7-08/01/78

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SUBJECT:
FORWARDING REPT AMENDING APPLICANT"S PROPOSED MODIFICATIONS DEALING WITH EXISTING UNDERVOLTAGE SYSTEM AND PROPOSED SECOND LEVEL SYSTEM... W/ATT.

PLANT NAME: RE GINNA - UNIT 1

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MDC [illegible] 4

DISTRIBUTION: LTR 44 ENCL 44
SIZE: 2P+4P+3P

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CP

ROCHESTER GAS AND ELECTRIC CORPORATION • 89 EAST AVENUE, ROCHESTER, N.Y. 14649

LEON D. WHITE, JR.
VICE PRESIDENT

TELEPHONE
AREA CODE 716 546-2700

July 24, 1978

Director of Nuclear Reactor Regulation
Attention: Mr. Dennis L. Ziemann, Chief
Operating Reactors Branch #2
Division of Operating Reactors
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Amendments to prior design modifications on the undervoltages protection systems. R. E. Ginna Nuclear Plant, Unit #1, Docket No. 50-244.

Dear Mr. Ziemann:

In accordance with the verbal commitment made on June 15, 1978 to your office, Rochester Gas and Electric Corporation is enclosing herewith copies of a report amending our proposed modifications dealing with our existing undervoltage system and our proposed second level system.

The changes to the prior submissions are intended to:

(1) Integrate the modification to eliminate lockout potential described in our May 1, 1978 letter with second level modification described in our July 21, 1977 submission.

(2) Incorporate coincident logic in our tripping circuits, in accordance with Mr. Schwencer's June 3, 1977 letter.

It should be noted that the coincident logic scheme represents a major change to the existing undervoltage protection system. Since the NRC has specifically required that coincident logic be incorporated in the design, we have prepared what we believe to be an optimal design consistent with the constraints imposed by existing plant configuration. RG&E engineering believes that the proposed design modification meets the new requirements imposed by the NRC with the minimum possible impact on existing systems. Any modification of this magnitude (over thirty-five additional Class IE relays and substantial amounts of new cable will be installed) entails some element of risk. When a demonstrable design deficiency is shown to exist either by analysis or by actual failure occurrences in a particular design, this small risk is justifiable. However, the existing Ginna undervoltage protection design meets the single failure criteria, and has not experienced a single operational failure of any type during

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almost 10 years of plant operation. In view of this, we believe the value of the coincident logic modification (which has the most significant impact) to be questionable.

Very truly yours,

L. D. White, Jr.

AMENDMENTS TO THE PROPOSED MODIFICATION ON THE LOSS OF VOLTAGE AND DEGRADE VOLTAGE PROTECTION SYSTEMS

R.E. GINNA STATION

Purpose

This report will serve to amend the Rochester Gas and Electric's approach to design solutions aimed at precluding potential lock out problems and complying with the NRC Staff position by implementing a second level of relaying to detect and correct a degraded voltage condition.

The potential lock out problem is thoroughly discussed in our May 1, 1978 design review of the Engineered Safety Features Actuation System. Two modifications are suggested that will ensure that this lock out does not occur. The May 1, 1978 report exclusively addressed the lock out problem without considering mitigating the effects of such events as blown P.T. fuses or failed relays. To design Ginna's undervoltage relaying system to completely mitigate these possible failures, a much more inclusive modification must be undertaken. Rochester Gas and Electric is now prepared to make these more detailed changes and consequently our previously recommended changes dealing with the lock out problem will be changed to include coincident logic. This type of logic is discussed below.

The second level of undervoltage protection is discussed in our July 21, 1977 Design Analysis. This modification will also be changed to include coincident logic so that it will be compatible with the loss of voltage relaying systems.

References

1. Second Level Undervoltage Protection Design Analysis - Submitted by letter from L. D. White, Jr., RG&E to Mr. Schwencer, USNRC dated July 21, 1977

2. Design Review Engineering Safety Features Actuation System - Submitted by letter from L. D. White, Jr., RG&E to Mr. Ziemann, USNRC dated May 1, 1978

3. Safety Evaluation and Statement of Staff Positions Relative to the Emergency Power Systems for Operating Reactors - Submitted by letter from Mr. Schwencer, USNRC to L. D. White, Jr., RG&E dated June 3, 1977

Coincident Trip Logic

All safeguards loads have in their trip circuits one contact from the primary undervoltage relay and one contact from the backup relay. These contacts are in parallel in our existing trip circuits. Consequently, a spurious operation of one undervoltage relay or one blown fuse will cause the loads to trip. It should be noted that only one train is affected and thus the existing design meets the single failure criteria. These parallel contacts can also be shown to cause a lock out in the unlikely event that these relays or those associated

with the second bus on that same train reset at different times. A cross connecting scheme was proposed, ESF modification #1 in reference 2, that corrects the potential lock out problem. This cross connecting scheme will be replaced by a coincident logic scheme. That is, contacts from the loss of voltage monitors (27 devices) and the backup monitors (27B) will be placed in series when used in a trip circuit. This coincident logic not only eliminates potential lock out problems as did the cross connecting scheme but also has the advantage of insuring operability of a safety train in the event of a blown fuse or a failed undervoltage relay.

The logic arrangement shown on Figure 1 represents the coincident logic scheme that will be incorporated into the trip circuits on all safeguards loads that require sequencing. Included along with the loss of voltage relays 27 and 27B devices are the second level relays 27SL and 27B-SL. The second level protection system (degraded voltage protection system) is discussed in the analysis noted as reference 2. This analysis recommended that the second level relays be used in parallel and that the existing auxiliary relays be used for both the loss of voltage and the second level systems. Since the existing loss of voltage system will use coincident logic to prevent potential lock out problems, the second level system must also use coincident logic. This change in the second level logic complies with the NRC staff position 1 of reference 3.

The existing loss of voltage system will not be converted into coincident form until the second level (degraded) system is ready for installation. The proposed second level system will not only serve to detect and correct a degraded voltage condition, but will also back up the loss of voltage system. Without this added backup protection, a failure of one of the ten auxiliary relays would result in a lockout of some or all safeguards loads.

Coincident Sequence Logic

Figure 2 shows three different undervoltage logic schemes that will allow the sequencer to start. That is, the resetting of the various undervoltage relays coincident with Safety Injection will start the timing train of the load sequencer.

Scheme 1 shows the existing 1 out of 4 logic required to start the sequencer. This is a reliable starting logic, however, there exists a low probability potential for relay timing differences that lead to lock out problems.

Scheme 2 is the proposed scheme discussed in reference 2. It mitigates most of the potential lock out problems without sacrificing the existing reliability. However, this scheme will be superseded by the same coincident logic used in the trip circuits.

Scheme 3 is the second level modification with coincident logic.

With the addition of the second level undervoltage relays, the reliability of sequencer starting using only buses 14 (or 16) will be at least equal to that of the existing system using buses 14 (or 16) and 18 or (17). Thus the new design can be simplified by using only bus 14 relays to start train A and bus 16 relay to start train B. The final sequencer logic is shown on figure 3.

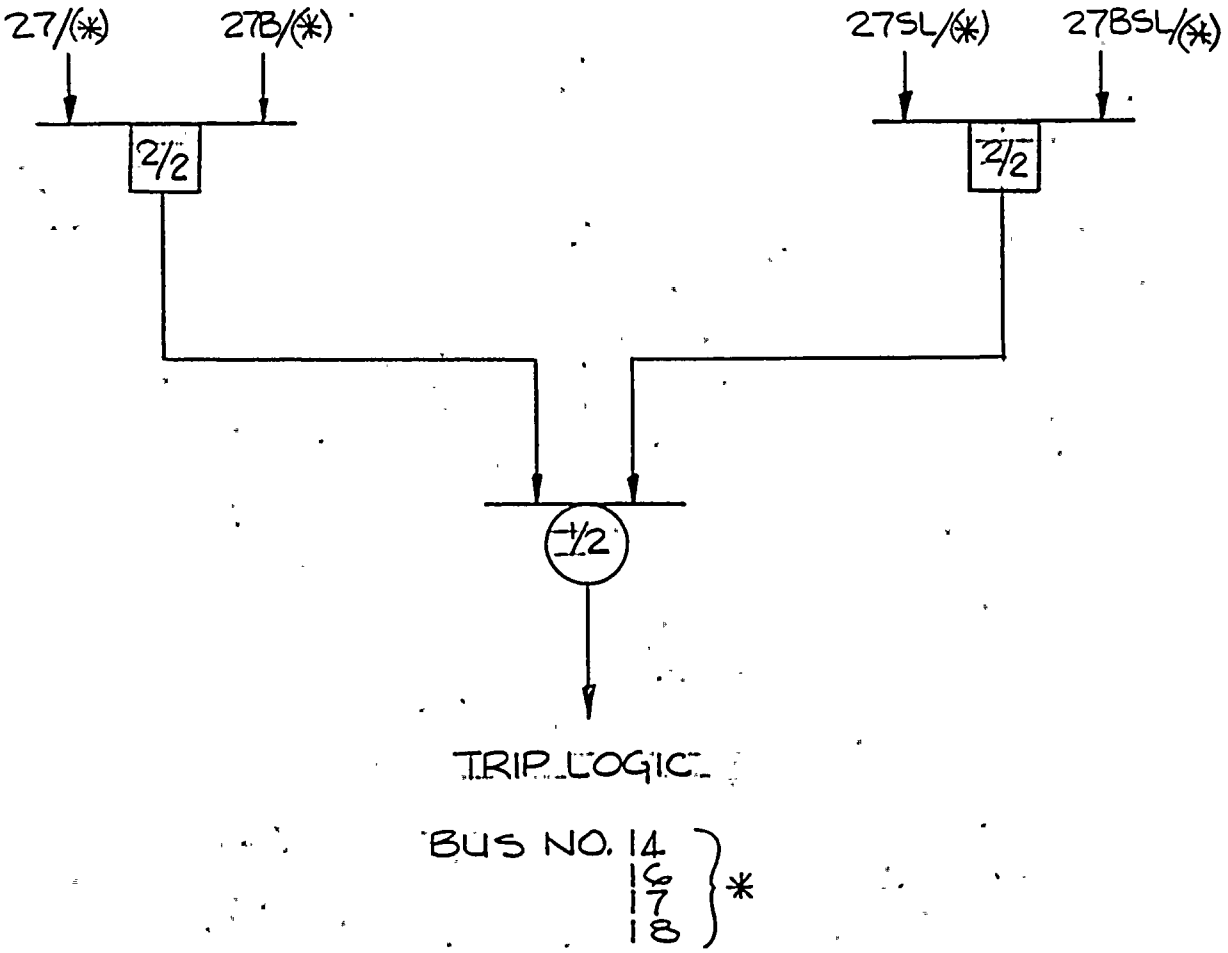
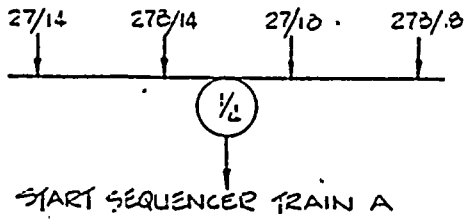


FIGURE 1

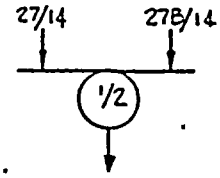
0	ORIGINAL INITIAL DATE	A.VORNDRAN, II 6-29-78	RW 7/11/78	HS Lide 7/11/78	BWD 7/11/78
NUMBER	REVISION	DRAWN BY	CHECKED BY	RESP. ENG.	ENG. MANG'R.
ROCHESTER GAS & ELECTRIC CORP. ROCHESTER, NEW YORK		GINNA STA. PROPOSED COINCIDENT TRIP LOGIC		SCALE NONE	
				NO. 03021-195	

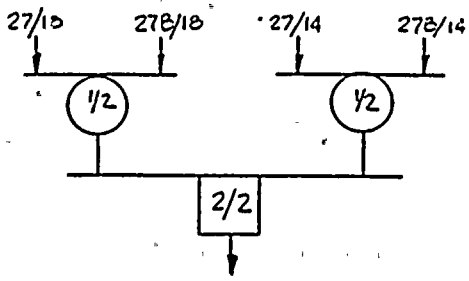
H.H.S. 19 1153•

(1) PRESENT LOGIC

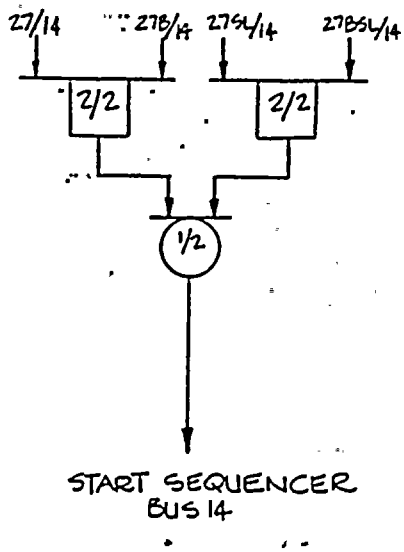


(2) MAY 1, 1979 PROPOSED MODIFICATION





(3) SECOND LEVEL MODIFICATION W/COINCIDENT LOGIC



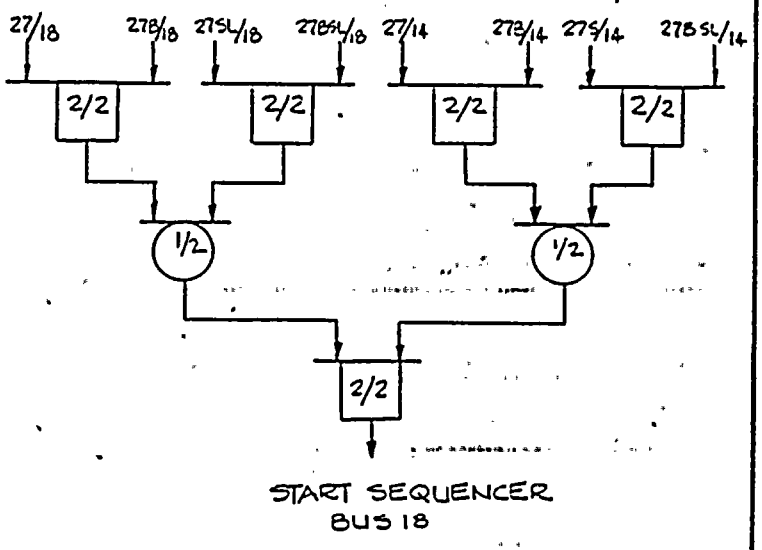
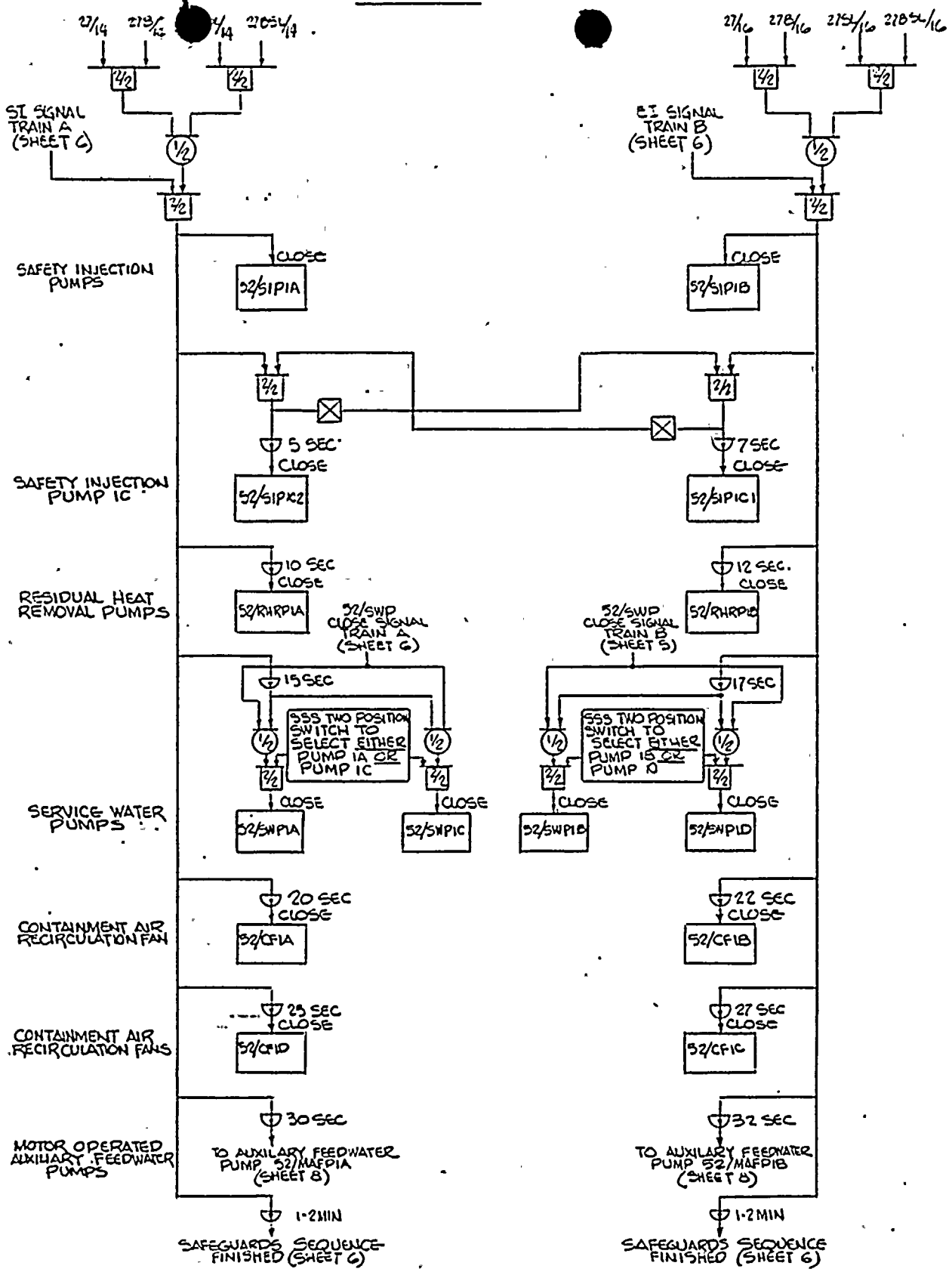


FIGURE 2

						SEQUENCER LOGIC	
						FACILITY GINNA STA	ROCHESTER GAS & ELECTRIC CORP. ROCHESTER, NEW YORK
0	ORIGINAL	INITIAL	AV			SCALE	
		DATE	7/79	7/11/79	7/11/79	JOB NO.	DRAWING NO. SK-447-175 REV.
NUMBER	REVISION		DRAWN BY	CHECKED	REVW. ENG.	ENG. MANG'R.	

FIGURE 3



NOTES:
1. TIMES ARE APPROXIMATE
2. CONTAINMENT SPRAY PUMPS ARE NOT SEQUENCED

NUMBER	REVISION	DRAWN BY	CHECKED	RESP. ENG.	ENG. MANG'R.
	ORIGINAL	INITIAL: GJF	LWK	KSJ	AWD
		DATE: 11/10/74	7/14/75	7/10/75	7/10/75

SAFEGUARDS SEQUENCER LOGIC DIAGRAM

FACILITY GINNA STA

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