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SUBJECT: LER 89-015-00: on 891119, TAVG channel malfunction due to
 electronic instrument problems causes automatic TR.
 W/8 ltr.

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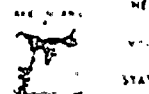
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December 15, 1989

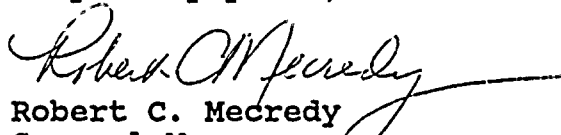
U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Subject: LER 89-015, TAVG Channel Malfunction Due To Electronic
Instrument Problems Causes Automatic Turbine Runbacks
R.E. Ginna Nuclear Power Plant
Docket No. 50-244

In accordance with 10 CFR 50.73, Licensee Event Report System, item (a)(2)(iv), which requires a report of, "any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature (ESF) including the Reactor Protection System (RPS)", the attached Licensee Event Report LER 89-015 is hereby submitted.

These events have in no way affected the public's health and safety.

Very truly yours,


Robert C. Mecredy
General Manager
Nuclear Production

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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PDR ADCK 05000244
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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) R.E. Ginna Nuclear Power Plant										DOCKET NUMBER (2) 0 5 0 0 0 2 4 4										PAGE (3) 1 OF 0 9	
TITLE (4) TAVG Channel Malfunction Due To Electronic Instrument Problems Causes Automatic Turbine Runbacks																					
EVENT DATE (6)			LER NUMBER (8)				REPORT DATE (7)			OTHER FACILITIES INVOLVED (9)											
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES					DOCKET NUMBER (8)							
1	1	1989	89	015	00	1	2	1989						0 5 0 0 0 1							
OPERATING MODE (10)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more of the following) (11)																			
N		20.402(b)				20.406(a)				<input checked="" type="checkbox"/> 80.73(a)(2)(h)				73.71(b)							
POWER LEVEL (10)		0.99				20.406(a)(1)(i)				80.34(a)(1)				80.73(a)(2)(v)				73.71(a)			
		20.406(a)(1)(ii)				80.34(a)(2)				80.73(a)(2)(w)				OTHER (Specify in Abstract below and in Text, NRC Form 364A)							
		20.406(a)(1)(iii)				80.73(a)(2)(u)				80.73(a)(2)(w)(A)											
		20.406(a)(1)(iv)				80.73(a)(2)(v)				80.73(a)(2)(w)(B)											
		20.406(a)(1)(v)				80.73(a)(2)(w)				80.73(a)(2)(a)											

LICENSEE CONTACT FOR THIS LER (12)

NAME Wesley H. Backus Technical Assistant to the Operations Manager										TELEPHONE NUMBER AREA CODE 3 1 5 5 2 4 - 4 4 4 6									
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)				<input checked="" type="checkbox"/> NO				EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR
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ABSTRACT (Limit to 1400 words, i.e., approximately fifteen single-space typewritten lines) (16)

On November 19, 1989 at 0752 EST and again on November 22, 1989 at 0947 EST, with the reactor at approximately 99% full power, turbine runbacks to approximately 94% reactor power occurred. These turbine runbacks were caused by Overtemperature Delta T (OT Delta T) and/or Overpressure Delta T (OP Delta T) circuitry due to a malfunction of TAVG Channel TI-401.

In both events the Control Room operators performed the applicable steps of abnormal procedure AP-TURB.2 (Automatic Turbine Runback) and stabilized the plant.

Subsequently, in both events, the affected TAVG Channel was defeated and the plant was restored to pre-event status.

The underlying cause of the TAVG Channel causing the turbine runbacks is undetermined at this time but further testing is continuing.

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TEXT (If more space is required, use additional NRC Form 368A's) (17)

I. PRE-EVENT PLANT CONDITIONS

For both events the unit was at approximately 99% steady state full power with no major activities in progress.

II. DESCRIPTION OF EVENT

A. DATES AND APPROXIMATE TIMES FOR MAJOR OCCURRENCES:

- o November 19, 1989, 0752 EST: First event date and time.
- o November 19, 1989, 0752 EST: Discovery date and time of first event.
- o November 19, 1989, 0752 EST: Control Room operators performed the actions of abnormal procedure AP-TURB.2 (Automatic Turbine Runback) and stabilized the plant at approximately 94% power.
- o November 19, 1989, 0815 EST: Control Room operators defeated TAVG Channel TI-401 per Equipment Restoration procedure ER-INST.1.
- o November 19, 1989, 0831 EST: Started increasing load to approximately 99% full power.
- o November 21, 1989, 1053 EST: TAVG Channel TI-401 restored to service.
- o November 22, 1989, 0947 EST: Second event date and time.
- o November 22, 1989, 0947 EST: Discovery date and time of second event.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO 3150-0104

EXPIRES 8/31/85

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- o November 22, 1989, 0947 EST: Control Room operators performed the actions of abnormal procedure AP-TURB.2 (Automatic Turbine Runback) and stabilized the plant at approximately 94% power.
- o November 22, 1989, 1122 EST: The Instrument and Control (I&C) Department placed TAVG Channel TI-401 in defeat per calibration procedure CP-401.
- o November 22, 1989, 1130 EST: Started increasing load to approximately 99% full power.

B. EVENT:

On November 19, 1989 at 0752 EST and again on November 22, 1989 at 0947 EST with the reactor at approximately 99% full power, a turbine runback occurred.

At the beginning of the first event, (November 19, 1989 at 0752 EST), the Control Room received the following alarms: F-31 (OT/T Turbine Runback), F-23 (RCS OT/T Channel Alert), F-15 (RCS TAVG Dev 4°F) and G-9 (RCS Loop "A" High TAVG 578°F). A turbine runback of approximately 5% power took place and the condition cleared. The runback was determined to be due to a malfunction of TAVG Channel TI-401.

The Control Room operators entered and performed the actions of AP-TURB.2 (Automatic Turbine Runback). The plant was stabilized at approximately 94% power. Subsequently, after the plant was stabilized, TAVG Channel TI-401 was defeated per equipment restoration procedure ER-INST.1. Higher supervision, the NRC and the Instrument and Control (I&C) Department were subsequently notified of the event. After TAVG Channel TI-401 was defeated the plant was returned to approximately 99% full power.

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Subsequently the I&C Department performed an extensive troubleshooting effort on TAVG Channel TI-401 but could not duplicate or identify any malfunctions that would have caused the turbine runback.

On November 21, 1989 at 1053 EST TAVG Channel TI-401 was returned to service.

At the beginning of the second event, (November 22, 1989 at 0947 EST), the Control Room received the following alarms: F-23 (RCS OT/T Channel Alert), F-30 (OP/T Turbine Runback) and F-31 (OT/T Turbine Runback). A turbine runback of approximately 5% power took place and the condition cleared. The runback was determined to be due to a malfunction of TAVG Channel TI-401.

The Control Room operators entered and performed the actions of AP-TURB.2 (Automatic Turbine Runback). The plant was stabilized at approximately 94% power. Subsequently, after the plant was stabilized, I&C was immediately notified, and TAVG Channel TI-401 was defeated per calibration procedure CP-401. Higher supervision and the NRC were subsequently notified of the event. After TAVG Channel TI-401 was defeated the plant was returned to approximately 99% full power.

Subsequently, the I&C Department performed another extensive troubleshooting effort on TAVG Channel TI-401 but could not duplicate or identify any malfunctions that would have caused the turbine runback. All suspect TAVG and Delta T modules which are associated with the runback circuit were changed to possibly eliminate the occurrence of another runback. After intensive monitoring for two weeks, no further problems were identified, and on December 6, 1989 at 0656 EST TAVG Channel TI-401 was returned to service.

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TEXT (If more space is required, use additional NRC Form 368A's) (17)

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 event was immediately apparent due to alarms and indications in the Control Room.

F. OPERATOR ACTION:

Immediate operator action for both events was to stabilize the plant at approximately 94% reactor power by performing the applicable steps of AP-TURB.2 (Automatic Turbine Runback).

Subsequent operator action was to defeat TAVG Channel TI-401 per equipment restoration procedure ER-INST.1 for the first event and to notify I&C to defeat TAVG Channel TI-401 per calibration procedure CP-401 for the second event and to notify Higher Supervision, the NRC, and the I&C Department.

G. SAFETY SYSTEM RESPONSES:

The turbine generator decreased load automatically to approximately 94% reactor power due to the OT Delta T and OP Delta T circuitry.

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TEXT (If more space is required, use additional NRC Form 366A's) (117)

III. CAUSE OF EVENT

A. IMMEDIATE CAUSE:

The automatic turbine runbacks were caused by Loop A, Channel I, OP Delta T and/or OT Delta T runback circuitry.

B. INTERMEDIATE CAUSE:

The Loop A, Channel I, OP Delta T and/or OT Delta T runback circuitry was activated by a malfunction of TAVG Channel TI-401.

C. ROOT CAUSE:

The underlying cause of the turbine runbacks from the malfunction of TAVG Channel TI-401 is undetermined at this time. The I&C Department could not duplicate or identify any malfunctions that would have caused the turbine runback, as discussed in Paragraph V. A. below.

IV. ANALYSIS OF EVENT

These events are reportable in accordance with 10 CFR 50.73, Licensee Event Report System, item (a)(2)(iv), which requires reporting of, "any event or condition that resulted in manual or automatic activation of any Engineered Safety Feature (ESF) including the Reactor Protection System (RPS)". The automatic turbine runbacks were automatic actuations of the RPS.

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 the turbine runback events because:

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- o The events were immediately apparent.
- o The turbine runbacks were in the conservative direction.
- o All reactor control and protection systems performed as designed thus limiting the overall effects of the transients.
- o The Control Room operators stabilized the plant very quickly after both transients.

Based on the above, it can be concluded 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:

- o Subsequent to the first runback (November 19, 1989), the I&C Department performed testing and calibration on the TAVG and Delta T modules which are associated with the runback circuit, with no identified failures apparent. Computer trends and data available at the time of the event indicated the problem was limited to TAVG Channel TI-401 only.
- o On November 20, 1989 the I&C Department removed the Dual Current Source TI-401 which supplies the excitation current to the primary loop RTD's and replaced it with a spare dual current source from stock. A test recorder was connected to monitor the input and output of each module associated with the TAVG and Delta T circuits. This was done to monitor which module was intermittently causing the turbine runback condition. After all troubleshooting was completed the channel was returned to service.

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

- o Subsequent to the second runback (November 22, 1989), the recorder traces monitoring the Dual Current Source, Dana Amplifier and Lag Unit indicated that all modules were being affected in the loop including the dual current source output. Further review of the data also indicated that both TAVG and Delta T temperature channels were being affected which indicates a current source or RTD failure. Subsequently, the I&C Department measured all Channel I RTD's resistance values and continuity to ground for a possible intermittent RTD failure. One RTD, TE-405A did indicate a partial ground (approximately 10K ohms).
- o Since the first runback indicated a TAVG Channel intermittently failed, it was decided to additionally replace the Dana Amplifier which connects the bridge output to an acceptable voltage. Also the lag unit which dampens the temperature signal was replaced in the TAVG circuit. These additional corrective actions were taken to possibly eliminate the occurrence of another runback and to allow testing of the modules in the shop under more controlled test conditions.
- o Subsequent testing also identified that the ground on TE-405A had changed from 10K ohms to 300-500 ohms ground. This may indicate a more gradual failure of RTD TE-405A. Further testing of this ground on RTD TE-405A identified that there was no effect on the TAVG or Delta T when a ground was placed on the RTD leads.

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- o Other testing included in the troubleshooting was to perform Time Domain Reflectometry (TDR) traces on the field wires from the protection racks to the RTD in containment. There were no identified deficiencies in the traces thus eliminating the possibility of a penetration splice as the possible cause. All electrical terminations in the Channel #1 RTD wiring were verified to be tight and states blocks were inspected for any faults in the field to rack terminations.

- o After all troubleshooting efforts were completed, TAVG Channel TI-401 was returned to service.

B. ACTION TAKEN OR PLANNED TO PREVENT RECURRENCE:

As the underlying cause of the events is still undetermined, the I&C Department is continuing to test the removed modules in the I&C Shop.

Any further corrective action will depend upon determinations reached from the above module testing.

VI. ADDITIONAL INFORMATION:

A. FAILED COMPONENTS:

None identified.

B. PREVIOUS LERS ON SIMILAR EVENTS:

A similar LER event historical search was conducted with the following results: No documentation of similar LERS with the same initiating circumstances at Ginna Station could be identified.

C. SPECIAL COMMENTS:

None.