



ENGINE SYSTEMS, INC.

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October 11, 2019

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. 10CFR21-0125, Rev. 1

Signal Converter Transmitter
P/N SCT/4-20MA/4-20MA/24DC/-LIM-TA[DCM]

Dear Sir:

The enclosed report addresses a revision to reportable notification on a Signal Converter Transmitter, P/N SCT/4-20MA/4-20MA/24DC/-LIM-TA[DCM].

A copy of the revised report has 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

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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Report No. 10CFR21-0125

Rev. 0: 07/19/19

Rev. 1: 10/11/19

10CFR21 REPORTING OF DEFECTS AND NON-COMPLIANCE

COMPONENT: Signal Converter Transmitter
P/N SCT/4-20MA/4-20MA/24DC/-LIM-TA[DCM]

SYSTEM: Steam Turbine Control

CONCLUSION: Reportable in Accordance with 10CFR21

Prepared By: *Ju Lin*
Engineering Manager

Date: 10/11/19

Reviewed By: *Dan Robert*
Quality Assurance Manager

Date: 10/11/19

REV	DATE	PAGE	DESCRIPTION
1	10/11/19	1	In Summary section, updated to address another potential defect with the same device. In item (iv), added nature of the defect for rev. 1 of this report. In item (v), added date for second failure. In item (vi), updated table to include second failed device.
		2	In item (vii), added discussion regarding the rev. 1 failure. In item (viii), added discussion regarding variations of this device.

SUMMARY

Subsequent to original issue of this report on July 19, 2019, ESI became aware of another potential defect with the same device. As a result, ESI has amended the report and is now issuing 10CFR21-0125, rev. 1 to expand the extent of condition.

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.

Signal Converter Transmitter, P/N SCT/4-20MA/4-20MA/24DC/-LIM-TA[DCM].

(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.

Rev. 0: A power inverter transformer, internal to the signal converter transmitter, failed shorted. The transformer failure adversely affected other circuit board mounted components which prevented the device from functioning properly.

Rev. 1: Four circuit board mounted components (two transistors, a capacitor, and a diode) failed that caused the device to go to zero output. These prevented the device from functioning properly.

The signal converter transmitter is a component of a turbine control panel. Within the panel, the transmitter is used to sense the customer's remote speed setpoint 4-20 mA input signal and convert the signal to an isolated 4-20 mA output signal which is transmitted to the turbine control. The transmitter includes a limiting function where if the input signal is below 4 mA, the minimum output is limited to 2.7 mA and if the input signal is above 20 mA, the maximum output is limited to 21.3 mA. Since the signal converter transmits the customer's remote speed setpoint input to the turbine control, operability of the device is critical to operation of the RCIC turbine control system. Therefore, a failure of the signal converter would adversely affect the RCIC turbine control system and thus may affect the safe shutdown of the reactor.

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

April 6, 2018 (second failure was confirmed following receipt at ESI on August 26, 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.

<i>ESI Sales Order</i>	<i>End User</i>	<i>End User P.O.</i>	<i>Qty</i>	<i>C-of-C Date</i>	<i>Mfg Serial Number</i>
<i>8001553</i>	<i>Cooper Nuclear Station (supplied through Dresser-Rand)</i>	<i>Contract 09-69A P.O. 200441/70000273 (D-R)</i>	<i>1</i>	<i>09/28/2015</i>	<i>2379741</i>
<i>3009493</i>		<i>P.O. 234546 (D-R)</i>	<i>1</i>	<i>09/23/2015</i>	<i>2390739</i>

- (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 Cooper Nuclear:

Both failed components have been removed and replaced with a transmitter from a different batch. No further action is necessary.

For ESI:

The original failure (rev. 0) was directly attributed to the power inverter transformer. The previous design transformer (used in the failed transmitter) was discontinued by transformer manufacturer in 2016 which required the signal converter transmitter manufacturer to source a new transformer. The new transformer has the same functionality with a slightly different form factor which minimizes the potential for common cause failure with the original style transformer. Therefore, no additional actions are required since a different transformer is in current use. ESI has included a verification of the current transformer design in the commercial grade dedication package.

For the subsequent failure (rev. 1), ESI has been unable to positively determine the root cause; however, correspondence with the signal converter manufacturer indicates this may be related to the previous style transformer. While no anomalies were detected with the transformer, the failed components are electrically connected to the transformer. As listed in the paragraph above, verification of the current style transformer is performed in the commercial grade dedication package.

- (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.

This part number signal converter transmitter (SCT/4-20MA/4-20MA/24DC/-LIM-TA[DCM]) is only used by one customer, Cooper Nuclear Station. Other customers use variations of this design that employ either a reversing output function or use a different input (1-5 VDC vs 4-20 mA). ESI is not aware of issues with any of the other variations and based on findings thus far, failures are limited to this one part number with the previous style transformer.