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VICE PRESIDENT

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February 2, 1995

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Gentlemen:

Subject: **Docket Nos. 50-361 and 50-362**
Supplement 1 to Amendment Application Nos. 136 and 120
Change to Technical Specifications 3/4.3.2,
"Engineered Safety Features Actuation Systems,"
San Onofre Nuclear Generating Station, Units 2 and 3

References: See Enclosure 1

By letter dated September 30, 1993, (Reference 1) Southern California Edison (Edison) submitted Amendment Application Nos. 136 and 120 to Facility Operating Licenses NPF-10 and NPF-15, respectively, for the San Onofre Nuclear Generating Station, Units 2 and 3. These Amendment Applications consisted of Proposed Change Number (PCN) 429. PCN 429 requests changes to Technical Specification (TS) 3/4.3.2, "Engineered Safety Features Actuation Systems (ESFAS)." These changes provide for installation of an enhanced degraded voltage protection system.

Provided as Enclosure 2 is Supplement 1 to Amendment Application Nos. 136 and 120. Supplement 1 is being submitted to expand the response time testing requirements for the new degraded voltage protection signals, Sustained Degraded Voltage Signal (SDVS) and Degraded Grid Voltage with Safety Injection Actuation Signal (SIAS) Signal (DGVSS).

PCN 429 provided overall response times for these two signals. These overall response times were based on the summation of the time delays for the individual sensing relays. The time delays for the individual sensing relays were to be verified according to procedures. Such verification, however, would not have been specifically required by the TSs proposed by PCN 429. This was because the overall response time requirement was sufficient to assure that the safety function of the enhanced degraded voltage protection system would be met.

It was realized during discussions with the NRC in support of the Technical Specification Improvement Project (TSIP) that additional TS response time requirements should be provided. This is to provide assurance that the sensing window for the DGVSS would not oper before 4.3 seconds following a Safety Injection Actuation Signal (SIAS). Opening this sensing window too early could lead to a spurious DGVSS trip because the degraded voltage sensors

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would be activated during a voltage dip caused by load sequencing, thus creating an apparent degraded voltage on the grid.

Supplement 1 to PCN 429 provides allowable response time values for each degraded voltage relay. The relays for SDVS are given individual response times to maintain consistency within the TS.

Since PCN 429 was submitted, the response time for relay 162T has been reanalyzed. The allowable range for the response time of relay 162T is now 0.85 seconds to 1.65 seconds (1.25 seconds ± 0.4 seconds). Previously this allowable response time had been reported as 1.5 seconds ± 0.15 seconds. Because the longest allowable response time for this relay (1.65 seconds) has not changed, this change has no effect on the overall proposed response time for the DGVSS of 6.14 seconds. This change is discussed in Reference 6 and is reflected in Supplement 1.

Similarly, for the Sustained Degraded Voltage Signal (SDVS), the response time for relay 162D has been reanalyzed from 120 seconds ± 12 seconds to 110 seconds ± 22 seconds. Again, because the longest allowable response time for this relay (132 seconds) has not changed, there is no effect on the overall response time of 134.2 seconds for SDVS. This change is discussed in Reference 6 and is reflected in Supplement 1.

PCN 429 proposed Note 10 to Table 3.3-5 to clarify that the DGVSS response times were measured from initiation of SIAS. The format of the proposed response time requirements in Supplement 1 show this explicitly. Therefore, proposed Note 10 is no longer necessary and is withdrawn by Supplement 1.

The additions to PCN 429 are shown highlighted and the deletions are shown as lined out.

PCNs 401, 405, and 431, (References 2, 3, and 4) also requested changes to portions of TS 3/4.3.2. Both the proposed changes from PCNs 401, 405, and 431 which affect the pages of PCN-429 and the proposed changes of this Supplement to PCN-429 are marked in Enclosure 3. PCN 401 has been approved since the submittal of PCN 429. Therefore, in the proposed pages of Supplement 1 (Enclosure 2) and the pages of Enclosure 3, the changes from PCN 401 appear as existing TSs.

By Reference 5, Edison submitted PCN 299, "Technical Specification Improvement Project (TSIP)." Markups of the proposed TSIP pages, including the proposed changes resulting from this supplement to PCN 429, are shown in Enclosure 4.

The enhanced degraded voltage protection system for Unit 2 is planned for installation during the Unit 2 Cycle 8 refueling outage. The enhanced degraded voltage protection system is already installed, although not currently in use, at San Onofre Unit 3. Edison has currently scheduled replacement of some defective relays on the Unit 3 system. This will require testing of the system before it is declared OPERABLE for use in the plant. Therefore, to avoid the necessity of on-line channel functional testing, Edison requests allowance that implementation of this TS change for Unit 3 be

delayed until Unit 3 Cycle 8 refueling outage close breakers (currently scheduled for September 11, 1995), or within 30 days of issuance of the amendments, whichever is later.

If you would like additional information regarding this Technical Specification change request, please let me know.

Sincerely,

Richard M Bracht

Enclosures

cc: L. J. Callan, Regional Administrator, NRC Region IV
A. B. Beach, Director, Division of Reactor Projects, NRC Region IV
K. E. Perkins, Jr., Director, Walnut Creek Field Office, NRC Region IV
J. A. Sloan, NRC Senior Resident Inspector, San Onofre Units 2 and 3
M. B. Fields, NRC Project Manager, San Onofre Units 2 and 3
H. Kocol, California Department of Health Services

ENCLOSURE 1

References

REFERENCES

1) September 30, 1993, letter from R. M. Rosenblum (Edison) to Document Control Desk (NRC), Subject: Amendment Application Nos. 136 and 120, Change to Technical Specifications 3/4.3.2, "Engineered Safety Features Actuation Systems," San Onofre Nuclear Generating Station, Units 2 and 3

2) April 7, 1992, letter from Harold B. Ray (Edison) to Document Control Desk (NRC), Subject: Amendment Applications 115 and 99, Change to Technical Specifications Tables 3.3-3, 3.3-4, 3.3-5, and 4.3-2, "Engineered Safety Features Actuation Systems," San Onofre Nuclear Generating Station, Units 2 and 3

3) December 30, 1992, letter from Harold B. Ray (Edison) to Document Control Desk (NRC), Subject: Amendment Applications 129 and 113, Changes to Technical Specifications 3/4.3.2 and 3/4.3.3, San Onofre Nuclear Generating Station, Units 2 & 3

4) September 16, 1993, letter from Richard M. Rosenblum (Edison) to Document Control Desk (NRC), Subject: Amendment Applications 134 and 118, Automatic Removal of Low Pressurizer Pressure Trip Bypass, San Onofre Nuclear Generating Station, Units 2 and 3

5) December 30, 1993, letter from R. M. Rosenblum (Edison) to Document Control Desk (NRC), Subject: Proposed Change Number 299, Technical Specification Improvement Project, San Onofre Nuclear Generating Station, Units 2 and 3

6) January 18, 1995, letter from W. C. Marsh (Edison) to Document Control Desk (NRC), Subject: Additional Information for Amendment Application Nos. 136 and 120, "Degraded Grid Voltage" San Onofre Nuclear Generating Station Units 2 and 3

ENCLOSURE 2

SUPPLEMENT 1 TO PCN 429

DEGRADED GRID VOLTAGE

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

Application of SOUTHERN CALIFORNIA EDISON COMPANY, ET AL. for a Class 103 License to Acquire, Possess, and Use a Utilization Facility as Part of Unit 2 of the San Onofre Nuclear Generating Station	)	Docket No. 50-361 Amendment Application No. 136, Supplement 1.

SOUTHERN CALIFORNIA EDISON COMPANY, ET AL. pursuant to 10 CFR 50.90, hereby submit Amendment Application No. 136, Supplement 1.

This amendment application consists of proposed Technical Specification Change No. NPF-10-429, Supplement 1, to Facility Operating License No. NPF-10. Proposed Technical Specification Change NPF-10-429, Supplement 1, will revise Technical Specification 3/4.3.2, "Engineered Safety Features Actuation Systems." This proposed change reflects the planned enhancement to the degraded voltage protection scheme to protect against the recently recognized possibility of sustained degraded grid voltage conditions.

Subscribed on this 2nd day of FEBRUARY, 1995.

Respectfully submitted,

SOUTHERN CALIFORNIA EDISON COMPANY

By: Richard M. Rosenblum
Richard M. Rosenblum
Vice President

State of California
County of Orange
On 2/2/95 before me, BARBARA A. McCARTHY/NOTARY PUBLIC, personally appeared RICHARD M. ROSENBLUM, personally known to me to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

WITNESS my hand and official seal.

Signature Barbara A. McCarthy

OFFICIAL SEAL
BARBARA A. MC CARTHY
Notary Public-California
ORANGE COUNTY
My Commission Expires
March 31, 1995

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

Application of SOUTHERN CALIFORNIA EDISON COMPANY, ET AL. for a Class 103 License to Acquire, Possess, and Use a Utilization Facility as Part of Unit 3 of the San Onofre Nuclear Generating Station	)	Docket No. 50-362 Amendment Application No. 120., Supplement 1.

SOUTHERN CALIFORNIA EDISON COMPANY, ET AL. pursuant to 10 CFR 50.90, hereby submit Amendment Application No. 120, Supplement 1.

This amendment application consists of proposed Technical Specification Change No. NPF-15-429, Supplement 1, to Facility Operating License No. NPF-15. Proposed Technical Specification Change NPF-15-429, Supplement 1, will revise Technical Specification 3/4.3.2, "Engineered Safety Features Actuation Systems." This proposed change reflects the planned enhancement to the degraded voltage protection scheme to protect against the recently recognized possibility of sustained degraded grid voltage conditions.

Subscribed on this 2nd day of FEBRUARY, 1995.

Respectfully submitted,

SOUTHERN CALIFORNIA EDISON COMPANY

By: Richard M. Rosenblum
Richard M. Rosenblum
Vice President

State of California
County of Orange
On 2/2/95 before me, BARBARA A. McCARTHY/NOTARY PUBLIC, personally appeared RICHARD M. ROSENBLUM, personally known to me to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

WITNESS my hand and official seal.

Signature Barbara A. McCarthy

OFFICIAL SEAL
BARBARA A. MC CARTHY
Notary Public-California
ORANGE COUNTY
My Commission Expires
March 31, 1995

DESCRIPTION AND SAFETY ANALYSIS
OF PROPOSED CHANGE NPF-10/15-429, Supplement 1

This is a request to revise Technical Specification (TS) 3/4.3.2, "Engineered Safety Feature Actuation Systems (ESFAS) Instrumentation," Figure 3.3-1 and Tables 3.3-3, 3.3-4, 3.3-5, and 4.3-2 to reflect implementation of the enhanced degraded voltage protection scheme.

Existing Specifications

Unit 2: Attachment "A"
Unit 3: Attachment "B"

Proposed Specifications

Unit 2: Attachment "C"
Unit 3: Attachment "D"

Description

The following changes are proposed for the San Onofre Units 2 and 3 Technical Specifications (TSs):

1. Revise heading of item 7 of Tables 3.3-3, 3.3-4, and 4.3-2, to read "Loss of Power (LOVS, SDVS, or DGVSS)" to reflect that undervoltage protection is now provided through more than one signal.

2. Delete the phrase "and degraded voltage" from item 7a of Tables 3.3-3, 3.3-4, 3.3-5, and 4.3-2 to reflect that degraded voltage protection will be separate from loss of voltage protection.

3. Replace the reference to Figure 3.3-1 with definite voltage and time characteristics in item 7a of Tables 3.3-4 and 3.3-5.

4. Add item 7b, "4.16 kV Emergency Bus Undervoltage (Degraded Voltage), to Tables 3.3-3, 3.3-4, and 4.3-2.

5. Add footnote "d" to Table 3.3-3. This footnote will read, "Applicability for SDVS is Modes 1, 2, 3, and 4 when the diesel generator circuit breaker is open."

6. Add item 7b, "Degraded Voltage," to Table 3.3-5, to provide response times for the Sustained Degraded Voltage Signal and the Degraded Grid Voltage with SIAS Signal.

7. Add Notes 9 ~~and 10~~ to Table 3.3-5. Note 9 clarifies that the 1.05 second response time for a Loss of Voltage Signal is for a step voltage change from nominal bus voltage to 0.0 volts. ~~Note 10 clarifies that the response time for the Degraded Grid Voltage with SIAS Signal is measured from initiation of a SIAS.~~

8. Delete item 4 of Table 3.3-4, "Table Notation," to reflect that Figure 3.3-1 is being deleted.

9. Delete Figure 3.3-1, "Degraded Bus Voltage Trip Setting."

Background

With the shutdown of Unit 1, Southern California Edison (SCE) performed a new grid stability study to confirm that 218 kV will be maintained at the San Onofre Nuclear Generating Station (SONGS) 230 kV switchyard under all ~~required~~ postulated scenarios. SCE has determined that 218 kV will be maintained under all conditions with the following exception:

1) only one SONGS unit is on line, and

2) a major transmission line or tower is lost, and

3) SCE system load exceeds specified thresholds (typical of system loading on a weekday summer afternoon)

Should a subsequent trip of the operating unit occur, the voltage at the switchyard could drop below the minimum analyzed value of 218 kV. SCE has implemented procedure changes as a short term compensatory action to mitigate the consequences of low switchyard voltage. These procedures require the SCE Energy Control Center Operator to notify the San Onofre Control Room whenever the three conditions stated above exist. The San Onofre Control Room Operator would then declare the offsite source INOPERABLE and enter the appropriate action statement. The Class 1E buses in the operating unit will then be manually transferred from their Reserve Auxiliary Transformer to the Unit Auxiliary Transformer. Because the Unit Auxiliary Transformer will be tripped on a Unit trip, a Loss of Voltage Signal (LOVS) will be generated and the Class 1E buses will shed their loads and automatically transfer to their respective Emergency Diesel Generators (EDGs).

Although these scenarios will still require operator action, as a long term measure to ensure that adequate voltage is maintained at the Class 1E buses at all voltage levels ~~under the conditions stated above~~, SCE plans to enhance the existing degraded voltage protection scheme to provide more reliable protection against a degraded grid. This enhancement will also transfer each 4.16 kV Class 1E bus directly to the standby power source when a loss of voltage or degraded voltage condition exists concurrent with a Safety Injection Actuation Signal (SIAS). This eliminates the time delay inherent in the existing scheme wherein the logic first seeks the alternate preferred power source before transferring the buses to the standby power source. This enhancement requires installation of new relays to perform the degraded voltage trip function.

This proposed TS change is being submitted to reflect the new undervoltage protection scheme.

Existing Design

The power sources to the Train A Class 1E 4.16 kV buses for SONGS Units 2 and 3 are provided in Figure 2. Train B has the same configuration.

The existing undervoltage trip channels are provided to detect a loss of voltage at the Class 1E 4.16 kV buses. In addition, this scheme also provides protection to the onsite power system during sustained degraded voltage conditions. This loss of voltage and degraded voltage protection is currently provided by a single set of induction disc-type relays with an inverse-time characteristic. The time-voltage characteristic curve of the relay is shown in TS Figure 3.3-1, "Degraded Bus Voltage Trip Setting." The relay setpoint is 3675V, (88.3% of 4.16 kV). If a complete loss of voltage occurs, the scheme will initiate a Loss of Voltage Signal (LOVS) after 1 second. For a degraded voltage condition, the scheme initiates a delayed LOVS. The LOVS actuation time would be dependent upon the severity of the degraded voltage condition at the Class 1E 4.16 kV bus. This design was approved in the NRC Safety Evaluation Report (SER) dated February 6, 1981.

For both types of undervoltage conditions, the LOVS first attempts to transfer the 4.16 kV Class 1E buses to the alternate preferred power source through the cross-tie breaker to the companion Unit at the 4.16 kV level. Upon receipt of the LOVS, the auxiliary relays associated with the undervoltage protection scheme will 1) trip the associated 4.16 kV Class 1E bus source breaker and 2) send a start signal to the associated diesel generator. After the residual voltage at the 4.16 kV Class 1E bus has decayed to approximately 30%, the cross-tie breakers close, switching the bus to the alternate preferred power source. Within 4 seconds after the LOVS is initiated, if the connection to the cross-tie is unsuccessful, all loads connected to the 4.16 kV Class 1E bus are shed except the 480V Class 1E load center, so as to limit startup in-rush currents. The bus is then connected to the diesel generator within 10 seconds following the LOVS.

10CFR50, Appendix A, General Design Criterion (GDC) 17 requires that two physically independent connections to the offsite transmission network be available. One of these two connections must be available within a few seconds following a Loss of Coolant Accident (LOCA). Because the existing design for Units 2 and 3 provides two immediate access circuits from the preferred power system to the onsite emergency buses, the requirements of Criterion 17 are exceeded. This is documented in the SER.

With the existing design, if a degraded voltage condition occurs following a Safety Injection Actuation Signal (SIAS), the unit experiencing a trip will attempt to transfer its 4.16 kV Class 1E buses through the cross-tie to the companion unit. However, because the switchyard, which is common to both units, could be in a degraded condition, the alternate preferred power source would also be degraded. Following an additional 4 second delay, the unit would then transfer its 4.16 kV Class 1E buses to the diesel generators, which would have started on receipt of the SIAS. Under this scenario it would be preferable to transfer the 4.16 kV Class 1E buses directly to the standby power source. This direct transfer would eliminate the unnecessary delays that would exist if the buses were to first attempt to transfer to the alternate preferred power source, and then transfer to the standby power source.

Planned Design

In order to provide more reliable protection against a degraded grid and also to allow the 4.16 kV Class 1E buses of the affected unit to go directly to the standby power source in case of a SIAS with a loss of voltage or degraded voltage condition, SCE is planning to modify the existing LOVS logic and install a separate degraded voltage protection scheme. The logic diagram for the new configuration is shown in Figure 1.

The existing LOVS trip function without SIAS will be unaffected by this change. Relays 127F1, 127F2, 127F3, and 127F4 will still provide the LOVS trip for a complete loss of voltage. This signal will still connect the affected unit to the alternate preferred power source if it is available, and then to the standby power source if the alternate preferred power source is unavailable. However, with the new configuration, LOVS with SIAS will transfer the 4.16 kV Class 1E bus directly to the standby power source.

The time-voltage characteristic of the new LOVS trip will be identical to the existing inverse time delay. The proposed TS time-voltage setting requirements are bounding values which will replace the curve in Figure 3.3-1.

The degraded voltage condition will be detected by new definite time delay solid state relays 127D1, 127D2, 127D3, and 127D4. These relays will be connected to the same set of bus potential transformers as the existing relays 127F1, 127F2, 127F3, and 127F4. The new 127D relays are set at 4228 V, with a definite time delay setting of 2.0 seconds. This voltage setting will assure adequate voltage at the terminals of all engineered safety features equipment based on a switchyard minimum allowable voltage of 218 kV. The voltage setting of 4228 V is below the voltage normally expected at the 4.16 kV level (4360 V or above) with switchyard voltage of 230 kV. Therefore, under normal operating conditions a spurious actuation is not expected.

The new relays, in conjunction with the timing relays 162S1 and 162T1, 162S2 and 162T2, 162S3 and 162T3, and 162S4 and 162T4, will provide the Degraded Grid Voltage with SIAS Signal (DGVSS). The voltage and time delay settings are such that a sensing window will open with a time delay of ~~approximately 4.3~~ 4.3 ± 0.19 seconds after initiation of SIAS. This window will remain open for ~~approximately 1.5~~ 1.25 ± 0.40 seconds, during which time a DGVSS will be initiated if a degraded voltage condition is established. Upon initiation of the DGVSS, the 4.16 kV Class 1E buses will be transferred directly to the standby power source rather than to the alternate preferred power source, which is likely to also be experiencing a degraded voltage.

The 4.3 second time delay for this signal is initiated by SIAS, and is independent of the time delay chosen for sustained degraded voltage protection. This time delay is chosen to 1) ride through the voltage transients and 2) to ensure that adequate voltage is available on the Class 1E bus during post-accident emergency safety feature load sequencing. Following acceleration of the first load group during post-accident load sequencing, the degraded voltage scheme will have ~~an approximately 1.5~~ 1.25 ± 0.40 second window in which to sense the voltage on the 4.16 kV Class 1E bus. If the voltage is below the

degraded voltage setpoint, the Class 1E bus will separate from the preferred power source and transfer to the standby power source.

The same 127D1, 127D2, 127D3, and 127D4 relays are also used for sustained degraded voltage protection when the diesel generator is not supplying the 4.16 kV Class 1E bus. A Sustained Degraded Voltage Signal (SDVS) is generated with the associated timing relays 162D1, 162D2, 162D3, and 162D4 within ~~135~~ 134.2 seconds so that permanently connected class 1E equipment will not be damaged. If a SIAS signal is present, SDVS will transfer the 4.16 kV Class 1E buses directly to the standby power source. If a SIAS signal is not present, SDVS will transfer the 4.16 kV Class 1E buses to the alternate preferred power source. If the alternate source is not available, the buses will transfer to the standby power source.

This new configuration provides two independent connections from the offsite transmission network to the onsite emergency buses. Because only one of these connections provides immediate access to the offsite transmission network, this configuration no longer exceeds the requirements of GDC 17, as does the existing configuration. However, this configuration meets the requirement in that one of the two offsite circuits is immediately available following a LOCA.

The 127D1, 127D2, 127D3, and 127D4 relays are also used for annunciation of a sustained degraded voltage condition at the 4.16 kV Class 1E bus within approximately 7 seconds. The existing 127L undervoltage annunciation will be deleted.

A two-out-of-four actuation logic similar to that of the existing configuration protects against spurious actuation.

Standard Review Plan, section 8.3, Branch Technical Position PSB-1, "Adequacy of Station Electrical Distribution System Voltages," describes the basis for acceptability of an undervoltage trip function. In addition to the ability to detect a loss of offsite power at the Class 1E bus, a second level of undervoltage should have the ability to separate the Class 1E distribution system from the offsite power system following a SIAS, to alert the control room of a degraded condition, and to have the ability to detect a sustained degraded condition. The new undervoltage configuration meets the intent of these guidelines.

This planned configuration ensures that adequate voltage is maintained at the Class 1E 4.16 kV buses for all cases except one. With heavy system loading on the offsite transmission grid and only one SONGS unit on-line during an outage of the Imperial Valley-Miguel 500 kV line and the Imperial Valley-Rosita 230 kV line, followed by a trip of the operating SONGS unit, the voltage at the SONGS 230 kV switchyard will not return to a stable level. Instead, the grid voltage, will oscillate in such a manner that the relays may not detect an undervoltage condition. For this condition only~~, pending further evaluation~~, SCE plans to continue using the procedures that are currently in place as short term compensatory actions. ~~SCE and San Diego Gas and Electric (SDG&E) are evaluating grid improvement which may eliminate this condition.~~ For the cases which are protected by the planned enhancement, Edison will still declare the offsite power sources inoperable whenever the pre-trip conditions exist.

Discussion

This proposed change separates the loss of voltage channel from the degraded voltage channel in item 7a of TS Tables 3.3-3, 3.3-4, 3.3-5, and 4.3-2. The new channel is added as item 7b to the Tables. These tables outline instrumentation, trip values, response time, and surveillance requirements for the Emergency Safety Features Actuation Systems (ESFAS) channels, including the loss of voltage and degraded voltage channels.

The new entry in Table 3.3-3 for the degraded voltage trip requires a total of 4 channels per bus, with a minimum of two channels per bus to trip and a minimum of 3 channels OPERABLE per bus. The new degraded voltage function is required to be OPERABLE in Modes 1 through 4. With one less than the total number of channels OPERABLE, power operation may continue provided the INOPERABLE channel is bypassed or placed in a tripped condition within 1 hour. With the number of channels OPERABLE one less than the minimum required, power operation may continue provided that one of the INOPERABLE channels is bypassed and the other is placed in the tripped condition. These requirements are identical to the instrumentation requirements for the existing LOVS channel, and therefore provide the same level of assurance of operability as the existing requirements for the existing undervoltage scheme.

Footnote d is added to Table 3.3-3 to reflect that SDVS is not required to be OPERABLE when the diesel generator is in parallel with the offsite source or is supplying the 4.16 kV Class 1E bus. This is because an undervoltage trip for a degraded voltage condition is not desirable when the standby power source is already in use. LOVS will remain in service when the diesel generator is in parallel with the offsite source or is supplying the 4.16 kV Class 1E buses. LOVS remains OPERABLE in order to detect more significant undervoltage conditions. DGVSS also remains OPERABLE to detect degraded voltage on the offsite sources following a LOCA.

When the diesel generator is in parallel with the offsite source for surveillance testing, a degraded voltage condition will cause control room annunciation as discussed above. After the alarm the emergency diesel generator and the offsite power would be separated. If a sustained degraded voltage condition is encountered while only the diesel generator is supplying the 4.16 kV Class 1E bus, control room annunciation occurs, and action may be taken to return to the offsite sources, if available.

The proposed trip value of 3675 V for the loss of voltage signal is identical to the bounding value for the range of voltage settings in the existing Figure 3.3-1. The proposed allowable value range is based on the proposed setting of 3675 V plus or minus a tolerance of 121 V (3.3%) to account for total loop uncertainty.

The proposed trip value of 4228 V for the degraded voltage signal will assure adequate voltage at the terminals of all engineered safety features equipment based on a switchyard minimum allowable voltage of 218 kV. The voltage setting of 4228 V is below the voltage normally expected at the 4.16 kV level (4360 V or above) with switchyard voltage of 230 kV. Therefore, under normal operating conditions a spurious actuation is not expected. The allowable value range for

the degraded voltage trip is based on the proposed trip setting of 4228 V, plus or minus an allowance of 47 V.

The response time requirements for the new degraded voltage protection scheme will ensure that in a sustained degraded voltage condition, an SDVS will be generated within ~~135~~134.2 seconds (based on a time delay of 2.0 +/- 0.2 seconds for the undervoltage detection relays plus ~~120 +/- 12.0~~110 ± 22 seconds for the degraded voltage timing relays) when voltage at the 4.16 kV Class 1E bus is less than 4228 V. The ~~proposed~~overall response time ~~requirement~~ of ~~135~~134.2 seconds ensures that permanently connected Class 1E equipment will not be damaged.

The ~~proposed~~ overall response time ~~requirement~~ of 6.14 seconds for Degraded Grid Voltage with SIAS will also ensure that if a degraded voltage condition exists with SIAS, the 4.16 kV Class 1E bus will transfer directly to the standby power source within 10 seconds. The response time ~~requirement~~ of 6.14 seconds is based on the requirement for a 4.3 +/- 0.19 second delay between initiation of SIAS and initiation of the degraded voltage sensing window, plus the requirement for a ~~1.5 +/- 0.15~~1.25 ± 0.4 second duration of the degraded voltage sensing window.

The 1.05 second response time for the LOVS signal is based on a step change from nominal bus voltage to 0.0 volts. ~~The 6.14 second response time for the DGVSS is measured from initiation of the SIAS, not detection of degraded voltage.~~ Notes 9 ~~and 10 are~~is added to Table 3.3-5 to clarify ~~these~~this stipulations.

The Surveillance Requirements for the new degraded voltage trip require a channel check once every 12 hours, and a channel calibration and functional test every refueling interval. These requirements must be met to allow operation in Modes 1 through 4. These Surveillance Requirements are identical to those for the existing loss of voltage trip function.

Item 4 of the "Table Notation" of TS Table 3.3-4 is deleted to reflect that Figure 3.3-1 is being deleted. Figure 3.3-1 is deleted to reflect that the degraded voltage function is no longer associated with the loss of voltage relays. The degraded voltage trip will have a definite voltage setting and time delay. The loss of voltage trip will still have inverse time delay characteristics but will have a voltage setting of 3675 V, which is identical to the existing voltage setting from Figure 3.3-1, and a time delay of 1.05 seconds for a step loss of voltage from nominal bus voltage to 0.0 volts. Therefore, the curve in Figure 3.3-1 is no longer necessary.

Safety Analysis

The proposed change described above shall be deemed to involve a significant hazards consideration if there is a positive finding in any one of the following areas:

1: Will operation of the facility in accordance with this proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No

This proposed change reflects separation of the loss of voltage and degraded voltage function into separate Emergency Safety Features Actuation Systems (ESFAS) schemes. This configuration meets the intent of Standard Review Plan, Section 8.3, PSB-1. Instrumentation, trip setting, response time, and surveillance requirements are added for the new schemes. The new configuration accomplishes both the existing loss of voltage and degraded voltage trip functions.

In addition, for loss of voltage and degraded voltage conditions following a Safety Injection Actuation Signal (SIAS), the affected unit is connected to the standby power source without first attempting to connect to the alternate preferred power source through the cross-tie to the companion unit, thus ensuring that power is available within 10 seconds following the SIAS. This is accomplished by the new trip functions Loss of Voltage Signal (LOVS) with SIAS and Degraded Grid Voltage with SIAS Signal (DGVSS).

While automatic transfer to the alternate preferred power source is normally desirable during undervoltage conditions, the proposed configuration is necessary because following the SIAS there is the possibility of the alternate preferred power source being in a degraded condition, resulting in a delay before power becomes available to safety-related equipment. The proposed configuration assures that this delay will not occur and power is available to safety-related equipment within the time allowed by the safety analyses. Therefore, there is no significant increase in the probability or consequences of any accident previously evaluated.

2: Will operation of the facility in accordance with this proposed change create the possibility of a new or different type of accident from any previously evaluated?

Response: No

This proposed change reflects separation of the loss of voltage and degraded voltage function into separate (ESFAS) relays. The proposed TSs for the new configuration maintain the same instrumentation and surveillance requirements as the existing TS with the exception of the applicability of the SDVS OPERABILITY requirements. SDVS is not required to be OPERABLE when the emergency diesel generator (EDG) is parallel to the offsite source or is supplying the 4.16 kV Class 1E bus because an undervoltage trip for a degraded condition is not desirable when the standby power source is already in use. The LOVS and DGVSS will remain OPERABLE. Control room annunciation of bus low voltage is provided to cause operator action to separate the EDG and the offsite power source.

The proposed voltage setting of 3675 V for the loss of voltage trip is identical to the bounding value of the range of voltage settings in the existing Figure 3.3-1. The proposed allowable value range of

3554 V to 3796 V for the loss of voltage trip is based on the existing trip setting plus or minus a 3.3% tolerance. The proposed trip value of 4228 V for the degraded voltage signal provides assurance that adequate voltage is seen at the terminals of all safety-related equipment. The allowable value range of 4181 V to 4275 V for the degraded voltage trip is based on the 4228 V trip value plus or minus a 47 V tolerance.

The proposed response time for the loss of voltage signal is a bounding value to replace the time voltage curve of figure 3.3-1, which is being deleted by this proposed change. For a complete loss of voltage (0.0 V), a loss of voltage signal will be generated within 1.05 seconds. The ~~proposed~~ overall response time ~~requirement~~ for degraded voltage of ~~135~~ 134.2 seconds ensures that permanently connected Class 1E equipment will not be damaged. The overall response time of 6.14 seconds for the DGVSS will also ensure that if a degraded voltage condition exists with SIAS, the 4.16 kV Class 1E bus will transfer directly to the standby power mode within 10 seconds. The proposed Note~~s~~ 9 ~~and 10~~ to Table 3.3-5 ~~are~~ is a clarification~~s~~ only.

The two-out-of-four actuation logic provides protection against spurious actuation. The additional functions of DGVSS, LOVS with SIAS and Sustained Degraded Voltage Signal (SDVS) with SIAS provide a faster transfer to standby power under SIAS conditions. The new configuration meets the requirement of General Design Criterion 17 in that one offsite circuit will be immediately available following a Loss of Coolant Accident. Therefore, there is no possibility of a new or different type of accident than any previously evaluated.

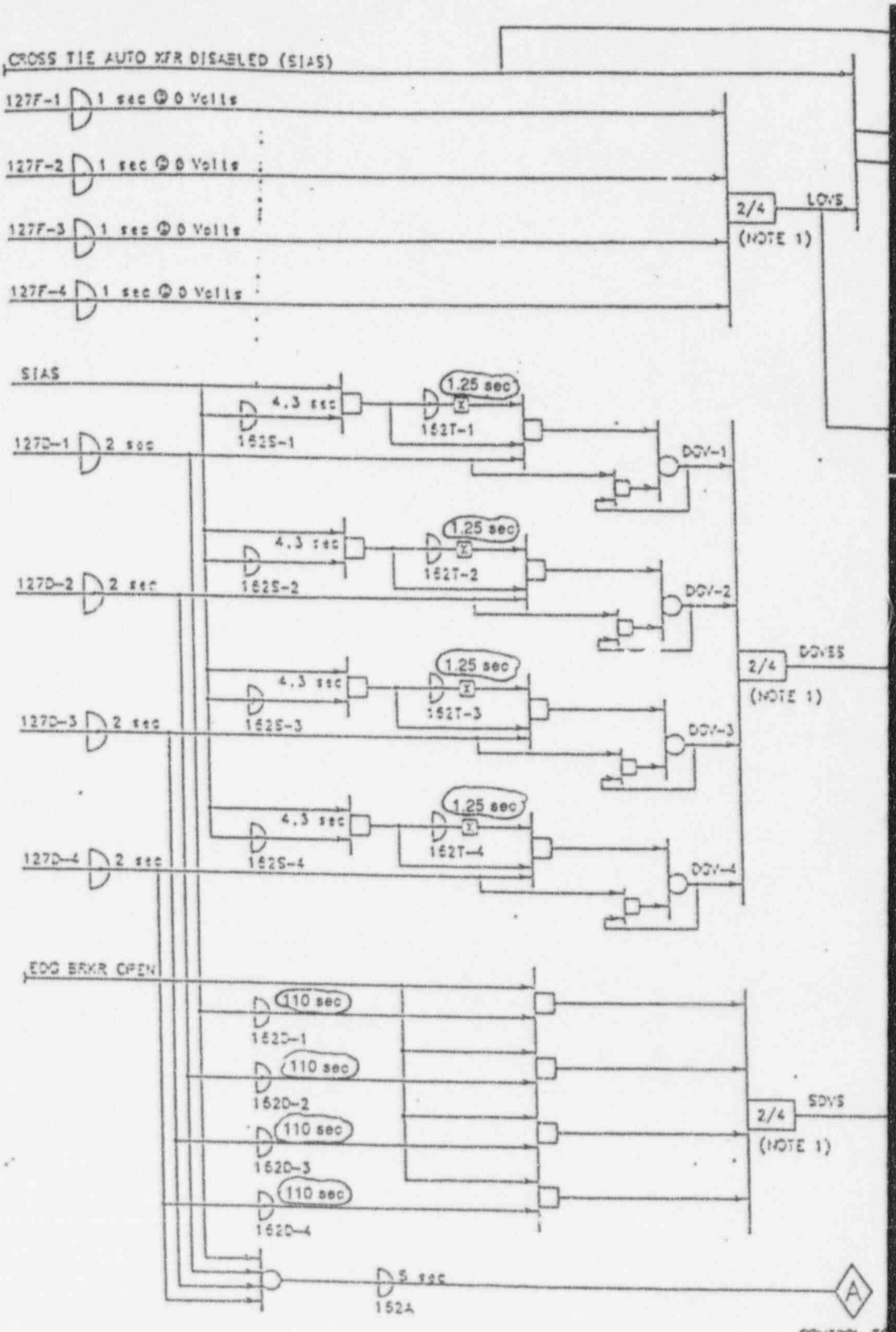
3: Will operation of the facility according to this proposed change involve a significant reduction in a margin of safety?

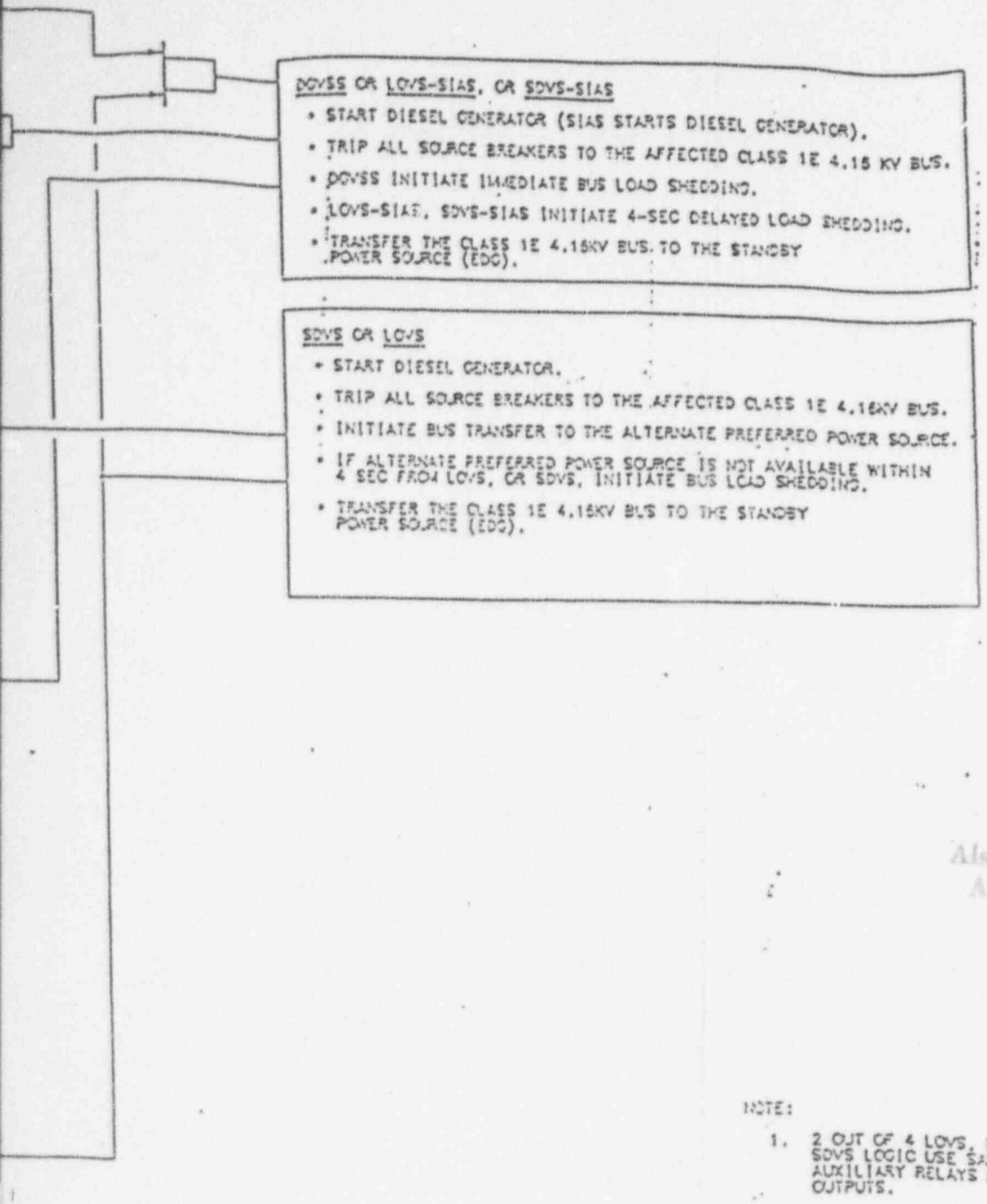
Response: No

The DGVSS, LOVS with SIAS and SDVS with SIAS will provide a faster and more reliable transfer to standby power than the existing configuration. The proposed TS changes provide instrumentation, trip setting, response time, and surveillance requirements consistent with the existing design and the appropriate regulatory documents.

Safety and Significant Hazards Determination

Based on the above Safety Analysis, it is concluded that: 1) the proposed change does not constitute a significant hazards consideration as defined by 10CFR50.92; 2) there is reasonable assurance that the health and safety of the public will not be endangered by the proposed change; and 3) this action will not result in a condition which significantly alters the impact of the station on the environment as described in the NRC Final Environmental Statement.


CROSS TIE AUTO XFR DISABLED (SIAS)
127F-1
1 sec @ 0 Volts
127F-2
1 sec @ 0 Volts
127F-3
1 sec @ 0 Volts
127F-4
1 sec @ 0 Volts
2/4
(NOTE 1)
LOVS
SIAS
4.3 sec
1.25 sec
162S-1
162T-1
127D-1
2 sec
DOV-1
162S-2
162T-2
127D-2
DOV-2
DOVES
162S-3
162T-3
127D-3
DOV-3
162S-4
162T-4
127D-4
DOV-4
EDG BRKR OPEN
110 sec
162D-1
162D-2
162D-3
162D-4
SDVS
5 sec
152A
A
CONTROL RO
ANNUNCIAT

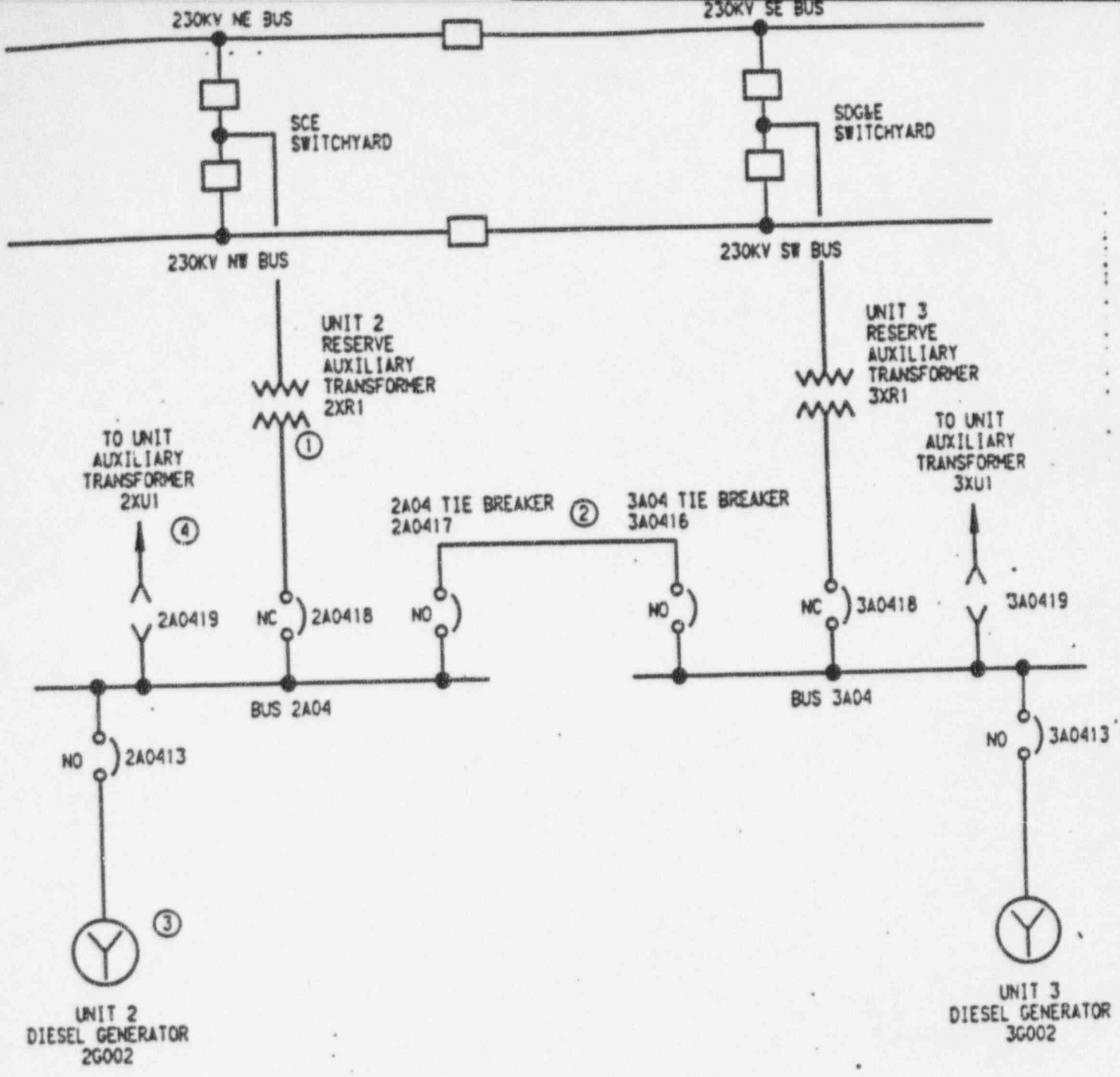


NOTE:

1. 2 OUT OF 4 LOVS, DOVSS AND SDVS LOGIC USE SAME SET OF AUXILIARY RELAYS FOR CONTACT OUTPUTS.

9502060089-01

SONGS 2 & 3	
SAN ONOFRE NUCLEAR GENERATING STATION	
LOGIC DIAGRAM CLASS 1E 4.16KV BUS UNDERVOLTAGE DETECTION	
SCE	SOUTHERN CALIFORNIA EDISON
	FIGURE 1



① NORMAL PREFERRED POWER SOURCE.

② ALTERNATE PREFERRED POWER SOURCE.

③ STANDBY POWER SOURCE.

④ THIRD PREFERRED POWER SOURCE.

UNITS 2 & 3

SAN ONOFRE NUCLEAR GENERATING STATION

ONE LINE DIAGRAM OF LOAD GROUP A POWER SOURCES

SOUTHERN CALIFORNIA EDISON

FIGURE 2