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Docket No. 50-244
LS05-81-02-060

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Mr. John E. Maier
Vice President
Electric and Steam Production
Rochester Gas & Electric Corporation
89 East Avenue
Rochester, New York 14649

Dear Mr. Maier:

RE: SEP TOPICS V-II.A, ISOLATION OF HIGH AND LOW PRESSURE SYSTEMS, AND VI-7.C.1, INDEPENDENCE OF REDUNDANT ONSITE POWER SYSTEMS,- R.E. GINNA NUCLEAR POWER PLANT

Enclosed are final evaluations of SEP Topics V-II.A and VI-7.C.1 for R.E. Ginna Nuclear Power Plant. These assessments compare your facility, as described in Docket No. 50-244, with the criteria currently used by the regulatory staff for licensing new facilities. These reports have been revised to reflect the factual comments provided by your January 8, 1981 letter.

Your observations with regard to the acceptability of alternative designs and the use of administrative controls will be considered during our preparation of the integrated safety assessment for your plant. However, it must be pointed out that the currently approved version of Regulatory Guide 1.139 is Revision 0. Revision 0 requires diverse interlocks.

These evaluations will be basic inputs to the integrated safety assessment for your facility. As previously stated, these assessments may be revised in the future if your facility design is changed or if NRC criteria relating to this subject are modified before the integrated assessment is completed.

Sincerely,

Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
Division of Licensing

Enclosure:
Draft SEP Topics V-II.A
and VI-7.C.1

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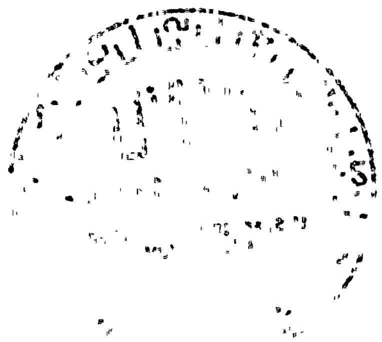

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

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SEP TECHNICAL EVALUATION

TOPIC V-11.A
ELECTRICAL, INSTRUMENTATION, AND CONTROL FEATURES FOR ISOLATION OF HIGH AND LOW PRESSURE SYSTEMS

FINAL DRAFT

R. E. GINNA NUCLEAR STATION

Docket No. 50-244

January 1981

S. E. Mays

1-26-81

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ELECTRICAL, INSTRUMENTATION, AND CONTROL FEATURES FOR ISOLATION OF HIGH AND LOW PRESSURE SYSTEMS

FINAL DRAFT

R. E. GINNA NUCLEAR STATION

1.0 INTRODUCTION

The purpose of this review is to determine if the electrical, instrumentation, and control (EI&C) features used to isolate systems with a lower pressure rating than the reactor coolant primary system are in compliance with current licensing requirements as outlined in SEP Topic V-11A. Current guidance for isolation of high and low pressure systems is contained in Branch Technical Position (BTP) EICSB-3, BTP RSB-5-1, and the Standard Review Plant (SRP), Section 6.3.

2.0 CRITERIA

2.1 Residual Heat Removal (RHR) Systems. Isolation requirements for RHR systems contained in BTP RSB-5-1 are:

1. The suction side must be provided with the following isolation features:

    a. Two power-operated valves in series with position indicated in the control room.

    b. The valves must have independent and diverse interlocks to prevent opening if the reactor coolant system (RCS) pressure is above the design pressure of the RHR system.

    c. The valves must have independent and diverse interlocks to ensure at least one valve closes upon an increase in RCS pressure above the design pressure of the RHR system.

2. The discharge side must be provided with one of the following features:

    a. The valves, position indicators, and interlocks described in (1)(a) through (1)(c) above.

b. One or more check valves in series with a normally-closed power-operated valve which has its position indicated in the control room. If this valve is used for an Emergency Core Cooling System (ECCS) function, the valve must open upon receipt of a safety injection signal (SIS) when RCS pressure has decreased below RHR system design pressure.

c. Three check valves in series.

d. Two check valves in series, provided that both may be periodically checked for leak tightness and are checked at least annually.

2.2 Emergency Core Cooling System. Isolation requirements for ECCS are contained in SRP 6.3. Isolation of ECCS to prevent overpressurization must meet one of the following features:

1. One or more check valves in series with a normally-closed motor-operated valve (MOV) which is to be opened upon receipt of a SIS when RCS pressure is less than the ECCS design pressure

2. Three check valves in series

3. Two check valves in series, provided that both may be periodically checked for leak tightness and are checked at least annually.

2.3 Other Systems. All other low pressure systems interfacing with the RCS must meet the following isolation requirements from BTP EICSB-3:

1. At least two valves in series must be provided to isolate the system when RCS pressure is above the system design pressure and valve position should be provided in the control room

2. For systems with two MOVs, each MOV should have independent and diverse interlocks to prevent opening until RCS pressure is below the system design pressure and should automatically close when RCS pressure increases above system design pressure

3. For systems with one check valve and a MOV, the MOV should be interlocked to prevent opening if RCS

pressure is above system design pressure and should automatically close whenever RCS pressure exceeds system design pressure.

3.0 DISCUSSION AND EVALUATION

There are three systems at R. E. Ginna Nuclear Station which have a direct interface with the RCS pressure boundary and have a design pressure rating of all or part of the system which is less than that of the RCS. These systems are the Chemical and Volume Control System (CVCS), the Safety Injection System (SIS), and the Residual Heat Removal (RHR) system.

3.1 Residual Heat Removal System. The RHR system takes a suction on the RCS loop A hot leg, circulates the water through the RHR system heat exchanger, and discharges to the RCS loop B cold leg. Two motor-operated valves in series provide isolation capabilities in both the suction and discharge lines. Each of these MOVs has position indication in the control room. The inboard (closest to the RCS) valves are interlocked to prevent opening if RCS pressure is above RHR system design pressure. However, both valves use the same pressure switch and relay to provide this interlock. The outboard valves have no pressure interlocks. None of the valves will automatically close if RCS pressure increases above RHR system design pressure during RHR system operation.

The RHR system is not in compliance with the current licensing requirements of BTP RSB-5-1 since none of the isolation valves will automatically close if RCS pressure exceeds RHR design pressure. Also, the outboard isolation valves have no interlocks to prevent RHR overpressurization, and the inboard valve interlocks are neither diverse nor independent.

3.2 Safety Injection System. One SIS subsystem consists of two accumulators pressurized with nitrogen with each accumulator isolated from the RCS by a pair of check valves. There are connections upstream of each check valve that can allow them to be tested. A normally-open motor-operated isolation valve upstream of the check valves for each accumulator has position indication in the control room. Each MOV is opened automatically, if closed, upon receipt of a safety injection signal.

The second SIS subsystem consists of two loops, each supplied by a safety injection pump. Each pump discharges to the hot and cold legs of one RCS loop. Isolation is provided by two check valves in series for each branch of the safety injection loop. The cold leg check valves are testable. The check valves in the lines supplying the RCS hot leg for each SIS loop are not testable. However, the MOV in each hot leg is locked shut with power removed and is not required for accident mitigation. A motor-operated isolation valve with position indication in the control room is provided in each branch of the cold leg discharge lines. These valves open upon receipt of a safety injection signal, but have no interlocks preventing opening when RCS pressure is above SIS design pressure.

The third SIS subsystem uses the RHR system to provide low pressure water from the refueling water storage tank to the reactor vessel head (core deluge). Isolation is provided by a MOV in series with a check valve in each of two branches. The MOVs open upon receipt of a safety injection signal but have no interlocks to prevent opening when RCS pressure is above SIS design pressure.

The SIS is not in compliance with the current licensing requirements of SRP 6.3 since the MOVs for the low pressure injection lines have no interlocks to prevent opening when RCS pressure exceeds SIS design pressure.

3.3 Chemical and Volume Control System. The CVCS takes water from the RCS and passes it through a regenerative heat exchanger, an orifice to reduce its pressure, and a nonregenerative heat exchanger before reducing its pressure further by the use of a pressure control valve. After filtering and cleanup, the water may be returned to the RCS by the use of the charging pumps, which increase the water pressure

and pass it through the regenerative heat exchanger to either the hot or cold legs of the RCS or to the pressurizer auxiliary spray line.

The CVCS suction line isolation is provided by a manually-operated solenoid valve in series with three parallel solenoid-operated valves. Each of these valves is operated from the control room and has valve position indicated. None of the valves have interlocks to prevent opening or to automatically close if the pressure exceeds the design rating of the low pressure portions of the system.

The CVCS discharge line isolation is provided by a common discharge line check valve and a branch check valve in each of the three branches downstream of the common check valve. Drain fittings on the discharge line upstream of each check valve can allow the valves to be tested. There is no position indication available in the control room for the check valves. There are solenoid isolation valves in each discharge line branch which have position indication in the control room, but these valves have no interlocks to prevent system overpressurization.

The CVCS is not in compliance with current licensing requirements for isolation of high and low pressure systems contained in BTP EICSB-3 since the suction line solenoid-operated valves have no interlocks to prevent system overpressurization, and the discharge line check valves have no position indication available in the control room.

4.0 SUMMARY

The R. E. Ginna Nuclear Station has three systems with a lower design pressure rating than the RCS, which are directly connected to the RCS. The CVCS, SIS, and RHR system do not meet current licensing requirements for isolation of high and low pressure systems as specified below.

1. The CVCS solenoid-operated valves have no pressure-related interlocks, and the discharge line check valves have no position indication available in the control room as required by BTP EICSB-3

2. The MOVs in the low pressure SIS lines have no pressure-related interlocks required by SRP 6.3

3. None of the RHR system isolation valves automatically close if RCS pressure increases above RHR system design pressure during RHR system operation, and the outboard isolation valves have no pressure-related interlocks as required by BTP RSB-5-1. The interlocks for the inboard isolation valves are neither diverse nor independent.

5.0 REFERENCES

1. NUREG-075/087, Branch Technical Positions EICSB-3, RSB-5-1; Standard Review Plan 6.3.

2. Updated Final Facility Description and Safety Analysis Report, Ginna Nuclear Power Plant, Unit No. 1.

3. RG&E drawings 33013-422, -424, -425, -426, -427, -428, -432, -433, -434, -435, and -436.

4. RG&E drawings 10905-280, -285, -287, -295, -296, -300, and -301.

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SEP TECHNICAL EVALUATION

TOPIC VI-7.C.1
INDEPENDENCE OF REDUNDANT ONSITE POWER SYSTEMS

FINAL DRAFT

R. E. GINNA NUCLEAR STATION

Docket No. 50-244

January 1981

S. E. Mays

1-26-81

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SEP TECHNICAL EVALUATION

TOPIC VI-7.C.1
INDEPENDENCE OF REDUNDANT ONSITE POWER SYSTEMS

FINAL DRAFT

R. E. GINNA NUCLEAR STATION

1.0 INTRODUCTION

The objective of this review is to determine if the onsite electrical power systems (AC and DC) are in compliance with current licensing criteria for electrical independence between redundant standby (onsite) power sources and their distribution systems.

General Design Criterion 17 requires that the onsite electrical power supplies and their onsite distribution systems shall have sufficient independence to perform their safety function assuming a single failure. Regulatory Guide 1.6, "Independence Betwen Redundant Standby (Onsite) Power Sources and Between Their Distribution System," and IEEE Standard 308-1974, "IEEE Standard Criteria for Nuclear Power Generating Stations" provide a basis acceptable to the NRC staff for meeting GDC 17 in regards to electrical independence of onsite power systems.

2.0 CRITERIA

2.1 AC Supplies. When operating from standby sources, redundant load groups and redundant standby sources should be independent of each other at least to the following extent.

1. The standby source of one load group should not be automatically paralleled with the standby source of another load group under accident conditions
2. No provisions should exist for automatically transferring one load group to another load group or loads between redundant power sources

3. If means exist for manually connecting redundant load groups together, at least one interlock should be provided to prevent an operator error that would parallel their standby power sources.

2.2 DC Supplies. Each d-c load group should be energized by a battery and battery charger. The battery-charger combination should have no automatic connection to any other redundant d-c load group.

3.0 DISCUSSION AND EVALUATION

3.1 AC Supplies

Discussion Ginna onsite emergency AC power system consists of two redundant diesel-generator power trains. Diesel generator 1A (DG1A) supplies 480 V buses 14 and 18 while diesel generator 1B (DG1B) supplies buses 16 and 17.

Manual means exist to tie buses 17 and 18 through a tie breaker and to tie buses 14 and 16 through a tie breaker. The control circuit for each breaker provides interlocks such that the breaker cannot be shut if either DG is closed on either bus or if the normal feeders to the bus are closed. Additionally, if the tie breakers are closed, they will trip open upon restoration of normal power, DG closing on the bus, or any safety injection signal.

Means exist to power safety injection pump SI-1C from either bus 14 or 16. The control circuit for the breaker from each bus is designed such that shutting of one breaker prevents shutting the other breaker so that paralleling the redundant DGs is prevented.

Instrument buses 1A, 1B, 1C, and 1D are capable of being supplied by multiple sources. Each bus is supplied by a pair of mechanically interlocked breakers such that paralleling of redundant sources is prevented.

Evaluation. The redundant onsite AC power trains have no automatic transfers of loads and/or load groups. The manual transfer of load groups or manual interconnection of emergency buses have the required interlocks to prevent inadvertent paralleling of redundant sources. Therefore, the onsite emergency AC system is in compliance with current licensing requirements for independence of onsite power systems.

3.2 DC Systems

Discussion. Ginna Nuclear Station has two redundant battery and charger trains to supply 125 V DC emergency loads. Each train consists of a battery, a 75-amp charger, and a 150-amp charger.

Means exist to interconnect both trains by manually shutting a tie breaker. This breaker is padlocked open and the key is maintained by the shift foreman. Current operating procedures require removal of the feeder fuse from one of the buses feeding the tie breaker prior to closing the tie breaker[3]. However, no interlocks exist to prevent closure of the tie breaker if the feeder fuse has not been removed. This would allow paralleling of the redundant DC trains.

Automatic transfer of 125 V DC load groups from train A to B (or vice versa) occurs in seven locations. Control power for 480 V switchgear on buses 14, 16, 17, and 18, DG1A control panel, DG1B control panel, and the rod drive MG set control panel automatically transfers to the redundant train on a loss of power from the normal source. Each load will automatically transfer back to the normal supply when it is regained.

Evaluation. The 125 V DC system has one manual tie between redundant trains and seven automatic transfers of power from one redundant train to the other. Although administrative controls are provided to prevent paralleling redundant trains via the tie breaker, no physical or electrical interlocks exist to prevent parallel operation of the two trains. Therefore, the 125 V DC system is not in compliance with current licensing requirements with respect to independence of onsite power systems.

4.0 SUMMARY

The review of docketed information and plant electrical drawings indicate tnat the Ginna Nuclear Station onsite AC redundant power sources and distribution system meet the current licensing requirements for independence of onsite power systems. The 125 V DC system has seven automatically transferred loads and one manual tie breaker which are not in compliance with current criteria for independence of onsite power systems.

5.0 REFERENCES

1. General Design Criterion 17, "Electrical Power System," of Appendix A, "General Design Criteria of Nuclear Power Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities."

2. "Independence Between Redundant Standby (Onsite) Power Sources and Between Their Distribution Systems," Regulatory Guide 1.6.

3. Rochester Gas and Electric Corp. letter (White) to NRC (Ziemann) dated April 18, 1979.

4. RG&E Corp. drawings 10905-59, 62, 63, 74, and 75.

5. RG&E Corp. drawings D-206-51, 21489-269, and 33013-652.

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SUBJECT: Forwards final evaluation of SEP Topic V-II.A re isolation of high & low pressure sys & SEP Topic VI-7.C.1 re independence of redundant onsite power sys.

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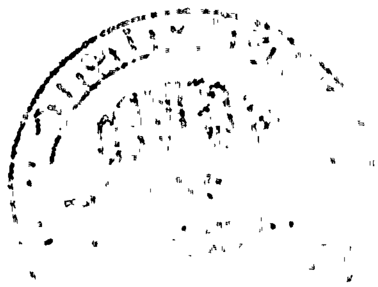

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SEP TECHNICAL EVALUATION

TOPIC V-11.A
ELECTRICAL, INSTRUMENTATION, AND CONTROL FEATURES FOR ISOLATION OF HIGH AND LOW PRESSURE SYSTEMS

FINAL DRAFT

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2.0 CRITERIA

2.1 Residual Heat Removal (RHR) Systems. Isolation requirements for RHR systems contained in BTP RSB-5-1 are:

1. The suction side must be provided with the following isolation features:

   a. Two power-operated valves in series with position indicated in the control room.

   b. The valves must have independent and diverse interlocks to prevent opening if the reactor coolant system (RCS) pressure is above the design pressure of the RHR system.

   c. The valves must have independent and diverse interlocks to ensure at least one valve closes upon an increase in RCS pressure above the design pressure of the RHR system.

2. The discharge side must be provided with one of the following features:

   a. The valves, position indicators, and interlocks described in (1)(a) through (1)(c) above.

b. One or more check valves in series with a normally-closed power-operated valve which has its position indicated in the control room. If this valve is used for an Emergency Core Cooling System (ECCS) function, the valve must open upon receipt of a safety injection signal (SIS) when RCS pressure has decreased below RHR system design pressure.

c. Three check valves in series.

d. Two check valves in series, provided that both may be periodically checked for leak tightness and are checked at least annually.

2.2 Emergency Core Cooling System. Isolation requirements for ECCS are contained in SRP 6.3. Isolation of ECCS to prevent overpressurization must meet one of the following features:

1. One or more check valves in series with a normally-closed motor-operated valve (MOV) which is to be opened upon receipt of a SIS when RCS pressure is less than the ECCS design pressure

2. Three check valves in series

3. Two check valves in series, provided that both may be periodically checked for leak tightness and are checked at least annually.

2.3 Other Systems. All other low pressure systems interfacing with the RCS must meet the following isolation requirements from BTP EICSB-3:

1. At least two valves in series must be provided to isolate the system when RCS pressure is above the system design pressure and valve position should be provided in the control room

2. For systems with two MOVs, each MOV should have independent and diverse interlocks to prevent opening until RCS pressure is below the system design pressure and should automatically close when RCS pressure increases above system design pressure

3. For systems with one check valve and a MOV, the MOV should be interlocked to prevent opening if RCS

pressure is above system design pressure and should automatically close whenever RCS pressure exceeds system design pressure.

3.0 DISCUSSION AND EVALUATION

There are three systems at R. E. Ginna Nuclear Station which have a direct interface with the RCS pressure boundary and have a design pressure rating of all or part of the system which is less than that of the RCS. These systems are the Chemical and Volume Control System (CVCS), the Safety Injection System (SIS), and the Residual Heat Removal (RHR) system.

3.1 Residual Heat Removal System. The RHR system takes a suction on the RCS loop A hot leg, circulates the water through the RHR system heat exchanger, and discharges to the RCS loop B cold leg. Two motor-operated valves in series provide isolation capabilities in both the suction and discharge lines. Each of these MOVs has position indication in the control room. The inboard (closest to the RCS) valves are interlocked to prevent opening if RCS pressure is above RHR system design pressure. However, both valves use the same pressure switch and relay to provide this interlock. The outboard valves have no pressure interlocks. None of the valves will automatically close if RCS pressure increases above RHR system design pressure during RHR system operation.

The RHR system is not in compliance with the current licensing requirements of BTP RSB-5-1 since none of the isolation valves will automatically close if RCS pressure exceeds RHR design pressure. Also, the outboard isolation valves have no interlocks to prevent RHR overpressurization, and the inboard valve interlocks are neither diverse nor independent.

3.2 Safety Injection System. One SIS subsystem consists of two accumulators pressurized with nitrogen with each accumulator isolated from the RCS by a pair of check valves. There are connections upstream of each check valve that can allow them to be tested. A normally-open motor-operated isolation valve upstream of the check valves for each accumulator has position indication in the control room. Each MOV is opened automatically, if closed, upon receipt of a safety injection signal.

The second SIS subsystem consists of two loops, each supplied by a safety injection pump. Each pump discharges to the hot and cold legs of one RCS loop. Isolation is provided by two check valves in series for each branch of the safety injection loop. The cold leg check valves are testable. The check valves in the lines supplying the RCS hot leg for each SIS loop are not testable. However, the MOV in each hot leg is locked shut with power removed and is not required for accident mitigation. A motor-operated isolation valve with position indication in the control room is provided in each branch of the cold leg discharge lines. These valves open upon receipt of a safety injection signal, but have no interlocks preventing opening when RCS pressure is above SIS design pressure.

The third SIS subsystem uses the RHR system to provide low pressure water from the refueling water storage tank to the reactor vessel head (core deluge). Isolation is provided by a MOV in series with a check valve in each of two branches. The MOVs open upon receipt of a safety injection signal but have no interlocks to prevent opening when RCS pressure is above SIS design pressure.

The SIS is not in compliance with the current licensing requirements of SRP 6.3 since the MOVs for the low pressure injection lines have no interlocks to prevent opening when RCS pressure exceeds SIS design pressure.

3.3 Chemical and Volume Control System. The CVCS takes water from the RCS and passes it through a regenerative heat exchanger, an orifice to reduce its pressure, and a nonregenerative heat exchanger before reducing its pressure further by the use of a pressure control valve. After filtering and cleanup, the water may be returned to the RCS by the use of the charging pumps, which increase the water pressure and pass it through the regenerative heat exchanger to either the hot or cold legs of the RCS or to the pressurizer auxiliary spray line.

The CVCS suction line isolation is provided by a manually-operated solenoid valve in series with three parallel solenoid-operated valves. Each of these valves is operated from the control room and has valve position indicated. None of the valves have interlocks to prevent opening or to automatically close if the pressure exceeds the design rating of the low pressure portions of the system.

The CVCS discharge line isolation is provided by a common discharge line check valve and a branch check valve in each of the three branches downstream of the common check valve. Drain fittings on the discharge line upstream of each check valve can allow the valves to be tested. There is no position indication available in the control room for the check valves. There are solenoid isolation valves in each discharge line branch which have position indication in the control room, but these valves have no interlocks to prevent system overpressurization.

The CVCS is not in compliance with current licensing requirements for isolation of high and low pressure systems contained in BTP EICSB-3 since the suction line solenoid-operated valves have no interlocks to prevent system overpressurization, and the discharge line check valves have no position indication available in the control room.

4.0 SUMMARY

The R. E. Ginna Nuclear Station has three systems with a lower design pressure rating than the RCS, which are directly connected to the RCS. The CVCS, SIS, and RHR system do not meet current licensing requirements for isolation of high and low pressure systems as specified below.

1. The CVCS solenoid-operated valves have no pressure-related interlocks, and the discharge line check valves have no position indication available in the control room as required by BTP EICSB-3

2. The MOVs in the low pressure SIS lines have no pressure-related interlocks required by SRP 6.3

3. None of the RHR system isolation valves automatically close if RCS pressure increases above RHR system design pressure during RHR system operation, and the outboard isolation valves have no pressure-related interlocks as required by BTP RSB-5-1. The interlocks for the inboard isolation valves are neither diverse nor independent.

5.0 REFERENCES

1. NUREG-075/087, Branch Technical Positions EICSB-3, RSB-5-1; Standard Review Plan 6.3.

2. Updated Final Facility Description and Safety Analysis Report, Ginna Nuclear Power Plant, Unit No. 1.

3. RG&E drawings 33013-422, -424, -425, -426, -427, -428, -432, -433, -434, -435, and -436.

4. RG&E drawings 10905-280, -285, -287, -295, -296, -300, and -301.

SEP TECHNICAL EVALUATION

TOPIC VI-7.C.1
INDEPENDENCE OF REDUNDANT ONSITE POWER SYSTEMS

FINAL DRAFT

R. E. GINNA NUCLEAR STATION

Docket No. 50-244

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TOPIC VI-7.C.1
INDEPENDENCE OF REDUNDANT ONSITE POWER SYSTEMS

FINAL DRAFT

R. E. GINNA NUCLEAR STATION

1.0 INTRODUCTION

The objective of this review is to determine if the onsite electrical power systems (AC and DC) are in compliance with current licensing criteria for electrical independence between redundant standby (onsite) power sources and their distribution systems.

General Design Criterion 17 requires that the onsite electrical power supplies and their onsite distribution systems shall have sufficient independence to perform their safety function assuming a single failure. Regulatory Guide 1.6, "Independence Betwen Redundant Standby (Onsite) Power Sources and Between Their Distribution System," and IEEE Standard 308-1974, "IEEE Standard Criteria for Nuclear Power Generating Stations" provide a basis acceptable to the NRC staff for meeting GDC 17 in regards to electrical independence of onsite power systems.

2.0 CRITERIA

2.1 AC Supplies. When operating from standby sources, redundant load groups and redundant standby sources should be independent of each other at least to the following extent.

1. The standby source of one load group should not be automatically paralleled with the standby source of another load group under accident conditions

2. No provisions should exist for automatically transferring one load group to another load group or loads between redundant power sources

3. If means exist for manually connecting redundant load groups together, at least one interlock should be provided to prevent an operator error that would parallel their standby power sources.

2.2 DC Supplies. Each d-c load group should be energized by a battery and battery charger. The battery-charger combination should have no automatic connection to any other redundant d-c load group.

3.0 DISCUSSION AND EVALUATION

3.1 AC Supplies

Discussion Ginna onsite emergency AC power system consists of two redundant diesel-generator power trains. Diesel generator 1A (DG1A) supplies 480 V buses 14 and 18 while diesel generator 1B (DG1B) supplies buses 16 and 17.

Manual means exist to tie buses 17 and 18 through a tie breaker and to tie buses 14 and 16 through a tie breaker. The control circuit for each breaker provides interlocks such that the breaker cannot be shut if either DG is closed on either bus or if the normal feeders to the bus are closed. Additionally, if the tie breakers are closed, they will trip open upon restoration of normal power, DG closing on the bus, or any safety injection signal.

Means exist to power safety injection pump SI-1C from either bus 14 or 16. The control circuit for the breaker from each bus is designed such that shutting of one breaker prevents shutting the other breaker so that paralleling the redundant DGs is prevented.

Instrument buses 1A, 1B, 1C, and 1D are capable of being supplied by multiple sources. Each bus is supplied by a pair of mechanically interlocked breakers such that paralleling of redundant sources is prevented.

Evaluation. The redundant onsite AC power trains have no automatic transfers of loads and/or load groups. The manual transfer of load groups or manual interconnection of emergency buses have the required interlocks to prevent inadvertent paralleling of redundant sources. Therefore, the onsite emergency AC system is in compliance with current licensing requirements for independence of onsite power systems.

3.2 DC Systems

Discussion. Ginna Nuclear Station has two redundant battery and charger trains to supply 125 V DC emergency loads. Each train consists of a battery, a 75-amp charger, and a 150-amp charger.

Means exist to interconnect both trains by manually shutting a tie breaker. This breaker is padlocked open and the key is maintained by the shift foreman. Current operating procedures require removal of the feeder fuse from one of the buses feeding the tie breaker prior to closing the tie breaker[3]. However, no interlocks exist to prevent closure of the tie breaker if the feeder fuse has not been removed. This would allow paralleling of the redundant DC trains.

Automatic transfer of 125 V DC load groups from train A to B (or vice versa) occurs in seven locations. Control power for 480 V switchgear on buses 14, 16, 17, and 18, DG1A control panel, DG1B control panel, and the rod drive MG set control panel automatically transfers to the redundant train on a loss of power from the normal source. Each load will automatically transfer back to the normal supply when it is regained.

Evaluation. The 125 V DC system has one manual tie between redundant trains and seven automatic transfers of power from one redundant train to the other. Although administrative controls are provided to prevent paralleling redundant trains via the tie breaker, no physical or electrical interlocks exist to prevent parallel operation of the two

trains. Therefore, the 125 V DC system is not in compliance with current licensing requirements with respect to independence of onsite power systems.

4.0 SUMMARY

The review of docketed information and plant electrical drawings indicate that the Ginna Nuclear Station onsite AC redundant power sources and distribution system meet the current licensing requirements for independence of onsite power systems. The 125 V DC system has seven automatically transferred loads and one manual tie breaker which are not in compliance with current criteria for independence of onsite power systems.

5.0 REFERENCES

1. General Design Criterion 17, "Electrical Power System," of Appendix A, "General Design Criteria of Nuclear Power Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities."

2. "Independence Between Redundant Standby (Onsite) Power Sources and Between Their Distribution Systems," Regulatory Guide 1.6.

3. Rochester Gas and Electric Corp. letter (White) to NRC (Ziemann) dated April 18, 1979.

4. RG&E Corp. drawings 10905-59, 62, 63, 74, and 75.

5. RG&E Corp. drawings D-206-51, 21489-269, and 33013-652.