

PRIORITY 1

(ACCELERATED RIDS PROCESSING)

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9409190247 DOC. DATE: 94/09/08 NOTARIZED: NO DOCKET #
 FACIL: 50-244 Robert Emmet Ginna Nuclear Plant, Unit 1, Rochester G 05000244
 AUTH. NAME AUTHOR AFFILIATION
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 MECREDY, R.C. Rochester Gas & Electric Corp.
 RECIP. NAME RECIPIENT AFFILIATION

JOHNSON, A.R. Project Directorate I-3

SUBJECT: LER 94-009-00: on 940809, SI pumps declared inoperable due to leak at socket weld in common recirculation line for SI pumps. Affected weld inspected & removed & maint procedure for overhaul of SI pumps will be upgraded. W/940908 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 11
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

NOTES: License Exp date in accordance with 10CFR2, 2.109(9/19/72). 05000244

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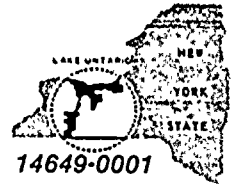
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September 8, 1994

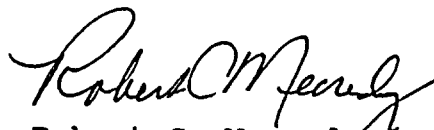
U.S. Nuclear Regulatory Commission
Document Control Desk
Attn: Allen R. Johnson
Project Directorate I-3
Washington, D.C. 20555

Subject: LER 94-009, Safety Injection Pumps Declared Inoperable
Due To Leak, Causes Condition Prohibited by Technical
Specifications and Completion of Plant Shutdown Required
by Technical Specifications
R.E. Ginna Nuclear Power Plant
Docket No. 50-244

In accordance with 10 CFR 50.73, Licensee Event Report System,
items (a) (2) (i) (A), and (a) (2) (i) (B), which require a
report of, "The completion of any nuclear plant shutdown required
by the plant's Technical Specifications", and "Any operation or
condition prohibited by the plant's Technical Specifications",
the attached Licensee Event Report LER 94-009 is hereby submitted.

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

Very truly yours,


Robert C. Mecredy

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

Ginna Senior Resident Inspector

150024

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LICENSEE EVENT REPORT (LER)

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

ESTIMATED BURDEN, PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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.

FACILITY NAME (1) R.E. Ginna Nuclear Power Plant

DOCKET NUMBER (2)
05000244PAGE (3)
1 OF 10

TITLE (4) Safety Injection Pumps Declared Inoperable Due to Leak, Causes Condition Prohibited by Technical Specifications and Completion of Plant Shutdown Required by 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
08	09	94	94	--009--	00	09	08	94	FACILITY NAME	DOCKET NUMBER
OPERATING MODE (9)		N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10)		097	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)		OTHER	
			20.405(a)(1)(iii)		X 50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		(Specify in Abstract below and in Text, NRC Form 366A)	
			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 John T. St. Martin - Director, Operating Experience

TELEPHONE NUMBER (Include Area Code)
(315) 524-4446

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
D	BQ	PSP	0000	N					

SUPPLEMENTAL REPORT EXPECTED (14)

YES
(If yes, complete EXPECTED SUBMISSION DATE).

X NO

EXPECTED
SUBMISSION
DATE (15)

MONTH DAY YEAR

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

On August 9, 1994, at approximately 1420 EDST, with the plant at approximately 97% steady state power, a leak developed at a socket weld in the common recirculation line for the safety injection (SI) pumps. All three (3) SI pumps were declared inoperable, which required entry into Technical Specification 3.0. To comply with Technical Specifications, the plant was shut down, and the reactor coolant system temperature was below 350 degrees F at 0130 EDST on August 10.

The underlying cause of the leak was a crack in the socket weld in the common recirculation line, caused by pipe displacement from air entrainment and pump misalignment. The affected weld was cut out and replaced. This event is NUREG-1022 Cause Code (D), Defective Procedure.

Corrective action to preclude repetition is outlined in Section V (B).

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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FACILITY NAME (1)		DOCKET NUMBER (2)		LER NUMBER (6)		PAGE (3)
R.E. Ginna Nuclear Power Plant		05000244		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER
				94	-- 009 --	00
						2 OF 10

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

I. PRE-EVENT PLANT CONDITIONS

On August 9, 1994, the plant was at approximately 97% steady state reactor power. Results and Test personnel (R&T) were performing an extended run of the three (3) safety injection (SI) pumps, in accordance with surveillance test procedure PT-2.1M, "Safety Injection System Monthly Test." PT-2.1M was changed to provide the controls for a ninety (90) minute operation of each SI pump, to obtain diagnostic test data for all 3 SI pumps. Among the data to be obtained were spectral vibration analysis; thermography, electrical parameters, and seal pressure on the pump inboard and outboard mechanical seals.

Part of the test preparations was a pre-test alignment and temporary installation of special data gathering instruments. At the completion of the test for each SI pump, this instrumentation would be removed and the pump realigned for normal service. The affected pump was considered inoperable while this instrumentation was installed. PT-2.1M was changed to accommodate this installation and removal of the special test instrumentation, and to control the administrative aspects of operability during these evolutions.

Testing of the "A" SI pump was performed satisfactorily during the morning of August 9, and the pump was returned to service. The "B" SI pump was declared inoperable for the installation of special instrumentation at approximately 1059 EDST. While preparing the "B" SI pump for this portion of the test, R&T personnel noticed some "weeping" of moisture near a welded connection (tee) on the recirculation line from the "B" SI pump, and notified supervision.

Plant management evaluated the situation, and the condition was reviewed by the Plant Operations Review Committee (PORC). Materials Engineering and Inspection Services (MEIS) personnel evaluated the affected weld, which was a socket weld connecting a 1 1/2 inch outside diameter (OD) pipe to a tee, and advised PORC that the weld, pipe and tee would withstand being exposed to the expected test pressure. The weepage appeared to be from a very small pinhole, and the flow-limiting orifice upstream of the observed leakage would reduce the SI pump discharge pressure from approximately 1500 pounds per square inch (PSIG) to approximately 90 PSIG at the affected weld during this test.



LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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FACILITY NAME (1)		DOCKET NUMBER (2)		LER NUMBER (6)			PAGE (3)
R.E. Ginna Nuclear Power Plant		05000244		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3 OF 10
				94	-- 009 --	00	

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

PORC concluded that the observed weepage did not affect the operability of the "B" SI pump, or of the two operable SI pumps. This conclusion was based on the amount of observed weepage, and the ability of the SI pumps to still supply adequate flow to the core. The amount of observed weepage did not affect SI pump recirculation capability. PORC concurred that further testing of the "B" SI pump could commence with these conditions, and that the test would be terminated if the observed weepage increased.

II. DESCRIPTION OF EVENT

A. DATES AND APPROXIMATE TIMES OF MAJOR OCCURRENCES:

- o August 9, 1994, 1115 EDST: Weepage is observed on the common recirculation line for the SI pumps, during pre-test alignment of the "B" SI pump.
- o August 9, 1994, 1420 EDST: Started the "B" SI pump, and observed increased leakage on the common recirculation line. 3 SI pumps declared inoperable, requiring entry into Technical Specification 3.0. Event date and time.
- o August 9, 1994, 1420 EDST: Discovery date and time.
- o August 9, 1994, 1444 EDST: Commenced a reactor shutdown to hot shutdown.
- o August 9, 1994, 1514 EDST: Notified the NRC of the leak, and of the initiation of a plant shutdown, in accordance with 10 CFR 50.72.
- o August 9, 1994, 1915 EDST: The reactor is in the hot shutdown condition, with all control rods inserted and both reactor trip breakers open.
- o August 10, 1994, 0130 EDST: The plant is below a reactor coolant system temperature of 350 degrees F.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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FACILITY NAME (1)		DOCKET NUMBER (2)		LER NUMBER (6)			PAGE (3)
R.E. Ginna Nuclear Power Plant		05000244		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 OF 10
				94	-- 009 --	00	

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

B. EVENT:

On August 9, 1994, with the reactor at approximately 97% steady state reactor power, a known source of weepage existed at the common recirculation line for the SI pumps. At approximately 1420 EDST, the "B" SI pump was started for the test. R&T personnel were stationed at the pump, with instructions to closely monitor the status of the weepage. When the pump was started, R&T observed that the weepage had increased to a leak.

Control Room operators were immediately notified of the increased leakage, and promptly stopped the "B" SI pump. With the pump stopped, the leakage was observed to decrease, and a leak rate of approximately ten (10) cubic centimeters per minute (cc/min) was measured. The leak rate prior to stopping the "B" SI pump was estimated at 5 times this rate, or approximately 50 cc/min. All 3 SI pumps were declared inoperable, in compliance with Technical Specification (TS) 3.3.1.1.f, which requires that all valves, interlocks, and piping required to function during accident conditions be operable.

With all 3 SI pumps declared inoperable, the plant was in a condition prohibited by TS 3.3.1. TS 3.0 was entered. The action statement of TS 3.0 requires that within one hour, action shall be initiated to place the unit in at least hot shutdown within the next six (6) hours. The Shift Supervisor directed the Control Room operators to initiate a plant shutdown. The shutdown was initiated at approximately 1444 EDST, in accordance with normal operating procedure O-2.1, "Normal Shutdown to Hot Shutdown".

The Shift Supervisor notified the NRC per 10 CFR 50.72 at approximately 1514 EDST. The shutdown proceeded in a timely manner, and the reactor was placed in the hot shutdown condition at approximately 1915 EDST, with all control rods inserted and both reactor trip breakers open.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
R.E. Ginna Nuclear Power Plant	05000244	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	5 OF 10
		94	-- 009 --	00	

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

The action statement of TS 3.0 requires that the unit be in at least cold shutdown within the following 30 hours. TS 3.3.1.4 requires that the reactor shall be placed in hot shutdown within the following 6 hours and below a reactor coolant system (RCS) temperature of 350 degrees F within an additional 6 hours. TS 3.3.1.5.c. addresses TS 3.3.1.1.f, and places a 72 hour limit on completion of repairs of piping.

It was determined that the most conservative approach was to be below a RCS temperature of 350 degrees F within a total of 12 hours, as required by TS 3.3.1.4. The Control Room operators initiated a cool down of the RCS to meet the most limiting of TS 3.0, 3.3.1.4, and 3.3.1.5.c Limiting Conditions for Operations (LCO). At the completion of the plant shutdown, the plant was cooled down in accordance with normal operating procedure O-2.2, "Plant Shutdown from Hot Shutdown to Cold Condition". The RCS was cooled down below 350 degrees F at approximately 0130 EDST on August 10, 1994.

With the RCS below a temperature of 350 degrees F, the plant was in a stable condition, where TS 3.3.1 is not applicable. With no TS LCO actions statements in effect for the SI pumps, TS 3.0 no longer applied.

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

None

D. OTHER SYSTEMS OR SECONDARY FUNCTIONS AFFECTED:

None

E. METHOD OF DISCOVERY:

The weepage on the SI pump common recirculation line was observed during the pretest alignment associated with the test of the "B" SI pump, controlled by surveillance test procedure PT-2.1M. When the "B" SI pump was started, the weepage increased to a visible leak.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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FACILITY NAME (1)		DOCKET NUMBER (2)	LER NUMBER (6)		PAGE (3)
R.E. Ginna Nuclear Power Plant		05000244	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER
			94	-- 009 --	00
					6 OF 10

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F. OPERATOR ACTION:

When notified of the increased leakage, the Control Room operators immediately stopped the "B" SI pump and declared the SI pumps inoperable. The Control Room operators initiated a plant shutdown and cooled down the plant in accordance with normal operating procedures.

The Shift Supervisor notified the NRC of the initiation of the reactor shutdown at approximately 1514 EDST on August 9, as required by 10 CFR 50.72 (b) (1) (i) (A).

G. SAFETY SYSTEM RESPONSES:

None

III. CAUSE OF EVENT

A. IMMEDIATE CAUSE:

The immediate cause of the inoperability of the 3 SI pumps was a leak in the common recirculation line for the SI pumps.

B. INTERMEDIATE CAUSE:

The intermediate cause of the leak was a discontinuity in the weld metal of a socket weld connection...

C. ROOT CAUSE:

The underlying cause of the leak was determined to be a discontinuity (crack) which initiated from the root of the socket weld. Based on the appearance of the fracture surface, it is believed that the crack was initiated by a recent tensile (bending) overload event. The crack continued to propagate through-wall by a fatigue mechanism, as determined by MEIS root cause analysis.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)		PAGE (3)
R.E. Ginna Nuclear Power Plant	05000244	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER
		94	-- 009 --	00
7 OF 10				

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

Indications of air entrainment in the "B" SI pump were noted during recent pump starts. Extensive venting was necessary to reduce observed pump vibration and displacement of adjacent piping. The "B" SI pump showed higher than normal vibration during recent monthly surveillance tests, which has been traced to a pump misalignment that occurred during an overhaul of the "B" SI pump which was performed in April, 1994.

It is tentatively concluded that the combination of pipe displacement from air entrainment and from pump misalignment resulted in initiation and propagation of the crack.

The air entrainment was caused by an inadequate procedure for venting a portion of the suction line for the "B" SI pump, which allowed a considerable amount of air to remain in the line. This air did not affect the suction for the other two SI pumps. The pump vibration was caused by misalignment of the "B" SI pump due to an inadequate maintenance procedure for the overhaul of the pump.

Extensive ongoing efforts, involving RG&E personnel and consultants, are in progress to confirm the root cause. If these efforts result in a different root cause, the NRC will be notified via a supplemental LER. This event is NUREG-1022 Cause Code (D), Defective Procedure.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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FACILITY NAME (1)		DOCKET NUMBER (2)		LER NUMBER (6)		PAGE (3)
R.E. Ginna Nuclear Power Plant		05000244		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER
				94	-- 009 --	00
						8 OF 10

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

IV. ANALYSIS OF EVENT

This event is reportable in accordance with 10 CFR 50.73, Licensee Event Report System, items (a) (2) (i) (A), and (a) (2) (i) (B), which require a report of, "The completion of any nuclear plant shutdown required by the plant's Technical Specifications", and "Any operation or condition prohibited by the plant's Technical Specifications". Having 3 SI pumps inoperable is a condition prohibited by TS, which resulted in the plant shutdown to be in compliance with TS.

An assessment was performed addressing the safety consequences and implications of the event as follows:

- o The leak that was identified compromised the integrity of the Class 2 piping in the SI pump recirculation line. Since the integrity of this line could not be assured during all accident scenarios, the SI pumps were declared inoperable. To reduce the possibility of challenging the piping integrity, the SI pumps were placed in the "Pull Stop" position to prevent an inadvertent pump start. However, the SI pumps remained available for operation through manual Control Room operator actions, if needed. In addition, the charging pumps, which can provide a supplement to injection flow, remained operable during this time.
- o The condition of having all 3 SI pumps inoperable is addressed by the plant's TS, Section 3.0. Entry into TS 3.0 required a plant shutdown and cooldown to 350 degrees F, which was accomplished within the time requirements of TS.
- o This event represented a conscious management decision to:
 - a. Place the plant in a safe condition
 - b. Perform the actions in a controlled manner
 - c. Achieve compliance with TS
 - d. Assure the availability of an injection path

Based on the above, it can be concluded that the public's health and safety was assured at all times.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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FACILITY NAME (1)		DOCKET NUMBER (2)		LER NUMBER (6)		PAGE (3)
R.E. Ginna Nuclear Power Plant		05000244		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER
				94	-- 009 --	00
						9 OF 10

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

V. CORRECTIVE ACTION

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

- o The affected weld was inspected and removed. MEIS personnel analyzed the removed components to determine the root cause of the leak.
- o A review of existing design basis stress levels of associated piping in the SI system was conducted. Several welds were selected for additional visual examinations, based on predicted stress levels. No indications were found in these welds.
- o The suction line for the "B" SI pump was thoroughly vented to remove all air in the line.
- o A new spoolpiece was fabricated, installed, and tested.
- o The "B" SI pump was disassembled and inspected to determine the cause of the higher than normal vibration. A representative of the pump manufacturer was present during the pump overhaul. The "B" SI pump internals were inspected (in the presence of the manufacturer's representative). Discrepancies in the April, 1994, pump overhaul, which resulted in pump misalignment, were identified and corrected.
- o During post-maintenance testing after the overhaul, the motor for the "B" SI pump exhibited vibration that was unacceptable. The motor was rebalanced to further reduce vibrations.
- o The "B" SI pump was tested, and vibrations were measured. The vibrations had returned to acceptable levels.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)		PAGE (3)
R.E. Ginna Nuclear Power Plant	05000244	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER
		94	-- 009 --	00
10 OF 10				

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

B. ACTION TAKEN OR PLANNED TO PREVENT RECURRENCE:

- o Maintenance procedures for overhaul of the SI pumps will be upgraded, based on the information obtained from the manufacturer's representative. Procedures for the overhaul of other safety-related pumps will be reviewed to determine if changes are warranted.
- o A Human Performance Enhancement System (HPES) evaluation will be conducted, to evaluate the actions of maintenance personnel during the April, 1994, overhaul of the "B" SI pump.
- o Appropriate maintenance personnel will be trained on the lessons learned from the HPES evaluation.
- o The venting process will be evaluated, and applicable procedures will be revised.
- o Ongoing efforts to determine or confirm the root cause will continue, utilizing an expert consultant and RG&E personnel.

VI. ADDITIONAL INFORMATION

A. FAILED COMPONENTS:

The failed component was the socket weld used to join the 1 1/2" Schedule 40 Type 316 stainless steel pipe to the Type 316 stainless steel tee.

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 Nuclear Power Plant could be identified.

C. SPECIAL COMMENTS:

None

