

# REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

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 FACIL: 50-244 Robert Emmet Ginna Nuclear Plant, Unit 1, Rochester G 05000244  
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 CRUTCHFIELD, D. Operating Reactors Branch 5

SUBJECT: Forwards response to 830311 request for info re mod to 1C  
 safety injection pump logic. Submittal consists of design  
 criteria & electrical schematics.

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NOTES: NRR/DL/SEP 1cy.

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| EXTERNAL: | ACRS 14                   |  | 6 6                 |  | LPDR 03                   |  | 1 1                 |
|           | NRC PDR 02                |  | 1 1                 |  | NTIS 5                    |  | 1 1                 |
| NOTES:    |                           |  | 1 1                 |  |                           |  |                     |

Subject: Forward response to 8/21/11 request for info re non to 11  
 Safety inspection, and letter, submitted consists of design  
 criteria & electrical schematics.

1. Service

REF ID: A63714

[illegible]



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

JOHN E. MAIER  
VICE PRESIDENT

TELEPHONE  
AREA CODE 716 546-2700



March 15, 1983

Director of Nuclear Reactor Regulation  
Attention: Mr. Dennis M. Crutchfield, Chief  
Operating Reactors Branch No. 5  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Subject: LC Safety Injection Pump Logic  
R. E. Ginna Nuclear Power Plant  
Docket No. 50-244

Dear Mr. Crutchfield:

By letter dated November 22, 1982, we identified the modification to be made to the LC Safety Injection Pump Logic. Enclosure A to this letter is in response to the March 11, 1983 telephone request for additional information on this subject, made by a member of your staff.

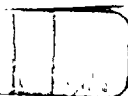
Very truly yours,

  
J. E. Maier

Enclosure

A035

8303230232 830315  
PDR ADDCK 05000244  
PDR



THE UNITED STATES OF AMERICA  
DO hereby certify that  
[illegible]  
[illegible]

is the true and correct  
[illegible]

at [illegible] this [illegible] day of [illegible]

Witness my hand and the seal of the  
[illegible] at [illegible] this [illegible] day of [illegible]  
[illegible]

BY [illegible]

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Design Criteria

1.0 Summary Description of the Design

1.1 The modification as proposed herein affects the Emergency Safety Features Actuation System (ESFAS). Specifically, the 1C Safety Injection pump control scheme is to be modified so as to a) insure predictable loading of the 1C pump, b) improve availability of the 1C pump in the event of a breaker failure, c) prevent the transfer of a faulted 1C pump motor from its preferred to its alternate source and d) allow the 871 A&B valves to go full open upon the loss of both 1A & 1B pump breakers.

1.1.1 The ESFAS System at Ginna Station, consists of control relays, electro-pneumatic timers and a series of electrical and mechanical interlocks on each train. In general, Class 1E equipment is loaded on the safeguards buses at approximately five second intervals. The only exception is the 1C Safety Injection pump, which is a "swing" pump and may be fed from either breaker 52/SIP1C2 (bus 14, train A) or breaker 52/SIP1C1 (bus 16, train B). To prevent closure of both circuit breakers, causing buses 14 and 16 to be paralleled, a network of interlocks is used. Presently, these interlocks are configured as discussed in the Ginna Station FSAR, page 8.2-12a and outlined below.

The first set of interlocks consists of instantaneous auxiliary contacts off of time delay relays associated with the 1C SIP breakers. This existing scheme is shown on Figure I. Normal operation of the 1C SIP system begins with a simultaneous SI signal and normal bus voltage. The timers on both systems initially energize, thereby simultaneously deenergizing each other, which through the interlocks, reenergize once again. This sequence occurs until such time as one interlock drops out ahead of the other and thus one timer is locked out. This sequence of instantaneously "picking up" and "dropping out" has the potential of delaying the overall time in which the 1C SI pump finally is placed in service. In addition, the timing relays can be overstressed.

Because the existing configuration is interlocked ahead of the timing relays it results in the unpredictable loading of the 1C SI pump onto either bus 14 or 16.

An improvement in the performance of the ESFAS system can be accomplished by using "time delayed" contacts as interlocks, that is, output contacts on the time delay relays.

Figure II details this modification, which establishes bus 14 as the preferred source for the 1C SI pump and bus 16 as the backup source, should bus 14 be out of service.

The proposed interlocking contacts are time delayed. That is, they will not open until the relay timers have completed their respective preset delay time. It can be seen that the 1C2 timer is set at 5 seconds while the 1C1 timer is set at 7 seconds. Consequently, the time delayed contacts on the 1C2 timers will deenergize the 1C1 timer in 5 seconds, thus making bus 14 the preferred source for the 1C SI pump motor.

The USNRC staff has evaluated this proposed change and in their Safety Evaluation Report (NUREG 0916) have endorsed this approach of eliminating the uncertainty associated with the 1C pump loading.

- 1.1.2 As discussed, the existing scheme loads the 1C pump on the bus whose timer happens to pick up first. If an undervoltage condition occurs, the 1C pump can swing over to the opposite train. However, if full bus voltage exists but the breaker fails to "close in", due to a tripper bar adjustment problem or some other mechanical problem, then the 1C pump function is lost.

Figure II represents part of the proposed modification which will allow the 1C pump motor to swing to bus 16, should the 1C2 breaker fail to close on bus 14 after a total delay time of 37 seconds. This transfer will not however be allowed if an electrical fault occurs on the 1C motor. This transfer scheme will not subject both trains to a common electrical fault. This is an NRC requirement and must be included in this modification.

The proposed modification to the ESFAS system utilizes a spare TD relay on the A Train Sequencer. The new relay (2-1C2X) will be energized through a "b" contact off of the SIP breaker on bus 14 (52/SIP1C2) coincident with an alarm switch off of the same breaker.

The new timing relay will be set at 30 seconds and it follows the 2/SIP 1C2 timer until it times out and causes the 1C2 breaker to close. If this breaker fails to close within the 30 second period, then the 2-1C2X

will energize and drop out the 2-SIP1C2 timer and allow the 2-SIP1C1 timer to pick up and seven seconds later, the 1C pump will be automatically loaded on bus 16.

The 37 second time delay comes about by using the spare 30 second timer on the A train plus the 7 seconds delay associated with the 1C1 breaker TD relay. Since a single 1C breaker failure is the only postulated failure that must be considered and it is assumed that both the 1A and 1B SI pumps are operational, the total accumulated time delay of 37 seconds is consistent with the Ginna Station FSAR.

- 1.1.3 In addition to modifications to the interlocks, the control scheme for the valves associated with the 1C pump requires evaluation.

In the event that either the 1A or 1B SI pump breakers fail to close after an SI signal is received, then the 871 A or B valves are automatically aligned so that the 1C pump functionally replaces the lost SI pump.

However, in the event that both the 1A and 1B SI pump breakers electrically fail to close after an SI, the 871 A & B valves will automatically go closed, isolating the 1C pump.

The proposed modification will provide valve control logic consisting of an auxiliary relay that energizes only when both the SIP1A and 1B breakers fail to close. This relay will block the auto closure of both 871A & B valves. This logic is only formed during SI. The auxiliary relay, once energized, will prevent the 871 A&B valves from going closed. (Note: 871 A&B are normally "opened"). Figure III outlines the proposed scheme.

## 1.2 Functions

- 1.2.1 The functions of the proposed change to the electrical interlocks (i.e. change from instantaneous to time delay contacts) is to assure that the 1C SIP will be supplied from Bus 14 and if Bus 14 undervoltage occurs, to swing over to Bus 16.)
- 1.2.2 The function of the additional timer and control changes is to allow the 1C pump to transfer to Bus 16 if the 1C breaker on Bus 14 fails to close due to any electrical or mechanical failure of the 1C2 breaker with the exception of an over current condition due to a fault on the 1C pump. Should a fault occur on the 1C motor

it will trip out after attempting to close on to bus 14. This condition will be detected and the 1C motor will not be transferred to bus 16. This will preclude subjecting both safety trains to a common fault.

In addition, the 480 volt class IE system has been evaluated to ensure that a fault on the 1C pump motor will not result in a detectable undervoltage on bus 14 and initiate a transfer. This evaluation has been reviewed and accepted by the USNRC staff reviewers and is referenced in section 2.3.

- 1.2.3 The functions of proposed control scheme on the 871 A&B valves is to allow these valves to open on the loss of both the 1A and 1B safety injection pump and the successful closure of either 1C1 or 1C2 breakers.

### 1.3 Performance Requirements

- 1.3.1 The time delayed interlocking contacts shall be set for 5 seconds on train A and 7 seconds on train B consistent with the Ginna Station FSAR.

- 1.3.2 The time delay required for developing the control scheme that will allow the 1C pump motor to swing over to Bus 16 on the failure of the 1C2 breaker (other than undervoltage) must be set to operate at 30 seconds so that the 1C motor is not loaded onto the diesel along with another 1E motor.

- 1.3.3 The auxiliary relay required to form the logic that will allow the 871 A and B valves to go open on concurrent loss of the 1A and 1B Safety Injection pump motors shall be instantaneous and not time delayed.

### 1.4 Control

- 1.4.1 All proposed changes and modifications shall be automatic, and no manual control will be included.

### 1.5 Modes of Operation

- 1.5.1 The normal mode of these control schemes to operate will be to automatically form the required logic. This logic will however be verified by test.

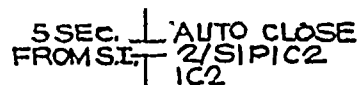




TRAIN B  
480V

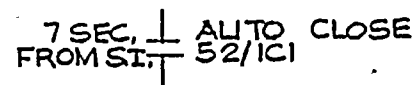


TRAIN A



IC SIP BKR  
BUS 14

TRAIN B

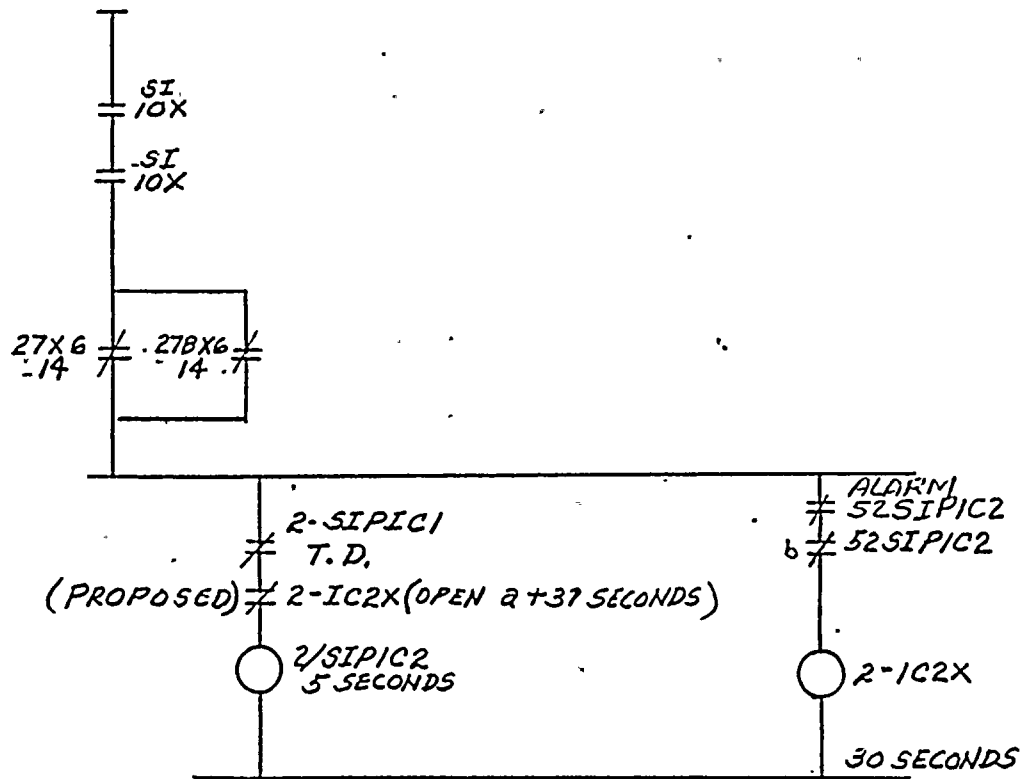


IC SIP BKR  
BUS 16

## EXISTING SCHEME

|                                                       |          |                       |                  |               |               |         |         |                 |  |
|-------------------------------------------------------|----------|-----------------------|------------------|---------------|---------------|---------|---------|-----------------|--|
|                                                       |          |                       |                  |               |               |         |         |                 |  |
| O                                                     | ORIGINAL | INITIAL<br>DATE       | N J 4<br>3-16-42 | 8/20/82       | 8/20/82       | 8/20/82 | 8/20/82 | ENG.<br>MANG'R. |  |
| NUMBER                                                | REVISION |                       | DRAWN<br>BY      | CHECKED<br>BY | RESP.<br>ENG. | SCALE   | 2       |                 |  |
| ROCHESTER GAS & ELECTRIC CORP.<br>ROCHESTER, NEW YORK |          | GINNA 514<br>FIGURE I |                  |               |               |         |         |                 |  |
|                                                       |          | NO. ENR 3435          |                  |               |               |         |         |                 |  |

# TRAIN A



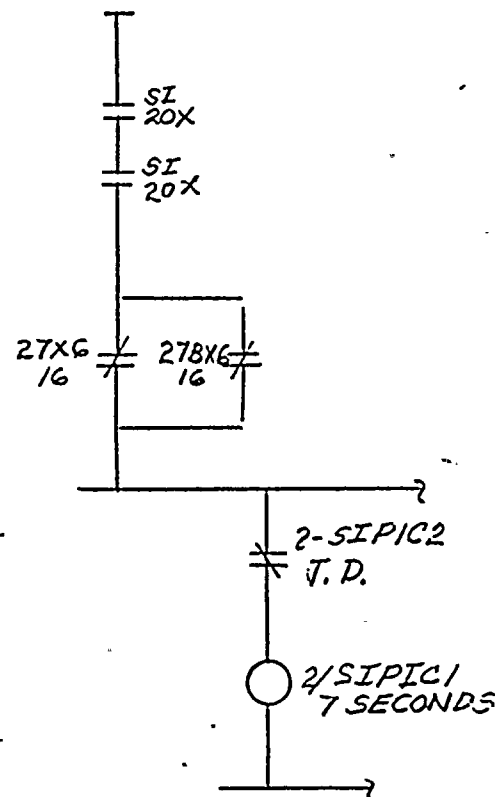
5 SEC. FROM SI, AUTO CLOSE  
2/SIPIC2  
IC2

IC SIP BKR.  
BUS 14

TO INSURE THAT IC PUMP WILL  
TRANSFER OVER TO BUS #16 IF BKR  
ON BUS 14 FAILS TO CLOSE.

## PROPOSED SCHEME

# TRAIN B

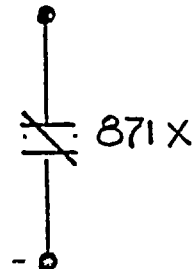
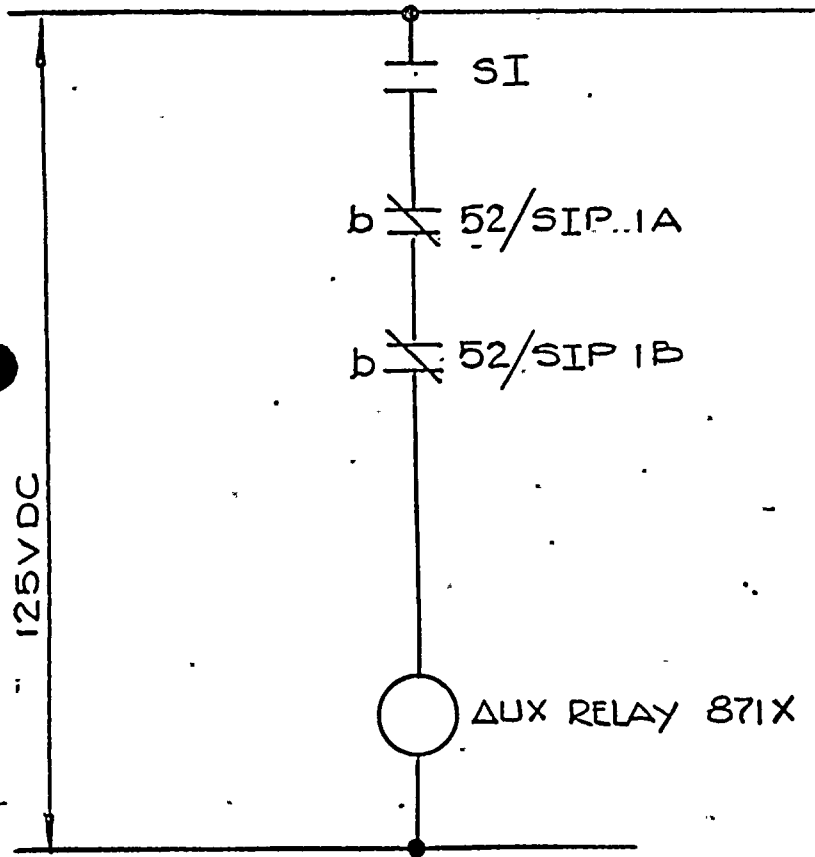


7 SEC. FROM SI, AUTO CLOSE  
52/IC1

IC SIP BKR.  
BUS 16

|   |          |              |                                |            |            |              |             |
|---|----------|--------------|--------------------------------|------------|------------|--------------|-------------|
| 1 | ORIGINAL | INITIAL DATE | 10/12/82                       | GSL        | 10/12/82   | GSL          | 10/12/82    |
| 0 | REVISION | DATE         | 8/20/82                        | YLP        | 8/20/82    | YLP          | 8/20/82     |
|   |          |              | 2-16-82                        |            |            |              |             |
|   |          |              | DRAWN BY                       | CHECKED BY | RESP. ENG. | ENG. MANG'R. |             |
|   |          |              | GINNY STA.                     |            |            |              | SCALE 1/2"  |
|   |          |              | FIGURE II                      |            |            |              | NO. EWR3435 |
|   |          |              | ROCHESTER GAS & ELECTRIC CORP. |            |            |              |             |
|   |          |              | ROCHESTER, NEW YORK            |            |            |              |             |





TO BLOCK CLOSURE  
OF 871A & 871B  
REF DWG. 10905-279

|                                                       |          |                 |                           |               |                       |                 |
|-------------------------------------------------------|----------|-----------------|---------------------------|---------------|-----------------------|-----------------|
|                                                       |          |                 |                           |               |                       |                 |
| O                                                     | ORIGINAL | INITIAL<br>DATE | ASM<br>7/15/82            | Rev 7-15-82   | 9-3-82                |                 |
| NUMBER                                                | REVISION |                 | DRAWN<br>BY               | CHECKED<br>BY | RESP.<br>ENG.         | ENG.<br>MANG'R. |
| ROCHESTER GAS & ELECTRIC CORP.<br>ROCHESTER, NEW YORK |          |                 | GINNATA STA<br>FIGURE III |               | SCALE<br>NO. EWR 3435 |                 |