

**ENGINE SYSTEMS, INC.**175 Freight Road  
Rocky Mount, NC 27804Telephone: 252/977-2720  
Fax: 252/446-1134**TELEFAX**

**Date:** June 30, 2023  
**Company:** NRC Operations Center  
**Fax Number:** 301/816-5151  
**Verification No.:** 301/816-5100  
**Reference:** Report No. 10CFR21-0136, Rev. 0  
**From:** Dan Roberts  
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Dear Sir / Madam:

Following this cover is a copy of our report 10CFR21-0136, Rev. 0, for a 10CFR21 reportable notification for voltage regulator chassis, P/N's 72-12300-100-ESI, 72-14200-100-ESI, and 72-14000-100-6020.

A copy of this report will be mailed to the NRC Document Control Desk and to our affected nuclear customers.

Should you have questions, please let us know.

Sincerely,

ENGINE SYSTEMS, INC.

Dan Roberts  
Quality Manager

/sjw

**ENGINE SYSTEMS, INC.**

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**Report No. 10CFR21-0136**

Rev. 0: 06/30/23

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

COMPONENT: Voltage Regulator Chassis – Incorrect Bus Bar Installation  
P/Ns: 72-12300-100-ESI  
72-14200-100-ESI  
72-14000-100-6020

SYSTEM: Emergency Diesel Generator

CONCLUSION: Reportable in Accordance With 10CFR21

Prepared By:



Engineering Manager

Date:

6/30/23

Reviewed By:



Quality Assurance Manager

Date:

6/30/23

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Record of Revisions

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REV	DATE	PAGE	DESCRIPTION
0	06/30/23		Initial issue.

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**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.

<i>John Kriesel</i>	<i>Dan Roberts</i>
<i>Engineering Manager</i>	<i>Quality Manager</i>
<i>Engine Systems Inc.</i>	<i>Engine Systems Inc.</i>
<i>175 Freight Rd.</i>	<i>175 Freight Rd.</i>
<i>Rocky Mount, NC 27804</i>	<i>Rocky Mount, NC 27804</i>

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

*Voltage regulator chassis with the following part numbers:*

- *72-12300-100-ESI*
- *72-14200-100-ESI*
- *72-14000-100-6020*

- (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.

*Copper bus bars are used at rectifier diode pigtail connections CR1, CR2, CR3, CR4, and CR7 to provide a common connection point for associated wiring to minimize the number of conductors on a single fastener. It is intended for the conductors to clamp directly to the bus bar, thereby maintaining a low resistance conduction path between components. ESI has determined the bus bars were installed incorrectly whereby the conductors are not clamped in direct contact, resulting in current flow through the stainless steel fasteners. This configuration is undesired and will result in unnecessary heat generation which may lead to failure of the connection and therefore failure of the automatic voltage regulator (AVR) assembly. The AVR is relied upon to automatically regulate emergency diesel generator (EDG) terminal voltage. Failure of the AVR would impact ability of the EDG to perform its safety-related function and therefore may impact the nuclear plant's ability to manage safety-related loads during an emergency event.*

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

*May 17, 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.

*The extent of condition is limited to the following voltage regulator assemblies:*

Part Number	Customer	Customer PO Number	ESI Sales Order	Qty Shipped	C of C Date
72-12300-100-ESI	Constellation Energy – Nine Mile Point	00702105	8003195	2	March 1, 2021
72-14200-100-ESI	Avaltec / CFE – Laguna Verde (Div III)	1879-20 / 700507054	8003429	2	May 16, 2021
72-14000-100-6020	Avaltec / CFE – Laguna Verde (Div II)	1966 / 700519535	8003506	2	October 25, 2022

**Table 1: Voltage Regulator Assemblies Affected**

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- (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 affected users:

- *Voltage regulators installed:*

*Bus bar installation should be corrected immediately by restacking the components to ensure direct contact with all conductors. See section viii below for details.*

- *Voltage regulators in inventory (not installed):*

*The bus bar installation should be corrected prior to installation. If desired, the customer may perform on site or the voltage regulator chassis may be returned to ESI for rework.*

For ESI:

*The shop traveler used for the build-up of voltage regulator chassis will be enhanced to provide additional guidance and a verification will be added to ensure proper installation of the bus bar. This is in process and will be incorporated for future builds prior to shipment.*

- (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.

*Photos below show an example of an incorrectly installed bus bar (photo 1) and one that is correctly installed that ensures proper conduction (photo 2). Photos and figures on the following pages provide additional information.*

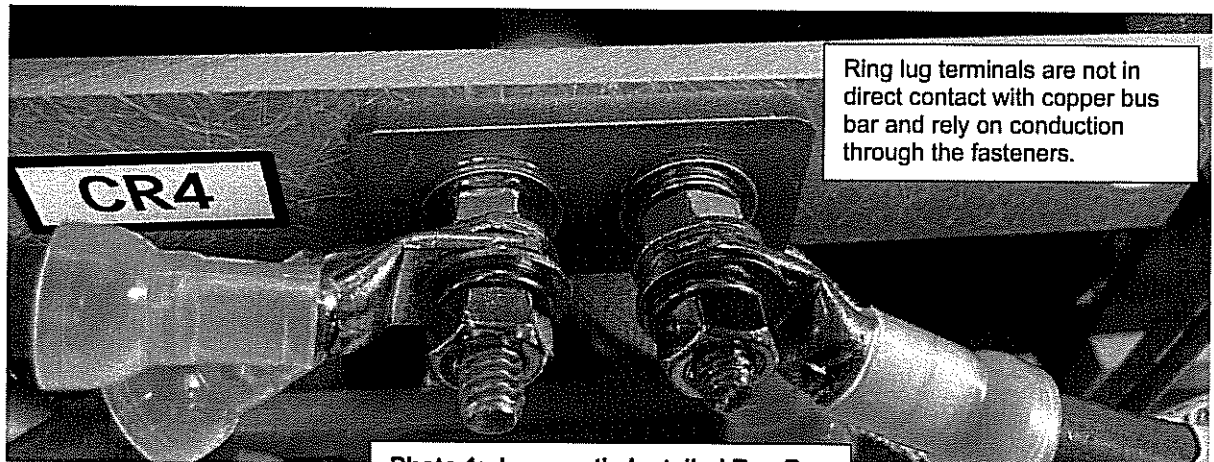


Photo 1: Incorrectly Installed Bus Bar

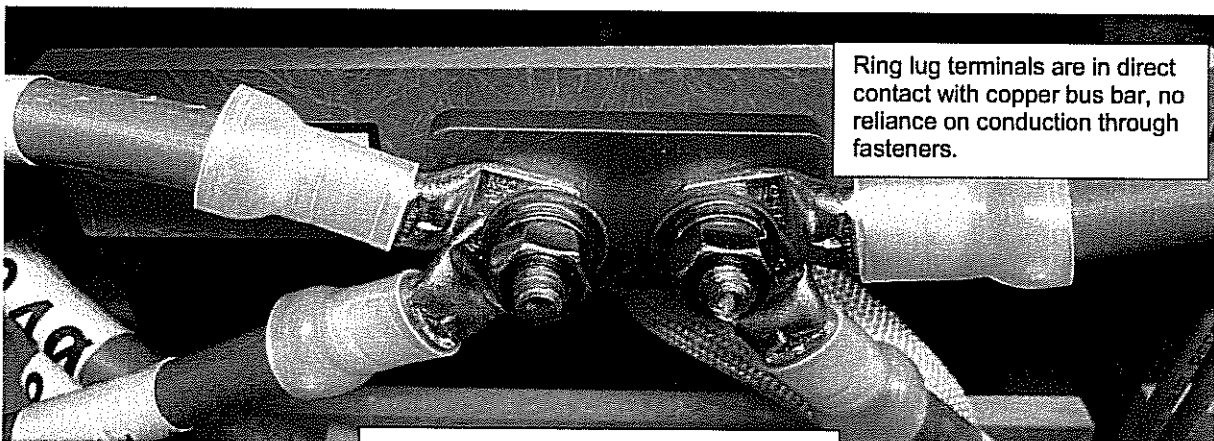
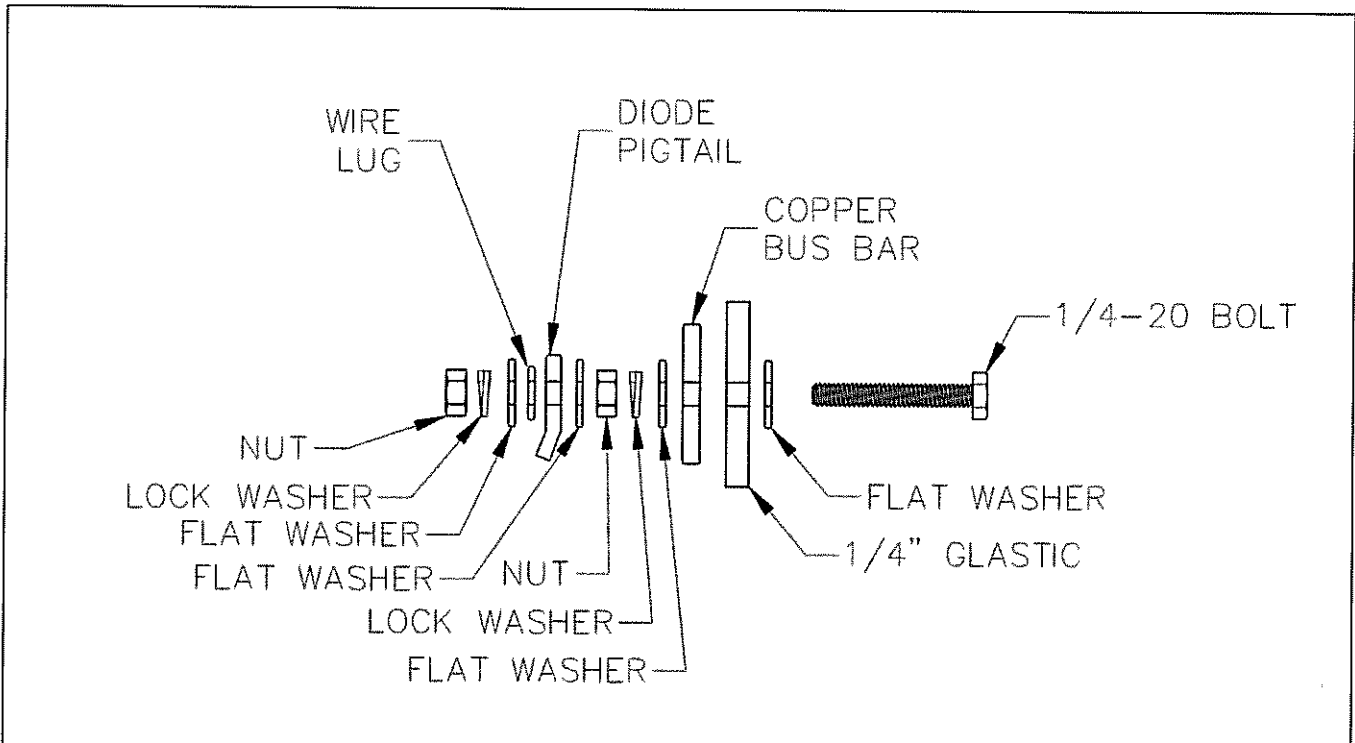
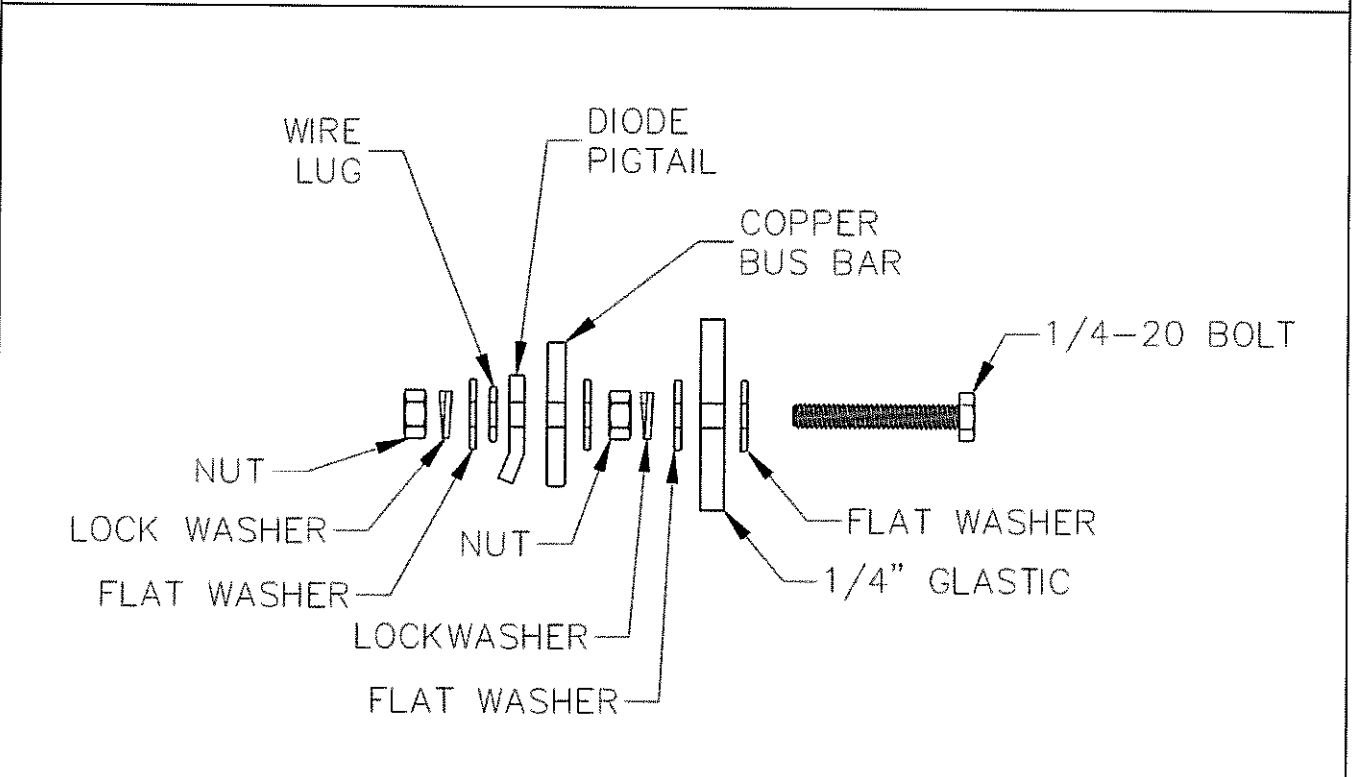


Photo 2: Correctly Installed Bus Bar



**Figure 1: Cross Section - Incorrect Bus Bar Install**  
(Note bus bar is not in direct contact with wire lug and diode pigtail)



**Figure 2: Cross Section - Correct Bus Bar Install**  
(Note wire lug, diode pigtail, and bus bar stacked in direct contact)

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Figure 3 and photo 3 below show location of the bus bars on the voltage regulator chassis.

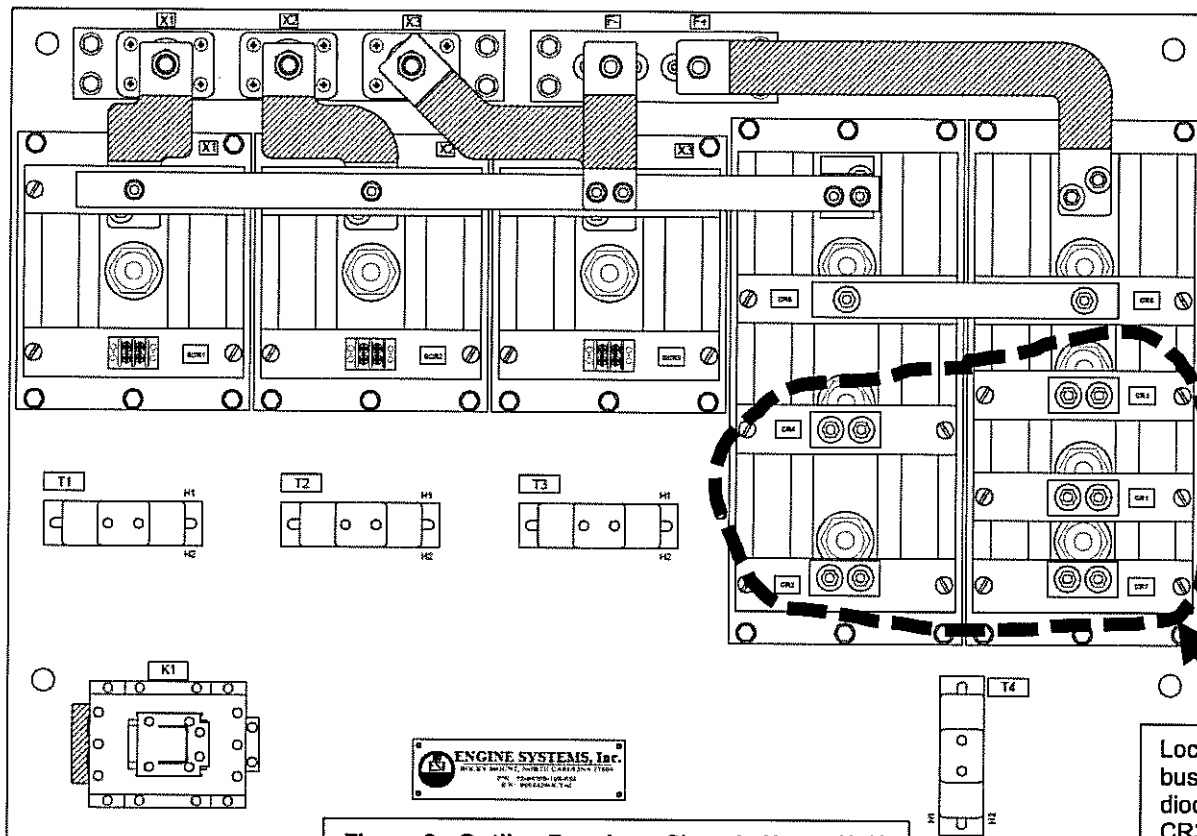


Figure 3: Outline Drawing - Chassis Upper Half

Location of the five bus bars at rectifier diodes CR1, CR2, CR3, CR4, & CR7

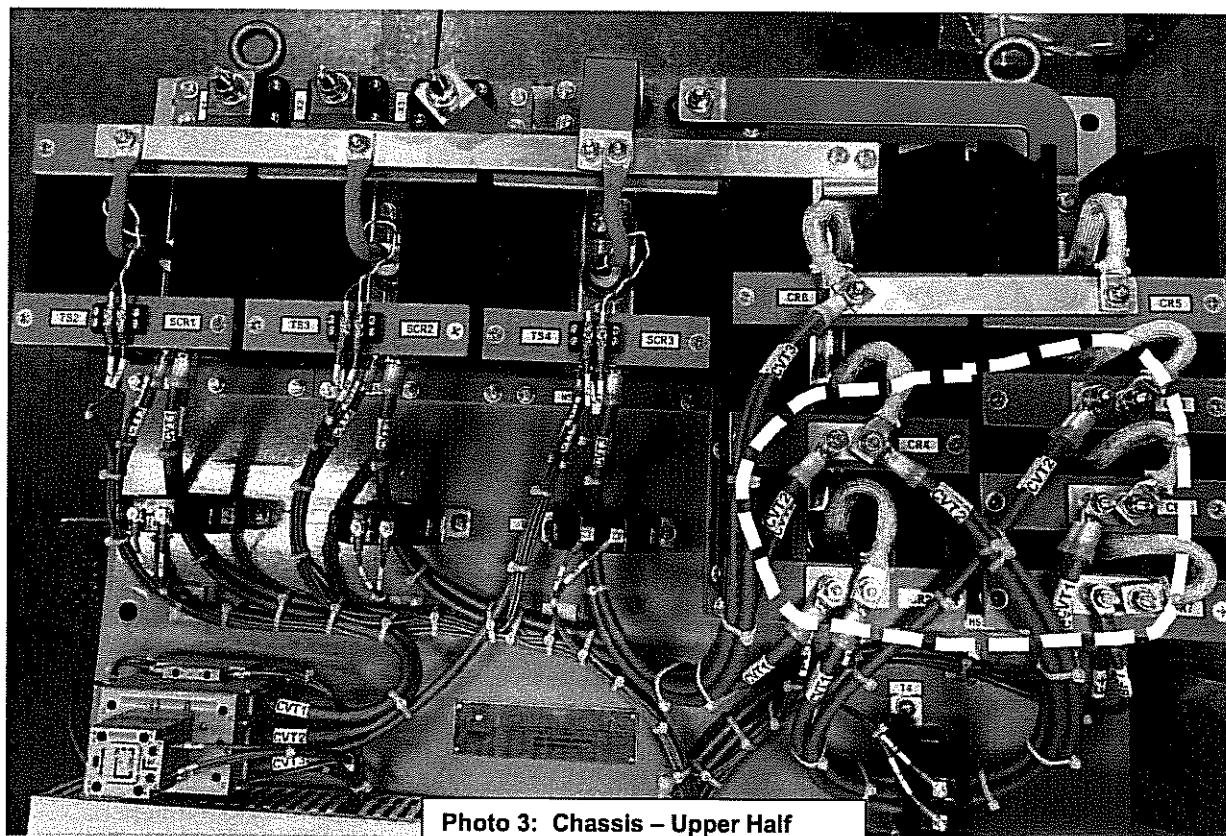


Photo 3: Chassis - Upper Half