	B1820026	B1820054	B1820071
					B1820013	B1820035	B1820055	B1820076
					B1820015	B1820036	B1820056	B1820079
					B1820016	B1820041	B1820057	B1820082
					B1820019	B1820046	B1820058	B1820097
					B1820020	B1820048	B1820059	B1820102
					B1820021	B1820050	B1820060	B1820113
3018480	Florida Power & Light - St Lucie	2382577	28	6/12/2018	B1820001	B1820042	B1820089	B1820116
					B1820006	B1820044	B1820104	B1820117
					B1820025	B1820047	B1820107	B1820119
					B1820034	B1820070	B1820109	B1820130
					B1820038	B1820072	B1820111	B1820138
					B1820039	B1820075	B1820112	B1820139
					B1820040	B1820078	B1820115	B1820140
3018761	Exelon - Dresden	703-13002	18	9/27/2018	B1820008	B1820081	B1820110	B1820136
					B1820045	B1820087	B1820114	B1820143
					B1820049	B1820094	B1820122	B1820145
					B1820077	B1820096	B1820126	
					B1820080	B1820101	B1820135	
3018897	Florida Power & Light - St Lucie	2389033	26	1/2/2019	B1820029	B1820095	B1820125	B1820137
					B1820033	B1820103	B1820127	B1820141
					B1820037	B1820108	B1820128	B1820142
					B1820069	B1820118	B1820131	B1820144
					B1820073	B1820121	B1820132	B1820146
					B1820074	B1820123	B1820133	
					B1820088	B1820124	B1820134	
3018966	Exelon - Fitzpatrick	675479	20	1/21/2019	B1820002	B1820065	B1820086	B1820098
					B1820003	B1820066	B1820090	B1820099
					B1820011	B1820083	B1820091	B1820100
					B1820030	B1820084	B1820092	B1820105
					B1820064	B1820085	B1820093	B1820106
3019020	NextEra Energy Point Beach LLC	2392198	14	12/18/2019	A1909011	A1909044	A1909100	A1909113
					A1909012	A1909052	A1909107	A1909125
					A1909016	A1909072	A1909110	
			A1909017	A1909075	A1909112			
			5	12/20/2019	A1909042	A1909071	A1909101	
A1909061	A1909084							

Table 1: ESI Supply History for New P/N H40084720 Injectors
(continued on next page)

ESI Order	Customer	Customer PO Number	Qty Shipped	C of C Date	Serial Numbers			
3019124	Florida Power & Light - St Lucie	2390768	4	1/11/2019	B1820017	B1820027	B1820031	B1820068
3019195	Florida Power & Light - Turkey Point	2391269	8	4/25/2019	B1820005	B1820028	B1820043	B1820120
			7	12/19/2019	B1820007	B1820032	B1820063	B1820129
3019958	Energy Northwest - Columbia	355071	10	12/20/2019	A1909014	A1909076	A1909088	A1909142
					A1909040	A1909083	A1909136	
3019967	Exelon - Quad Cities	00000703-13229	18	11/27/2019	A1909009	A1909037	A1909086	A1909137
					A1909022	A1909059	A1909092	
3020114	Florida Power & Light - St Lucie	2402697	22	11/26/2019	A1909035	A1909079	A1909108	
					A1909004	A1909039	A1909121	A1909140
3020226	Energy Operations - Grand Gulf Nuclear	10595310	20	12/18/2019	A1909008	A1909043	A1909128	A1909147
					A1909034	A1909115	A1909132	A1909149
					A1909036	A1909117	A1909135	
					A1909038	A1909120	A1909139	
					A1909002	A1909077	A1909127	A1909143
					A1909007	A1909078	A1909129	A1909144
					A1909027	A1909085	A1909130	A1909148
					A1909029	A1909105	A1909131	A1909150
					A1909031	A1909118	A1909134	
					A1909074	A1909119	A1909138	
					A1909010	A1909032	A1909091	A1909124
					A1909015	A1909033	A1909102	A1909126
					A1909026	A1909073	A1909103	A1909133
					A1909028	A1909081	A1909104	A1909141
					A1909030	A1909087	A1909116	A1909146
					Total Supplied		240	

Table 1: ESI Supply History for New P/N H40084720 Injectors

(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 end users:

- Fuel injectors installed on engine:
No action is required. Successful completion of on-engine testing indicates the injector is not susceptible to failure.
- Fuel injectors in inventory (not-installed) on engine:
Fuel injectors in inventory are considered suspect and should be returned to ESI for evaluation.

For ESI:

The following corrective actions pertaining to the endurance test stand have been implemented:

- a) Coordinated with the injector manufacturer to modify and correct the endurance test stand. Engineering controls are now in place to eliminate possibility of off center strikes, regardless of the individual operator.
- b) Added steps in the test procedure to verify the injector and actuator are aligned on the test stand prior to testing.
- c) Added steps in the test procedure to saturate the top of the injector (follower/body interface) with oil prior to testing and every 30 minutes during testing.
- d) Following the 2-hour endurance test, added inspection of the follower to verify no scoring present and inspection of the top of the injector to verify the oil remains clean.

These items will be verified prior to any 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.*

N/A.