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FACIL:50-244 Robert Emmet Ginna Nuclear Plant, Unit 1, Rochester G 05000244
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MECREDY,R.C. Rochester Gas & Electric Corp.
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 91-010-00:on 911230,during operator review of plant process computer logs,util discovered that invalid data had been used for calculation.Caused by invalid input from LEFM.LEFM HP-85B Computer was reinitialized.W/920129 ltr.

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TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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TELEPHONE
AREA CODE 716 546-2700

January 29, 1992

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

Subject: LER 91-010, During Operator Review of Plant Process Computer Logs, It Was Discovered That Invalid Data Had Been Used For Calorimetric Calculation
R.E. Ginna Nuclear Power Plant
Docket No. 50-244

This event is being voluntarily reported using the guidance of NUREG-1022 (Licensee Event Report System), and Supplement No. 1 to NUREG-1022. This report is intended to alert other utilities which may have similar systems. This event is related to, but does not meet, the reporting requirements of 10CFR50.73, item (a)(2)(i)(B). Item (a)(2)(i)(B) requires reporting of "any operation or condition prohibited by the plant's Technical Specifications". The attached Licensee Event Report LER 91-010 is hereby voluntarily submitted.

This event has in no way affected the public's health and safety.

Very truly yours,

Robert C. Mecredy

Robert C. Mecredy

xc: U.S. Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, PA 19406

Ginna USNRC Senior Resident Inspector

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NRC Form 366 (5-83)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
R.E. Ginna Nuclear Power Plant	0 5 0 0 0 2 4 4	1 OF 0 8

TITLE (4) During Operator Review of Plant Process Computer Logs, It Was Discovered That Invalid Data Had Been Used For Calorimetric Calculation

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
1 2	3 0	9 1	9 1	— 0 1 0	— 0 0	0 1	2 9	9 2		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 9 8	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	X OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
Wesley H. Backus Technical Assistant to the Operations Manager	AREA CODE 3 1 5 — 5 2 1 4 1 4 4 6

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
X	I O	C P V	W 1 2 0	N					

SUPPLEMENTAL REPORT EXPECTED (14)

	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO			

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On December 30, 1991 at approximately 1830 EST, with the reactor at approximately 98% full power, the Control Room Foreman, while performing a review of the hourly Plant Process Computer System (PPCS) logs, determined that the Leading Edge Flow Meter (LEFM) data used by the PPCS to calculate calorimetrics, was invalid from 1800 EST, December 20, 1991 to approximately 1830 EST, December 30, 1991. This event is being voluntarily reported to alert other utilities which may have similar systems.

The Control Room operators notified the reactor engineer and reinitialized the LEFM computer. After reinitialization, the LEFM printout values and PPCS values returned to expected/normal indications.

Corrective actions include revisions to the affected procedures to require checking the operation of the LEFM prior to performing calorimetrics and the addition of a high alarm on PPCS indicating a failure may have occurred.

The immediate cause was identified as a failure of the LEFM HP-85B computer.

I. PRE-EVENT PLANT CONDITIONS

The plant was at approximately 98% steady state reactor power with no major activities in progress. The Control Room Foreman (CRF) was reviewing the hourly Plant Process Computer System (PPCS) logs.

II. DESCRIPTION OF EVENT

A. DATES AND APPROXIMATE TIMES OF MAJOR OCCURRENCES:

- o December 20, 1991, 1800 EST: Event date and approximate time.
- o December 30, 1991, 1830 EST: Discovery date and approximate time.
- o December 30, 1991, 2055 EST: Performed calorimetric using Barton D/P cells option and plant thermal power was determined to be approximately the same as that calculated using the Leading Edge Flow Meter (LEFM) option.

B. EVENT:

On December 30, 1991 at approximately 1830 EST, with the reactor at approximately 98% full power, the CRF, while performing a review of the hourly PPCS logs, determined that the LEFM data used by the PPCS to calculate calorimetrics, was invalid from 1800 EST, December 20, 1991 to approximately 1830 EST, December 30, 1991. This determination was based on the following information:

- o The LEFM Feedwater (FW) Flow confidence level was 100.0% for most of the time period in question (It should be less than 100% and some variation is expected).

- The LEFM Feed Water Flow (FFWH) was a constant 6399 KLB/Hr for most of the time period in question (some variation is expected).

- Local observation of the remotely located LEFM HP-85B computer indicated the last printout was on December 20, 1991.

- During the time period in question, the PPCS still indicated valid values for all data points used for the calorimetric.

The Control Room operators notified the reactor engineer and reinitialized the LEFM HP-85Bcomputer. After reinitialization, the LEFM HP-85B computer printout values and PPCS values returned to expected/normal indications. Subsequently, calorimetrics were performed using both the Barton D/P Cells and the LEFM for Feedwater Flow Data input. The observed difference in calculated thermal power between these two calorimetrics was approximately 0.15%.

C. INOPERABLE STRUCTURES, COMPONENTS, OR SYSTEMS THAT CONTRIBUTED TO THE EVENT:

A constant feedwater flow output from the LEFM was the prime contributor to the event.

D. OTHER SYSTEMS OR SECONDARY FUNCTIONS AFFECTED:

None.

E. METHOD OF DISCOVERY:

The event was discovered during the review of hourly PPCS logs by the CRF.

F. OPERATOR ACTION:

Immediate operator action was to notify the reactor engineer, reinitialize the LEFM HP-85B computer and perform additional calorimetrics using the Barton D/P Cells to confirm that reactor thermal power was within limits.

G. SAFETY SYSTEM RESPONSES:

None.

III. CAUSE OF EVENT

A. IMMEDIATE CAUSE:

The source of invalid data to the PPCS calorimetric calculation was invalid input from the LEFM.

B. INTERMEDIATE CAUSES:

When the LEFM HP-85B computer failed it stopped updating the Digital Analog (D/A) output card. Therefore, the analog output to PPCS remained unchanged.

C. ROOT CAUSE:

The invalid LEFM output was due to the unanticipated failure mode of the HP-85B computer.

IV. ANALYSIS OF EVENT

This event is being voluntarily reported using the guidance of NUREG-1022 (Licensee Event Report System), and Supplement No. 1 to NUREG-1022. This report is intended to alert other utilities which may have similar systems. This event is related to, but does not meet, the reporting requirements of 10CFR50.73, item (a)(2)(i)(B) which requires reporting of "any operation or condition prohibited by the plant's Technical Specifications".

The plant Technical Specification related to this event is specification 4.1.1 which states, "calibration, testing, and checking of analog channel and testing of logic channel shall be performed as specified in Table 4.1-1". Table 4.1-1 describes that the nuclear power ranges shall be calibrated daily (i.e. at least once per 24 hours) using a Heat Balance Calculation (i.e. calorimetric).

The Plant Operating Review Committee determined that the intent to perform the required Technical Specification daily calibration of the Nuclear Power Ranges, using the Daily Heat Balance calculation, was met, but the Heat Balance Calculations were invalid due to the invalid LEFM input data.

In summary, it was determined that while the daily heat balance calculations were not valid, due to the steady state power maintained during the period, the Nuclear Power Ranges continued to be within design tolerances and were capable of performing their intended functions. An assessment was performed considering both the safety consequences and implications of this event and it was concluded that there were no operational or safety consequences or implications attributed to the invalid LEFM input to the Heat Balance Calculation because:

- During the period in question, the highest recorded total feedwater flow (from the Main Control Board Feedflow Transmitters as recorded on the Heat Balance Calculation Form) was 6497.29 KLB/Hr. Using this feedflow resulted in a calculated reactor thermal power of approximately 98.7%. Previous to the LEFM HP-85B computer failure, reactor power as indicated from plant calorimetrics had been limited to a maximum of approximately 98% power due to degradation in secondary side performance. Therefore, reactor thermal power was below 100% for all calculated heat balances.

- The lowest calculated reactor thermal power using the invalid LEFM input was 97.27%. The highest that reactor thermal power was estimated to be was 98%. Based on these indications, the Nuclear Power Ranges could have been calibrated as much as .7% low. The accuracy of the reactor thermal power calculation is determined to be ± 2.0%. Therefore, the Nuclear Power Ranges were calibrated to within the accuracy of the reactor thermal power calculation and the Nuclear Power Range trips would have actuated within their design tolerance.

Based on the above, the conclusion was that the public's health and safety was assured at all times.

An evaluation was performed to determine appropriate means to detect an invalid LEFM input to the Reactor Thermal Power Calculation. The following conclusions were reached:

- Reactor power was steady state during the time in question (i.e. approximately 10 days) and all control board indications remained approximately the same.

- When the LEFM HP-85B computer failed, the output to PPCS failed "as is", as opposed to a failure that would register in an expected obvious extreme mode.

- This failure mode was not anticipated by the LEFM vendor. As a result, verification functions and associated alarms for this failure mode were not included in the system design.

- In addition to the LEFM vendor, plant staff did not anticipate this failure mode. As a result, the awareness level for a problem of this type was low and the formal processes to detect and respond to this condition were not in place. Although specific procedure guidance was provided to verify LEFM accuracy, verifying operability of the LEFM HP-85B computer prior to performing the Reactor Thermal Power Calculation was not required.

V. CORRECTIVE ACTION

A. ACTION TAKEN TO RETURN AFFECTED SYSTEMS TO PRE-EVENT NORMAL STATUS:

- The LEFM HP-85B Computer was reinitialized and the LEFM printout and PPCS values returned to expected normal indications.
- All subsequent calorimetrics were performed using the Barton D/P Cells and the Nuclear Power Ranges were adjusted as required.
- A note was added to the Plan Of The Day (POD) to instruct the Control Room Operators to use the Barton D/P cells data for calorimetrics until further notice.

B. ACTION TAKEN OR PLANNED TO PREVENT RECURRENCE:

The following corrective actions have been taken to assure valid data from the LEFM prior to its use in a PPCS reactor thermal power calculation (i.e. calorimetric).

- An indication of failure of the LEFM input to the PPCS is that the LEFM Confidence Level (FFWCL) will approach 100% indicating the LEFM output is not changing. A high alarm on PPCS for FFWCL has been added to indicate that this failure has occurred. If this alarm activates, the LEFM will not be used.
- Operating Procedures O-6.3 (Maximum Unit Power) and O-6.3.2 (Maximum Unit Power Calculation Using The LEFM For Flow Measurement) have been revised to include the following requirements prior to using the LEFM for a calorimetric:

  1. Verifying that the LEFM HP-85B computer is updating and has been operating for at least 10 minutes. This ensures the current value for the LEFM in the PPCS is not failed.

2. Verifying that the LEFM confidence level is not in alarm (FFWCL > 99.50% and FFWCL < 99.90%). This ensures that the LEFM is operating properly.

o An identification and evaluation process focusing on other plant systems that may be susceptible to this type of failure mode is in progress.

VI. ADDITIONAL INFORMATION

A. FAILED COMPONENTS:

The LEFM system was supplied by Westinghouse Electric Corporation, Model #LEFM-824, Serial #U001. The specific component that failed was the HP-85B computer with I/O ROM, Serial #2619A53804.

B. PREVIOUS LERs ON SIMILAR EVENTS:

A similar LER event historical search was conducted with the following results: No documentation of similar LER events with an undetermined root cause could be identified.

C. SPECIAL COMMENTS:

Due to the unanticipated nature of the computer failure, the industry will be notified via Nuclear Network.