



A Subsidiary of RGS Energy Group, Inc.

ROCHESTER GAS AND ELECTRIC CORPORATION • 89 EAST AVENUE, ROCHESTER, N.Y. 14649-0001 • 716 546-2700

www.rge.com

ROBERT C. MECREDY  
Vice President  
Nuclear Operations

October 19, 2000

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Attn: Guy S. Vissing  
Project Directorate I  
Washington, D.C. 20555

Subject: LER 2000-003, Source Range Channel Not Promptly Discovered to be  
Inoperable, Due to Personnel Error, Resulted in Violation of Technical  
Specifications  
R.E. Ginna Nuclear Power Plant  
Docket No. 50-244

Dear Mr. Vissing:

The attached Licensee Event Report LER 2000-003 is submitted in accordance with  
10 CFR 50.73, Licensee Event Report System, item (a) (2) (i) (B), which requires a report of,  
"Any operation or condition prohibited by the plant's Technical Specifications".

Very truly yours,

  
Robert C. Mecredy

xc: Mr. Guy S. Vissing (Mail Stop 8C2)  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

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

U.S. NRC Ginna Senior Resident Inspector

TE22

1000196

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

**LICENSEE EVENT REPORT (LER)**

(See reverse for required number of digits/characters for each block)

**FACILITY NAME (1)**

R. E. Ginna Nuclear Power Plant

**DOCKET NUMBER (2)**

05000244

**PAGE (3)**

1 OF 11

**TITLE (4)**

Source Range Channel Not Promptly Discovered to be Inoperable, Due to Personnel Error, Resulted in Violation of Technical Specifications

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 NAME	DOCKET NUMBER
09	20	2000	2000	03	00	10	19	2000		05000
OPERATING MODE (9)		5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10)		000	20.2201(b)		20.2203(a)(2)(v)		<input checked="" type="checkbox"/> 50.73(a)(2)(i)		50.73(a)(2)(viii)	
			20.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)	
			20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71	
			20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)		OTHER	
			20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A	
			20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)			

**LICENSEE CONTACT FOR THIS LER (12)****NAME**

John T. St. Martin - Technical Assistant

**TELEPHONE NUMBER (Include Area Code)**

(716) 771-3641

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
A	IG	MON	W120	Y					

**SUPPLEMENTAL REPORT EXPECTED (14)**

YES (If yes, complete EXPECTED SUBMISSION DATE).	<input checked="" type="checkbox"/> NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
---	--	-------------------------------	-------	-----	------

**ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)**

On September 20, 2000, at approximately 1652 EDST, with the plant in Mode 5, a nuclear instrument system source range channel became inoperable. This condition was not promptly discovered. When it was discovered, at approximately 0650 EDST, September 21, 2000, it was also discovered that the operators had not recognized the need to apply the actions required by the plant's Technical Specifications. This constituted a condition prohibited by the plant's Technical Specifications.

The cause of the source range channel becoming inoperable was a failure of the detector. The cause of not promptly discovering this condition, leading to not recognizing the need to apply the actions required by the plant's Technical Specifications, was personnel error.

After this condition was discovered, the Control Room operators performed actions to assure that the plant was currently in compliance with these requirements. The source range drawer was connected to the spare source range detector and a source range channel was declared operable.

Corrective action to prevent recurrence is outlined in Section V.B.

**LICENSEE EVENT REPORT (LER)**  
**TEXT CONTINUATION**

FACILITY NAME (1)	DOCKET (2) NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
R. E. Ginna Nuclear Power Plant	05000244	2000	-- 03	-- 00	2 OF 11

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

**I. PRE-EVENT PLANT CONDITIONS:**

On September 20, 2000, at approximately 1600 EDST, the plant was in Mode 5 for the 2000 refueling outage. Reactor coolant system (RCS) temperature was being maintained at approximately 135 degrees F. Pressurizer pressure was being maintained at approximately 320 psig. As allowed by Ginna Station Improved Technical Specifications (ITS) Limiting Condition for Operation (LCO) 3.3.1, CONDITION A, one Nuclear Instrumentation System (NIS) source range (SR) channel (N-32) was in service, and the other channel (N-31) was inoperable.

**II. DESCRIPTION OF EVENT:****A. DATES AND APPROXIMATE TIMES OF MAJOR OCCURRENCES:**

- September 20, 2000, 1652 EDST: NIS SR channel N-32 becomes inoperable.
- September 20, 2000, 2215 EDST: The need to apply the requirements of the plant's Technical Specifications was not recognized, in that an RCS cooldown occurred. Event date and time.
- September 21, 2000, 0650 EDST: It is discovered that NIS SR channel N-32 is inoperable. Discovery date and time.
- September 21, 2000, 0702 EDST: Actions are performed to assure compliance with the plant's Technical Specifications.
- September 21, 2000, 1136 EDST: NIS SR channel N-32 is restored to operable status.

**LICENSEE EVENT REPORT (LER)**  
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET (2) NUMBER (2)	LER NUMBER (6)			PAGE (3)
R. E. Ginna Nuclear Power Plant	05000244	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3 OF 11
		2000	- 03	- 00	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

**B. EVENT:**

At approximately 0650 EDST on September 21, with the plant in Mode 5, off-shift Operations supervision observed that the Main Control Board (MCB) meter indication for NIS SR channel N-32 was indicating approximately 2 counts per second (CPS), which is lower than expected at these plant conditions. After further evaluation, it was concluded that channel N-32 was inoperable. Subsequent review of Plant Process Computer System (PPCS) information for N-32 revealed that N-32 had become inoperable at approximately 1652 EDST on September 20, 2000. At that time, the Control Room operators had received a PPCS alarm. The on-shift investigation of this PPCS alarm did not assist the Control Room operators in concluding that channel N-32 was inoperable, due to factors discussed in Section III of this LER.

The time that the second source range channel became inoperable was approximately 1652 EDST on September 20, 2000. Time of discovery was 0650 EDST on September 21, 2000. ITS LCO 3.3.1 REQUIRED ACTIONS A.1, J.1 and J.2 for two source range channels inoperable is to immediately suspend operations involving positive reactivity additions and perform Surveillance Requirement SR 3.1.1.1. within 12 hours. SR 3.1.1.1 states: Verify SDM (shutdown margin) is within the limits specified in the COLR (Core Operating Limits Report). For approximately 14 hours, it was not known that the plant was in LCO 3.3.1 for two source range channels inoperable.

Due to the 14 hour delay from the time channel N-32 became inoperable until discovery time, the operators did not recognize the need to apply these ITS LCO REQUIRED ACTIONS. During this time period, the required SDM corresponded to a boron concentration of 720 parts per million (ppm). Boron samples were taken approximately every four hours, and actual boron concentration for this time period was:

DATE	TIME	BORON CONCENTRATION
September 20, 2000	1300 EDST	2330 ppm
September 20, 2000	1655 EDST	2333 ppm
September 20, 2000	2105 EDST	2333 ppm
September 21, 2000	0016 EDST	2316 ppm
September 21, 2000	0702 EDST	2328 ppm

**LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION**

FACILITY NAME (1)	DOCKET (2) NUMBER (2)	LER NUMBER (6)			PAGE (3)
R. E. Ginna Nuclear Power Plant	05000244	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 OF 11
		2000	-- 03	-- 00	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

Thus, the SDM was within the limits specified in the COLR for this time period, from the time of failure. There were no operations in progress which involved positive reactivity additions, so none had to be suspended. The Control Room operators performed a scheduled evolution to remove a reactor coolant pump (RCP) from service, beginning at approximately 2215 EDST on September 20. Since the failure of the second NIS SR channel was not recognized prior to stopping the RCP, the ITS LCO 3.3.1 REQUIRED ACTIONS were not performed. Performance of this evolution resulted in an RCS cooldown of approximately 35 degrees F. It was commonly accepted that any measurable RCS cooldown adds positive reactivity. Therefore, the event date and time was presumed to be approximately 2215 EDST on September 20, when a potential positive reactivity addition occurred and the Control Room operators did not recognize the need to apply the actions required by the plant's Technical Specifications. Failure to perform the actions as specified in ITS LCO 3.1.1 REQUIRED ACTIONS A.1, J.1 and J.2 is a condition prohibited by the Technical Specifications.

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

NIS SR channel N-31 was inoperable prior to this event, eliminating the opportunity for performing channel checks of N-31 against NIS SR channel N-32.

**D. OTHER SYSTEMS OR SECONDARY FUNCTIONS AFFECTED:**

None

**E. METHOD OF DISCOVERY:**

This condition was discovered by off-shift Operations supervision during a routine walkdown of MCB indications during the 2000 refueling outage, and was confirmed by review of PPCS alarm printouts.

**LICENSEE EVENT REPORT (LER)**  
**TEXT CONTINUATION**

FACILITY NAME (1)	DOCKET (2) NUMBER (2)	LER NUMBER (6)			PAGE (3)
R. E. Ginna Nuclear Power Plant	05000244	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	5 OF 11
		2000	- 03	- 00	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

**F. OPERATOR ACTION:**

When channel N-32 became inoperable, the Control Room operators did not discover this condition, as discussed in Section III of this LER. When this event was discovered, the Control Room operators performed the appropriate actions of Equipment Restoration procedure ER-NIS.1, "SR Malfunction". They complied with the requirements of ITS LCO 3.1.1 REQUIRED ACTIONS A.1, J.1 and J.2. At the time of discovery (0650 EDST on September 21), Control Room operators performed actions to assure that the plant was currently in compliance with these requirements. They verified that the SDM was within the limits specified in the COLR. The required SDM corresponded to a boron concentration of 720 parts per million (ppm). A sample was taken, and actual boron concentration was 2328 ppm.

**G. SAFETY SYSTEM RESPONSES:**

None. For Maintenance Rule purposes, this event is classified as a Functional Failure. However, this condition does not meet the definition for the NRC Performance Indicator (PI) "Safety System Functional Failure", because having two NIS SR channels inoperable in Mode 5 does not prevent the fulfillment of any safety function.

**III. CAUSE OF EVENT:**

**A. IMMEDIATE CAUSE:**

The immediate cause of the condition prohibited by Technical Specifications was not performing the actions as specified in ITS LCO 3.1.1 REQUIRED ACTIONS with two NIS SR channels inoperable.

**LICENSEE EVENT REPORT (LER)**  
**TEXT CONTINUATION**

FACILITY NAME (1)	DOCKET (2) NUMBER (2)	LER NUMBER (6)			PAGE (3)
R. E. Ginna Nuclear Power Plant	05000244	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	6 OF 11
		2000	- 03	- 00	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

**B. INTERMEDIATE CAUSE:**

The intermediate cause of not performing these ITS REQUIRED ACTIONS was not discovering that two NIS SR channels were inoperable until approximately 14 hours after the second channel became inoperable. One of the reasons for not discovering this condition more promptly is that NIS SR channel N-31 was inoperable prior to and during this event, eliminating the opportunity for performing channel checks of N-31 against NIS SR channel N-32.

The intermediate cause of NIS SR channel N-32 becoming inoperable was a spurious failure of the SR detector NE-32.

**C. ROOT CAUSE:**

The underlying cause of the spurious failure of the NIS SR detector NE-32 could not be determined. The N-32 drawer was connected to the spare source range detector and channel N-32 functioned satisfactorily and was declared operable.

An Event Evaluation was initiated to determine the root cause and contributing factors. The underlying cause for not discovering that NIS SR channel N-32 was inoperable for approximately 14 hours was personnel error resulting from inadequate evaluation of available alarms and indications. Due to this delay, the operators did not recognize that the plant met the conditions for required compliance with ITS LCO 3.1.1 REQUIRED ACTIONS A.1, J.1 and J.2. The contributing factors are:

**LICENSEE EVENT REPORT (LER)**  
**TEXT CONTINUATION**

FACILITY NAME (1)	DOCKET (2) NUMBER (2)	LER NUMBER (6)			PAGE (3)
R. E. Ginna Nuclear Power Plant	05000244	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	7 OF 11
		2000	- 03	- 00	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

- This error was a cognitive error. A valid PPCS alarm was received for NIS SR channel N-32 low warning at approximately 1652 EDST on September 20. When this PPCS alarm was received, an operator acknowledged the alarm without providing the actual alarm (exponential) value to the other Control Room operators. He asked for the indication on the NIS SR channel N-32 MCB meter. Another operator did not recognize the change on the NIS SR channel N-32 MCB logarithmic meter indication, which went from approximately 6E+1 CPS (60 CPS) to approximately 6E+0 CPS (6 CPS). (This change in indication was almost precisely one decade, so the value was perceived by the operator as not having changed.) This operator reported the value which he perceived. The first operator mentally compared this reported value to the operability value (5 CPS), and did not follow up with questioning the exponential units of the PPCS alarm, but instead observed the MCB NIS SR meter (from a distance) and concluded from comparison of the numerical values that there was no operability concern. The operators incorrectly documented this value beginning with the hourly readings for 1700 EDST on September 20. The incorrect readings continued until time of discovery by off-shift personnel at 0650 the next morning, by which time the N-32 meter indication had decreased to approximately 2E+0 CPS (2 CPS), which was perceived to be 2E+1 CPS and logged as 20 CPS.
- Other indications of NIS SR channel N-32 were not utilized or consulted. The operators did not observe the change on the MCB nuclear power instrument recorder RK-45 chart. NIS protection racks in another area of the Control Room were not reviewed.
- During the subsequent shift turnover, questions about the lower than expected indication on the NIS SR channel N-32 MCB meter were not aggressively pursued. A strong questioning attitude was not in evidence.
- Not promptly identifying the failure of channel N-32 was contrary to approved procedures O-6, "Operations and Process Monitoring" and O-6.13, "Daily Surveillance Log". These procedures state the Operations management expectations for channel checks and logging MCB indications and responding to PPCS alarms.



**LICENSEE EVENT REPORT (LER)**  
**TEXT CONTINUATION**

FACILITY NAME (1)	DOCKET (2) NUMBER (2)	LER NUMBER (6)			PAGE (3)
R. E. Ginna Nuclear Power Plant	05000244	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	8 OF 11
		2000	- 03	- 00	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

- There were no unusual characteristics in the Control Room that directly contributed to the error.

This event is NUREG-1022 Cause Code (A), "Personnel Error".

**IV. ANALYSIS OF EVENT:**

This event is reportable in accordance with 10 CFR 50.73, Licensee Event Report System, item (a) (2) (i) (B), which requires a report of, "Any operation or condition prohibited by the plant's Technical Specifications". The operators did not recognize the need to apply the requirements of the plant's Technical Specifications, which is a condition prohibited by the plant's Technical Specifications.

An assessment was performed considering both the safety consequences and implications of this event with the following results and conclusions:

There were no operational or safety consequences or implications attributed to not complying with the requirements of the plant's Technical Specifications because:

- As stated in the basis for ITS LCO 3.3.1 REQUIRED ACTION J, if the Control Rod Drive System is not capable of rod withdrawal and all rods are fully inserted, the source range detectors are not required to trip the reactor. However, their monitoring Function must be OPERABLE to monitor core neutron levels and provide indication of reactivity changes that may occur as a result of events such as boron dilution.
- Boron samples during this time period confirmed that the SDM was within the limits specified in the COLR.
- There were no evolutions that would have compromised the required Mode 5 shutdown margin from the time NIS SR channel N-32 became inoperable until the time of discovery. The reactor was tripped, the control rod drive motor-generator sets were de-energized, and all control rods were incapable of movement. The RCS had already been borated to the refueling shutdown boron concentration of greater than 2300 ppm boron. Any changes in RCS temperature or pressure, or fission product poisons are accounted for with this boron concentration, and any such changes in these parameters would not compromise the required Mode 5 shutdown margin.

**LICENSEE EVENT REPORT (LER)**  
**TEXT CONTINUATION**

FACILITY NAME (1)	DOCKET (2) NUMBER (2)	LER NUMBER (6)			PAGE (3)
R. E. Ginna Nuclear Power Plant	05000244	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	9 OF 11
		2000	- 03	- 00	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

- The RCS cooldown that occurred when an RCP was removed from service was approximately 35 degrees F. It was commonly accepted that an RCS cooldown adds positive reactivity. While this is certainly true for conditions at higher RCS temperatures and lower boron concentrations, it was subsequently verified that this is not the case for the condition of boron concentration greater than 2300 ppm and low temperatures. Results of calculations show that the isothermal temperature coefficient (ITC) was considerably positive at the specified conditions. This indicates that there would be no addition of positive reactivity to the core for a cooldown conducted at these core conditions.
- The most probable and consequential event to add positive reactivity would be a boron dilution transient. Dilution transients are analyzed in the Ginna Station Updated Final Safety Analysis Report (UFSAR) Chapter 15. Section 15.4.4 discusses Chemical and Volume Control System (CVCS) malfunctions. Boron dilution is a manual operation. The CVCS is designed to limit, even under various postulated failure modes, the potential rate of dilution to a value which, after indication through alarms and instrumentation, provides the operator sufficient time to correct the situation in a safe and orderly manner. These alarms and instrumentation include Main Control Board annunciators and meter indications, audible indication of dilution flow, and PPCS alarms. Thus, in the absence of NIS SR indication, there were still numerous means available to indicate a dilution transient, if an unintentional dilution of boron in the reactor coolant were to have occurred. For the conditions present at this time, the RCS boron concentration would have to have been reduced from 2300 ppm to 390 ppm before the reactor could have gone critical. This would have required a dilution of more than 80,000 gallons of reactor makeup water (RMW), which is greater than the capacity of the RMW tank.

Based on the above, it can be concluded that there were no unreviewed safety questions, and that the public's health and safety was assured at all times.

**V. CORRECTIVE ACTION:**

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

- The requirements of ITS LCO 3.3.1 REQUIRED ACTIONS were complied with when it was discovered that two NIS SR channels were inoperable.

**LICENSEE EVENT REPORT (LER)**  
**TEXT CONTINUATION**

FACILITY NAME (1)	DOCKET (2) NUMBER (2)	LER NUMBER (6)			PAGE (3)
R. E. Ginna Nuclear Power Plant	05000244	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	10 OF 11
		2000	- 03	- 00	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

- The NIS SR N-32 drawer was connected to the spare source range detector, and NIS SR channel N-32 was restored to operable status at approximately 1136 EDST on September 21, 2000.
- The failed source range detector NE-32 was replaced. The new NE-32 detector was reconnected to the channel N-32 drawer and recalibrated prior to plant startup.

**B. ACTION TAKEN OR PLANNED TO PREVENT RECURRENCE:**

NOTE: There are no NRC regulatory commitments in this Licensee Event Report.

- Operations management directed each Operations Shift Supervisor to review the ACTION Report (AR 2000-1176) associated with this event with his shift at the next shift turnover, stressing the importance of attention to detail.
- A facilitated crew debriefing was held with the operators who were on-shift when NIS SR channel N-32 failed. At this debriefing, station management focused on crew dynamics/interaction to promote self-revealing of errors in information exchange and supporting behaviors, and personally stressed the importance of a strong questioning attitude, and that failure to meet management expectations for pursuing valid alarms was a contributing factor of this event. (The PPCS alarm was not fully described to the crew and follow up questioning was not as rigorous as possible to close the loop on the information transfer).
- Management will meet with the operators who were on-shift when this event was discovered, and will stress the importance of a strong questioning attitude and the need to rigorously pursue acceptable responses to questions raised.
- A Training Work Request will be submitted for this event, to present a case study to all operating shifts of the Event Evaluation, which will stress pursuing the cause of PPCS alarms, the continuing need for a questioning attitude, and proper use of alternate indications to verify plant conditions.

**LICENSEE EVENT REPORT (LER)**  
**TEXT CONTINUATION**

FACILITY NAME (1)	DOCKET (2) NUMBER (2)	LER NUMBER (6)			PAGE (3)
R. E. Ginna Nuclear Power Plant	05000244	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	11 OF 11
		2000	- 03	- 00	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

**VI. ADDITIONAL INFORMATION:**

**A. FAILED COMPONENTS:**

The NIS SR detector NE-32 is a model NY-10032 detector, housed in a model NY-10362 assembly housing, supplied by Imaging and Sensing Technology Corporation

**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 the same root cause at Ginna Station could be identified.

**C. SPECIAL COMMENTS:**

None

**D. IDENTIFICATION OF COMPONENTS REFERRED TO IN THIS LER:**

COMPONENT	IEEE 803 FUNCTION	IEEE 805 SYSTEM IDENTIFICATION
nuclear instrument system	JIC	IG
reactor coolant pump	P	AB
source range detector	MON	IG
PPCS	CPU	ID
RMW tank	TK	CB