DESCRIPTION OF PROPOSED CHANGE AND SAFETY ANALYSIS
PROPOSED CHANGE NO. 91 TO THE TECHNICAL SPECIFICATIONS
PROVISIONAL OPERATING LICENSE DPR-13

This is a request to revise Appendix A Technical Specification 3.7, AUXILIARY ELECTRICAL SUPPLY. This revision provides a description of the power sources to the new San Onofre switchyard.

Reason for Proposed Change

The existing 220 kV and 138 kV switchyard at San Onofre, designated as the Site A switchyard, will be replaced with the new 220 kV switchyard being constructed in conjunction with San Onofre Units 2&3. A description of the new switchyard design is included in Chapter 8 of the San Onofre Units 2&3 FSAR. As a result of the replacement of the Site A switchyard, it has been determined that the Basis for Technical Specification 3.7 should be changed to provide a correct description of the high voltage transmission lines which will be interconnected to the new switchyard. In addition, in order to prevent the need to modify this Basis when future lines are added, the wording of the Basis has been modified to specify the minimum lines available.

Existing Specification

The Basis for Technical Specification 3.7 currently reads, in part:

> "The station is connected electrically to the Southern California Edison Company and San Diego Gas & Electric Company systems via either of two independent high voltage transmission routes composed of two Southern California Edison Company high voltage lines and of four San Diego Gas & Electric Company high voltage lines.
>
> Of the two Southern California Edison Company lines, either one can serve as a source of power to the station auxiliaries at any time. Similarly, any of the four San Diego Gas & Electric Company lines can serve as a source of power to the station auxiliaries at any time. By specifying two out of these six lines, redundancy of sources of auxiliary power for an orderly shutdown is provided."

Proposed Specification

The Basis for Technical Specification 3.7 would be revised to read, in part:

> "The station is connected electrically to the Southern California Edison Company and San Diego Gas & Electric Company systems via either of two independent high voltage transmission routes composed of a minimum of four Southern California Edison Company high voltage lines and of a minimum of three San Diego Gas & Electric Company high voltage lines.

8004080504

> Of the four Southern California Edison Company lines, any one can serve as a source of power to the station auxiliaries at any time. Similarly, any of the three San Diego Gas & Electric Company lines can serve as a source of power to the station auxiliaries at any time. By specifying two out of these seven lines, redundancy of sources of auxiliary power for an orderly shutdown is provided."

The balance of the basis for Technical Specification 3.7 would remain as constituted in Appendix A to Provisional Operating License No. DPR-13.

Safety Analysis

A review of the change-over to the new switchyard has been conducted in accordance with the requirements of 10CFR50.59. This review has determined that the new switchyard design is generally comparable to the Site A design since the modifications are intended to replace existing equipment with new equipment performing a similar function. However, a comparison of the design of the two switchyards identified three areas where there existed a significant difference and an evaluation was performed to determine whether these changes involved an unreviewed safety question as defined in 10CFR50.59(2). The results of this evaluation are provided below.

I. Identified Differences in Switchyard Design

A. Improved Seismic Design Criteria

The seismic design criteria for the new switchyard has been determined to be more conservative than that used for the existing Site A switchyard. As indicated in Enclosure 1 to this Proposed Change, the seismic loading used in the analysis for the new switchyard is at least 40% more severe than that used for Site A.

B. Use of a Common Dead-End Structure

The new switchyard makes use of a single, three bay, line dead-end structure to support the powerlines that provide the offsite power for San Onofre Unit 1 whereas the existing design uses separate dead-end structures. It should be noted that the reason for the use of two separate structures in the existing switchyard is due to the fact that at the time it was constructed, the San Onfore Nuclear Generating Station consisted of a single unit serving two utility grids at different voltages. It was, therefore, desirable and practical to have completely separate switchyards to service the two grids so the two dead-end structures were erected for convenience.

C. Station to Switchyard Bus Intertie

The existing Site A switchyard is arranged such that San Onofre Unit 1 can be interconnected to four separate isolatable switchyard buses. In the new switchyard this capability will be reduced to two separate isolatable switchyard buses since both sets of power lines to the unit will be interconnected to the same side of the switchyard bus breakers.

D. Control of Line Breakers from Control Room

The existing Site A switchyard 220 kV transmission line circuit breakers can be remotely operated from the San Onofre Unit 1 control room but not the 138 kV transmission line circuit breakers which are operated remotely from the San Diego Gas and Electric Company's dispatch office. The circuit breakers for all transmission lines in the new switchyard will be remotely operated from the San Onofre Units 2&3 control room.

II. Review in Accordance with 10CFR50.59(2)

A. Probability of Occurrence of the Loss of Offsite Power Accident

The applicable definition of an unreviewed safety question indicates that one exists "if the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis report may be increased". Since the Loss of Offsite Power Accident was analyzed in the Final Safety Analysis for San Onofre Unit 1, the probability of occurrence for this event must be considered. Initially, it may appear that by the use of one structure, instead of two, a single event would lead to loss of offsite power and thereby increase the probability of occurrence of that event. A more detailed review indicates that this is not necessarily true. These details are discussed as follows:

1. The probability of the loss of offsite power is composed of several partial contributing probabilities. Based on a statistical analysis of all SCE 220 kV transmission system outage data recorded since 1962, it was concluded that the major causes of a forced outage due to faults at line terminals were incorrect relay operation and fire. The structural failure of a line dead-end structure within a switchyard or substation was never observed. It can, therefore, be concluded that the probability of occurrence for the structural failure of a line dead-end structure is a minor contributor to the total probability for the Loss of Offsite Power Accident.

2. The forced deenergization of a switchyard bus due to 220 kV system or bus faults was also determined to be a minor contributor to the probability for loss of offsite power. The simultaneous loss due to system or bus faults of two buses within a switchyard has never been observed so that this occurrence is of course an even smaller contributor. It can be concluded that the additional capabilities provided by the availability of more than two buses at a switchyard would only provide additional benefit during highly improbable accident conditions when more than two buses would deenergize due to system or bus faults.

   Periodic maintenance on the switchyard buses requires that they be deenergized. During these maintenance periods it would be desirable to have the additional capability to interconnect to more than two switchyard buses in case the low probability (minor contributor) loss of the non-maintenance bus did occur. However, it is considered that the reduction in the number of buses does not significantly impact the overall probability since scheduled maintenance periods are very infrequent and of short duration in comparison with the periods of power operation.

3. The new switchyard components, including the line dead-end structures, have been designed to withstand seismic loadings at least 40% greater than the components of Site A. The more severe seismic design basis for the components of the new switchyard, alone, reduces the likelihood of their failure, particularly failure due to earthquakes.

Since the failure of the dead-end structure and the simultaneous loss of two switchyard buses are minor contributors to the overall probability for loss of offsite power, and since more severe seismic design standards have been met, it is concluded that, despite the changes in the new switchyard design, the interconnection of the new switchyard to the San Onofre Unit 1 onsite electrical distribution system will not significantly impact the probability of occurrence of the Loss of Offsite Power Accident analyzed in the Final Safety Analysis.

B. Impact of Change in Control of Line Breakers

A review of the possible impact which the change in remote operation of the switchyard line circuit breakers could have on the safe operation of the station has been conducted. The protective function of these breakers has not changed. Each circuit is provided with high speed primary relaying for rapid isolation of faulty components. A second set of backup relays is provided on each circuit. In addition, bus differential relays are provided for each bus and breaker failure backup protection is arranged to clear a bus of all sources of power in the event one of the circuit breakers connected to the bus fails to clear a fault.

Based on the fact that protective function of the line circuit breaker has not changed, the isolation of faulted line is still automatic and even though remote operation of the breakers is not available from Unit 1, the availability of offsite power during these accident conditions will not be affected.

With respect to the function of restoring a line to service, this function is dependent on coordination of the breaker operation between the two control rooms and the system dispatcher. The location of the remote controls for the breakers does not affect the correct functioning of the system. Instrumentation, indicators and alarms are provided in both control rooms to facilitate continuous surveillance of the switchyard status.

Since the availability of offsite power during accident conditions is not affected and the location of the remote controls is not important for normal switchyard operation, it is concluded that locating the remote operation controls for the new switchyard transmission line circuit breakers in the Units 2&3 control room will not impact the safe operation of the station.

III. Additional Justification for the Acceptability of the Switchyard Design

Though the findings indicated above provide sufficient justification for the determination that an unreviewed safety question is not created by the change-over to the new switchyard, additional justification for the acceptability of the design is provided by the following:

A. Compliance with Applicable Criteria for Power Systems

A discussion of the manner in which the new switchyard design complies with existing design criteria is presented in Enclosure 2. The conclusions of Enclosure 2 are:

1. The design of the San Onofre switchyard complies with all applicable criteria regarding physical and electrical separation of power sources.

2. The design of the dead-end structure, as part of the common switchyard conforms with GDC-17.

3. The switchyard is designed for appropriately conservative operating, environmental and accident conditions.

4. Complete loss of offsite power results in the actuation of the diesel generators as the source of onsite electric power for the station.

The information included in Enclosure 2 was presented to members of the NRC staff during a meeting in Bethesda, Maryland on October 25, 1979. The NRC staff's determination, as stated in their summary of the meeting which was transmitted to us by letter dated November 18, 1979, was as follows:

> "SCE representatives reviewed the adequacy of the new switchyard for San Onofre 1, 2 and 3 (Attachment 5*) when compared with applicable design criteria. Based on this information the NRC staff concluded that the common switchyard for San Onofre Units 1, 2 and 3 satisfies the requirements of all applicable design criteria and San Onofre Unit 1 may be interconnected to the new switchyard as planned during the refueling outage currently scheduled for March-April 1980."

This determination of the NRC staff reinforces SCE's confidence that all requirements have been met.

B. Acceptability of Consequences of Loss of Offsite Power

As indicated in item III.A. above, the design of the switchyard conforms with the requirements of General Design Criterion 17 of Appendix A to 10CFR50. As required by this criterion, the onsite diesel generators at San Onofre Unit 1 are provided with "sufficient capacity and capability to assure that (1) specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operational occurrences and (2) the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents". By providing this additional source of onsite power, the concept of defense in depth is implemented in relation to the power sources to safety-related systems and equipment. Therefore, independent of the probability of occurrence of the Loss of Offsite Power Accident, the consequences of the accident will remain acceptable since power supply to the safety-related systems and equipment will be available from the onsite diesel generators.

IV. Conclusion

Based upon the analysis provided above, it is concluded that (1) the proposed change does not involve an unreviewed safety question as defined in 10CFR50.59, nor does it present significant hazards considerations not described or implicit in the Final Safety Analysis, and (2) there is reasonable assurance that the health and safety of the public will not be endangered by the proposed change.

*Enclosure 2 of this document.

ENCLOSURE 1

COMPARISON OF SEISMIC DESIGN CRITERIA
HIGH VOLTAGE SWITCHYARD
SAN ONOFRE NUCLEAR GENERATING STATION

I. Site A Switchyard Seismic Design Criteria

The existing Site A switchyard was designed to the seismic criteria as specified in the San Onofre Unit 1 Final Safety Analysis (FSA). As indicated in Table 9.5 of the Unit 1 FSA, the high voltage switchyard (HVS) structures are determined to be of Seismic Category A. As such, these structures were designed to the following criteria (Section 9.2.2 of the Unit 1 FSA):

9.2.2.2 Primary steady state stresses when combined with seismic stresses shall be maintained within the allowable working stress range based upon the response to a ground motion having a maximum acceleration of 0.25g.

9.2.2.3 Combined stresses, including seismic stresses based upon the response to a ground acceleration of twice the above value (0.5g), are such that the function of the component, system or structure is not impaired, and a safe and orderly shutdown of the plant is assured.

9.2.2.4 The analysis of the dynamic loads imparted by the maximum ground acceleration resulting from an earthquake was performed using the response spectrum approach. This analysis was applied for all components and structures considering their natural periods in using appropriate damping factors.

II. New Switchyard Seismic Design Criteria

The new switchyard, which is under construction in conjunction with San Onofre Units 2&3, is designed to the seismic criteria as specified in the San Onofre Units 2&3 Final Safety Analysis Report (FSAR). As indicated in Table 3.2.1 and Section 3.2.1-1 of the Units 2&3 FSAR, the HVS is considered to be Seismic Category II. Structures, components and systems within Seismic Category II are those that are not Seismic Category I, but whose limited damage could interrupt generation of power.

Class II structures, systems and equipment are designed in accordance with the applicant's standard practice. The design of structures, systems and equipment follow special requirements where the applicants desire a level of conservatism above normal applicable codes. Most structures, systems and equipment in this classification are designed using an equivalent static seismic load of 0.20g horizontally and 0.13g vertically, applied simultaneously, with nc increase in allowable stress loads. However, under no circumstances are structures, systems and equipment designed less restrictively than that required by the Uniform Building Code, 1970 edition.

In the case of the HVS structures systems and equipment, special requirements that the Company applies to system HVS were utilized. For the HVS structures, this means a three dimensional (3-D) response spectrum analysis utilizing the FUGRO Spectrum. The FUGRO Spectrum in this case is adjusted to have Zero Period Acceleration (ZPA) of 0.50g.

III. Comparison of Seismic Design Criteria

For the comparison of the seismic criteria of the two switchyard designs, the major differences in the seismic evaluation were considered. These were:

A. Two Dimensional vs. Three Dimensional Analysis

As indicated in attached Figure 1, X, Y, and Z represent uniaxial stress ratios for a given location that are due to seismic loading in different directions x, y, and z, respectively. As can be seen from Figure 1, seismically induced loading from a three dimensional (3-D) analysis is always equal to or greater than the seismically induced loading from a two dimensional (2-D) analysis. It can also be seen, from Figure 1, that a 3-D analysis can increase seismically induced loading by as much as 40% over that produced by a 2-D analysis.

B. Housner Spectrum vs. FUGRO Spectrum

The existing Site A switchyard was seismically designed utilizing the Housner Response Spectrum, whereas the new switchyard was designed utilizing the FUGRO Spectrum as identified above. As indicated in the attached Figure 2, the FUGRO Spectrum exceeds the Housner Spectrum in the period range of .04 seconds and greater, and both are equal in the period range of less than .04 seconds. The FUGRO Spectrum is greater than the Housner Spectrum by as much as 50%. However, over the period range of .06 seconds to .3 seconds, the period range where the HVS structures are, a FUGRO Spectrum is 30% or more greater than the Housner Spectrum.

IV. Conclusion

The seismic criteria used for the design of the new switchyard are more conservative than that used for the seismic design of the existing Site A Switchyard. The seismic loading used in the analysis of the new switchyard is more severe than that used in the analysis for the existing Site A switchyard by a factor of up to 2.10, but, more likely, the ratio is of the order 1.4.

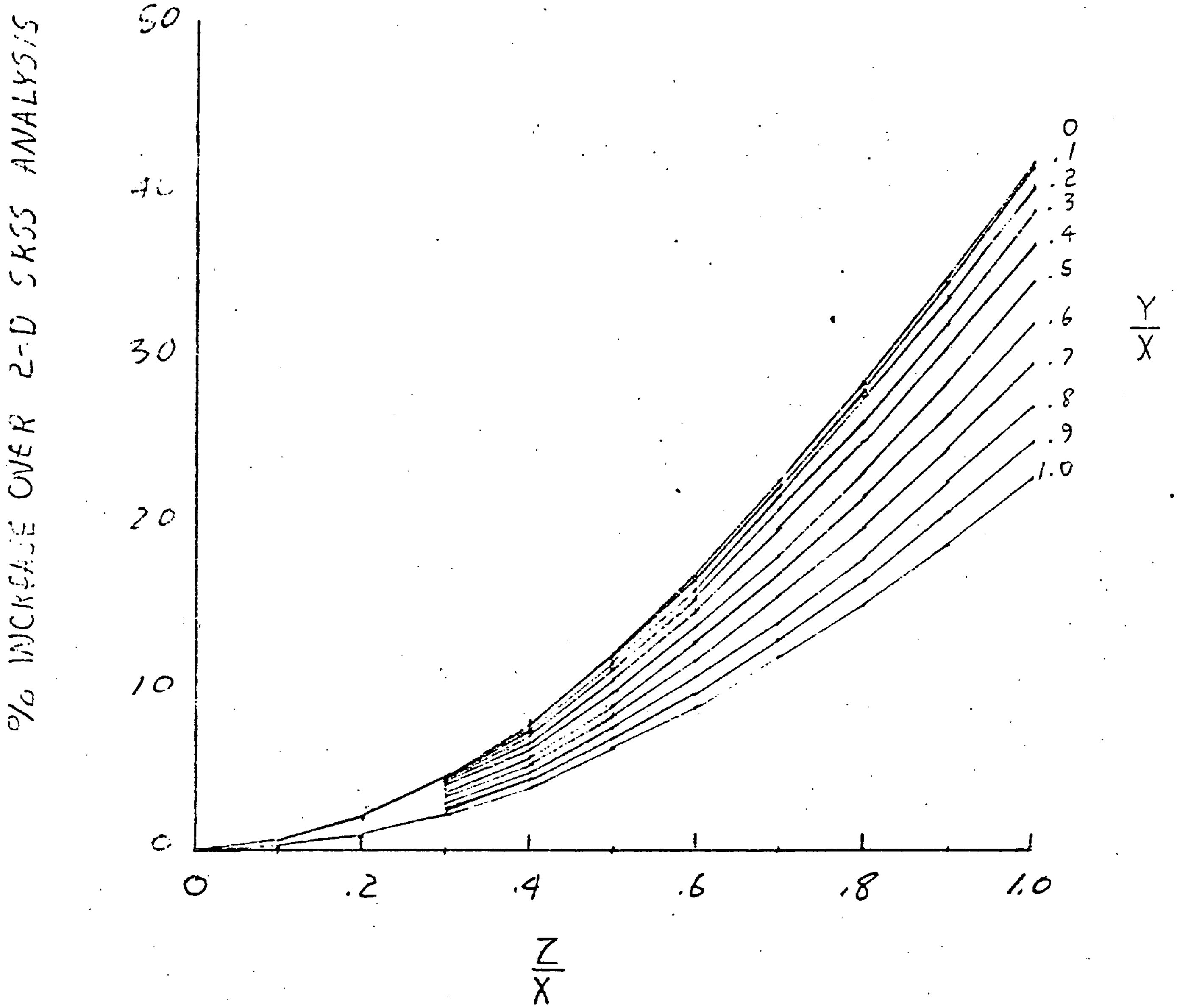

FIGURE 1 THREE-D SRSS ANALYSIS VS. TWO-D (ONE HORIZONTAL COMPONENT) SRSS ANALYSIS.

RESPONSE SPECTRUM

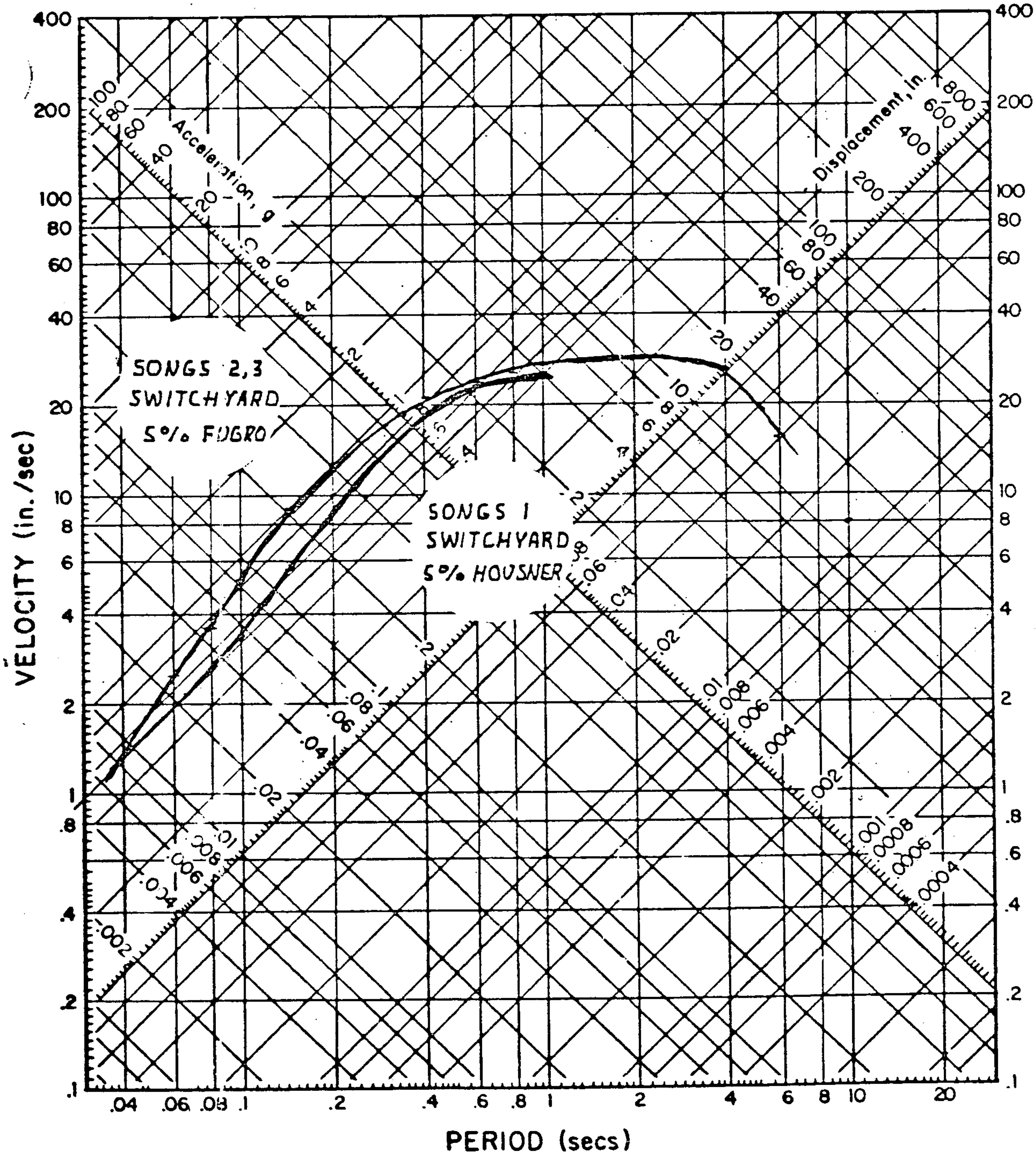

FIGURE 2 FUGRO AND HOUSNER .5g RESPONSE SPECTRA.

Enclosure 2

SUMMARY OF SCE REMARKS AT 10/25/79 MEETING REGARDING

OFFSITE POWER SOURCES

SAN ONOFRE NUCLEAR GENERATING STATION, UNIT 1

In connection with the construction of Units 2 and 3 at the San Onofre site, a new switchyard for Units 1, 2 and 3 has been constructed. The San Onofre Unit 1 onsite electrical distribution system will be interconnected with the new switchyard during the next refueling outage for San Onofre Unit 1 which is currently scheduled for March-April 1980. The station design change represented by the planned cutover of Unit 1 to the new switchyard has been reviewed and approved by the Company's Onsite Review Committee in accordance with 10 CFR 50.59. The design of the switchyard has been presented in the San Onofre Units 2 and 3 FSAR.

During the week of August 20, 1979, NRC Region V personnel conducted a site visit during which it was noted that the offsite power sources to the three units as planned in the new switchyard were supported by common deadend structures in each case, a situation which they believed was not in agreement with the requirements of General Design Criterion 17 (GDC-17) of 10 CFR 50. In light of this concern, a rereview of applicable separation criteria for the design of switchyards for nuclear generating stations and the compliance of the San Onofre Unit 1 design thereto was conducted and is summarized below:

I. APPLICABLE DESIGN CRITERIA

The following applicable codes specifically relating to the separation requirements of power sources were identified:

A. Criterion 17, Appendix A, 10CFR50, "Electric Power Systems".

1. Requires that both an onsite and an offsite electric power system be provided to permit functioning of safety related systems.

2. Requires that the electric power from the transmission network to the onsite electrical distribution system is to be supplied by two physically independent circuits. The two circuits are to be designed and located so as to minimize to the extent practical, the likelihood of their simultaneous failure.

3. A switchyard common to both circuits is acceptable.

B. IEEE308, "IEEE Standard Criteria for Class IE Power Systems for Nuclear Power Stations".

1. Requires that each redundant Class IE load group (4kv buses) shall have access to both a preferred and a standby power supply.

2. The preferred power supply shall consist on one or more circuits from the transmission network, or equivalent source of energy to the Class IE distribution system input terminals.

3. A minimum of one circuit from the transmission network normally shall be available during operation. If only one circuit from the transmission network is normally available, the design shall include a provision for alternate access to the transmission network. The circuit that is normally available shall be designed to be available within an acceptable time following a loss of coolant accident.

C. Regulatory Guide 1.32, "Criteria for Safety-Related Electric Power Systems".

1. Accepts the criteria of IEEE308.

2. Defines the statement, "within an acceptable time" of B.3 above to mean within a few seconds, reflecting the requirement stated in GDC-17.

D. Regulatory Guide 1.93, "Availability of Electric Power Sources".

1. This guide describes operating limit requirements rather than design requirements.

2. The Limiting Conditions for Operation (LCO) are met when all the electric power sources required by GDC-17 are available.

II. COMPLIANCE WITH APPLICABLE CRITERIA

The switchyard has been designed to meet all of the previously mentioned criteria with regard to the electrical and physical separation of the power sources to the station. The manner in which compliance is accomplished for the San Onofre Unit 1 switchyard is discussed below:

The requirement of both an offsite and an onsite electrical system identified in GDC-17 is met at Unit 1 by the existence of the switchyard power sources and the diesel generators, both systems with sufficient capacity and redundancy to assure that "(1) specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operational occurrences and, (2) the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents".

The requirement of GDC-17 for two independent circuits is met at the Unit 1 switchyard since the seven transmission lines from the electrical grids of SCE and SDG&E are routed independently (both structurally and electrically) to the SONGS switchyard. The switchyard is designed in a double bus arrangement so that on each side of the breakers, which isolate the SCE side from the SDG&E side, the required loads for each unit can be supplied from two separate buses. Since a switchyard common to both power circuits is acceptable, the routing of the two sets of lines from the switchyard, to the Unit 1 4kv buses, is such that they share a common dead-end structure, however, due to the breaker isolation scheme of the switchyard as discussed above, the two circuits are completely independent electrically.

The other design criteria of Section I are all met by the design of the SONGS switchyard since the 4kv buses have access to both the offsite and onsite power supplies, there exists more than one electrical circuit from the transmission network, the normally available offsite source is available immediately following a LOCA, and the existing technical specifications require that a second circuit be available.

As discussed above, GDC-17 specifies that the switchyard be designed to "minimize to the extent practical the likelihood" of the simultaneous failure of both power circuits "under operating and postulated accident and environmental conditions". As these requirements apply to the dead-end structures under consideration, a discussion of the design of the structure for these conditions follows:

A. Operating Conditions

Under normal operating conditions the applicable loads on the structure are the static loading due to the weight of the structure, conductor and insulator and a wind load due to a 5 mph wind speed.

B. Environmental Conditions

The structure is additionally designed for a maximum wind speed of 80 mph and is coated with a corrosion inhibiting agent.

C. Accident Conditions

For seismic considerations, the structures were designed for a DBE of 0.50g and a OBE of 0.25g.

III. CONCLUSION

A. The design of the San Onofre switchyard complys with all applicable criteria regarding physical and electrical separation of power sources.

B. The design of the dead-end structure, as part of the common switchyard conforms with GDC-17.

C. The switchyard is designed for appropriately conservative operating, environmental and accident conditions.

D. Complete loss of offsite power results in the actuation of the diesel generators as the source of onsite electric power for the station.

DESCRIPTION OF PROPOSED CHANGE AND SAFETY ANALYSIS
PROPOSED CHANGE NO. 92 TO THE TECHNICAL SPECIFICATIONS
PROVISIONAL OPERATING LICENSE DPR-13

This is a request to revise Appendix A Technical Specification 3.14, FIRE PROTECTION SYSTEMS OPERABILITY and 4.15, FIRE PROTECTION SYSTEMS SURVEILLANCE. This revision incorporates the Technical Specification changes required due to the implementation of the Fire Protection modifications which will be completed during the refueling outage for Cycle 8 operation.

Reason for Proposed Change

As indicated in the Fire Protection Safety Evaluation Report dated July 19, 1979, modifications to the station to improve fire protection will be completed during the refueling outage scheduled for April, 1980. The implementation of these modifications requires several changes to the above specified section of the Technical Specifications.

Existing Specifications

The existing specifications are as constituted in Section 3.14, FIRE PROTECTION SYSTEMS OPERABILITY and Section 4.15, FIRE PROTECTION SYSTEMS SURVEILLANCE.

Proposed Specifications

The existing specifications would be revised as indicated in Enclosure 1 to this Proposed Change. The revised portions are identified by a bar in the margin.

Safety Analysis

The station modifications related to this Proposed Change are being provided to improve Fire Protection at the station. These modifications are consistent with the requirements specified in the Fire Protection Safety Evaluation Report (SER) dated July 19, 1979. This Proposed Change to the Technical Specifications will add requirements on limiting conditions for operation and surveillance for those systems which are being modified in accordance with the SER.

Accordingly, it is concluded that (1) the proposed change does not involve an unreviewed safety question as defined in 10CFR50.59, nor does it present significant hazard considerations not described or implicit in the Final Safety Analysis, and (2) there is reasonable assurance that the health and safety of the public will not be endangered by the proposed change.

ENCLOSURE 1

3.14 FIRE PROTECTION SYSTEMS OPERABILITY

Applicability: Applies to the operating status of the fire detection and extinguishing systems and equipment at all times.

Objective: To ensure availability of fire protection systems.

Specifications: A. As a minimum, the following fire detection and extinguishing systems and equipment shall be operable:

(1) The Fire Suppression Water System[1] with:

a. Any two of the following four pumps operable each with a capacity of 1000 gallons per minute with their discharge aligned to the fire main:

1. San Onofre Unit 1 fire water pumps (2).

2. San Onofre Units 2 and 3 motor-driven fire water pumps (2).

b. With San Onofre Unit 1 fire water pumps satisfying the pump requirement, the San Onofre Unit 1 service water reservoir supply available containing a minimum of 300,000 gallons reserved for fire fighting.

c. With San Onofre Units 2 and 3 fire pumps satisfying the pump requirement, the San Onofre Units 2 and 3 service and fire water storage tanks available with 300,000 gallons reserved for fire fighting.

d. With a combination of the four pumps satisfying the pump requirement, the separate water supplies for each pump(s) available as indicated in A(1)b and A(1)c above.

e. An operable flow path capable of taking suction from the separate supplies per A(1)b or A(1)c above and transferring the water through distribution piping with operable sectionalizing control or isolation valves to the yard hydrant curb valves and the first valve upstream of each sprinkler, hose standpipe or spray system riser required to be operable per Specifications 3.14.A.(2) and 3.14.A(3).

(2) The Spray and/or Sprinkler Systems located in the following areas:

a. Containment sphere. This includes a refueling water pump, 240,000 gallons of water in the Refueling Water Storage Tank and associated system valves. During refueling operations, when the Refueling Water Storage Tank water has been transferred to the refueling cavity, backup fire suppression equipment shall be provided.

b. North end of turbine building.

c. Hydrogen seal oil.

d. Diesel generator building.

(3) The Foam Suppression Systems with the storage tanks containing 100 gallons of foam concentrate located in the following areas:

a. Lube oil reservoir and conditioner.

(4) The Halon Suppression Systems with the storage tanks having at least 95% of full charge weight and 90% of full charge pressure located in the following areas:

a. 4160 volt switchgear room.

(5) The Fire Hose Stations indicated in Table 3.14.1.

(6) The Fire Detection Instrumentation for each fire detection area or zone indicated in Table 3.14.2.

B. In the event a limiting condition for operation for the fire detection and extinguishing systems and equipment indicated in A above is not met, the following corrective measures shall be taken:

(1) The Fire Suppression Water System

a. With less than the required equipment indicated in A(1) above, restore the inoperable equipment to operable status within seven days or in lieu of any other report required by Specification 6.9 prepare and submit a Special Report to the Commission pursuant to Technical Specification 6.9.3.c within the next thirty days outlining the plans and procedures to be used to provide for the loss of redundancy in this system.

b. With no Fire Suppression Water System operable;

1. Establish a backup Fire Suppression Water System within 24 hours, and

2. In lieu of any other reports required by Specification 6.9, submit a special report in accordance with Specification 6.9.3.c;

a) By telephone within 24 hours,

b) Confirmed by telegraph, mailgram or facsimile transmission no later than the first working day following the event, and

c) In writing within 14 days following the event, outlining the action taken, the cause of the inoperability and the plans and schedule for restoring the system to operable status.

3. If B.(1)b. 1 and 2.(a) above cannot be fulfilled, place the reactor in Hot Standby within six (6) hours and in Cold Shutdown within the following thirty (30) hours.

(2) The Spray and/or Sprinkler Systems

a. With a spray and/or sprinkler system inoperable establish a continuous fire watch with backup fire suppression equipment for the unprotected area(s), within one hour.

b. Restore the system to operable status within fourteen days or in lieu of any other report required by Specification 6.9, prepare and submit a Special Report to the Commission pursuant to Technical Specification 6.9.3.c within the next thirty days outlining the action taken, the cause of inoperability and the plans and schedule for restoring the system to operable status.

(3) The Foam Suppression Systems

a. With a foam suppression system inoperable, perform an area inspection twice per shift for the areas where a permanent backup system is installed, otherwise establish a continuous fire watch with backup fire suppression equipment for the unprotected area(s), within one hour.

b. Restore the system to operable status within fourteen days or in lieu of any other report required by Specification 6.9, prepare and submit a Special Report to the Commission pursuant to Technical Specification 6.9.3.c within the next thirty days outlining the action taken, the cause of inoperability and the plans and schedule for restoring the system to operable status.

(4) The Halon Suppression Systems

a. With a Halon suppression system inoperable, establish a continuous fire watch with backup fire suppression equipment for the unprotected area(s), within one hour.

b. Restore the system to operable status within fourteen days or in lieu of any other report required by Specification 6.9, prepare and submit a Special Report to the Commission pursuant to Technical Specification 6.9.3.c within the next thirty days outlining the action taken, the cause of inoperability and the plans and schedule for restoring the system to operable status.

(5) The Fire Hose Stations

With one or more of the fire hose stations indicated in Table 3.14.1 inoperable, route an additional equivalent capacity fire hose to the unprotected area from an operable hose station within one hour.

(6) The Fire Detection Instrumentation

With one or more of the fire detection instruments shown in Table 3.14.2 inoperable.

a) Within one hour, establish a fire watch patrol to inspect the zone(s) with the inoperable instrument(s) at least once per hour with the exception of the zones inside containment where the following alternative instrumentation shall be utilized:

1. Inside the secondary shield: temperature indication of air after primary coolant motor cooling fan unit, primary coolant motor space, and reactor cavity air inlet; reactor coolant pump lower bearing coolant temperature, motor winding temperature and oil lubricated bearing temperature.

2. Outside the secondary shield: temperature of control rod cooler discharge, control rod shroud air inlet, sphere space, and control rod cooler inlet; closed circuit television camera.

b. Restore the inoperable instrument(s) to operable status within fourteen days or, in lieu of any other report required by Specification 6.9, prepare and submit a Special Report to the Commission pursuant to Technical Specification 6.9.3.c within the next thirty days outlining the course of action taken, the cause of the inoperability and the plans and schedule for restoring the instrument(s) to operable status.

C. The penetration fire barriers in the following areas shall be functional:

(1) The control room.

(2) The 4160 volt switchgear room.

(3) The north end of turbine building.

D. With a penetration fire barrier nonfunctional, a continuous fire watch shall be established on at least one side of the affected penetration within one hour.

Bases:

The operability of the Fire Suppression Systems ensures that adequate fire suppression capability is available to confine and extinguish fires occurring in any portion of the facility where safety related equipment is located. The Fire Suppression Systems consists of the water system, spray and/or sprinklers, and fire hose stations. The collective capability of the fire suppression systems is adequate to minimize potential damage to safety related equipment and is a major element in the facility fire protection program.

In the event that portions of the fire suppression systems are inoperable, alternate backup fire fighting equipment is required to be made available in the affected areas until the affected equipment is restored to service. If permanent backup equipment is installed, as in the north end of the turbine building where the water spray and sprinkler systems backup the foam system, a periodic inspection of the area will assure adequate fire protection for the affected zones.

In the event that the fire suppression water system becomes inoperable, immediate corrective measures must be taken since this system provides the major fire suppression capability of the plant. The requirement for a twenty-four hour report to the Commission provides for prompt evaluation of the acceptability of the corrective measures to provide adequate fire suppression capability for the continued protection of the nuclear plant.

The operability of the fire detection instrumentation ensures that adequate warning capability is available for the prompt detection of fires. This capability is required in order to detect and locate fires in their early stages. Prompt detection of fires will reduce the potential for damage to safety related equipment and is an integral element in the overall facility fire protection program.

In the event that a portion of the fire detection instrumentation is inoperable, the establishment of frequent fire patrols in the affected areas is required to provide detection capability until the inoperable instrumentation is returned to service.

The functional integrity of the fire barrier penetration seals ensures that fires will be confined or adequately retarded from spreading to adjacent portions of the facility. This design feature minimizes the possibility of a single fire rapidly involving several areas of the facility prior to detection and extinguishment. The fire barrier penetration seals are a passive element in the facility fire protection program and are subject to periodic inspections.

During periods of time when the seals are not functional, a continuous fire watch is required to be maintained in the vicinity of the affected seal until the seal is restored to functional status.

Penetration fire barriers that perform a pressure seal function are required to maintain a leak free seal. When a seal is broken for the installation or removal of cables, the seal must be repaired and tested to ensure that the seal maintains its integrity. To accomplish this, the seal will be isolated and tested by inserting a colored aerosol gas on one side and inspecting for visible leakage on the other side. If no visible gas is detected, it will be determined that the seal has been succesfully repaired and returned to its original condition.

Reference: 1. Fire Protection Program Review, BTP APCSB 9.5-1, San Onofre Nuclear Generating Station, Unit 1, March 1977; submitted to the NRC by letter dated March 16, 1977 in Docket No. 50-206.

TABLE 3.14.1

FIRE HOSE STATIONS

Fire Area or Zone	Number
Inside Sphere	One
Reactor Auxiliary Building, Lower Level	One
Boric Acid Injection Pump Room	One
Turbine Plant Cooling Water Area	One
Chemical Feed and Lubricating-Oil Reservoir Area	One
East Feedwater Pump/Condenser Area	Three
West Feedwater Pump/Condenser Area	Two
Turbine and Heater Decks	Six
Administration/Control Building, First Floor Single-Story Office Area	One
Administration/Control Building, First Floor Health Physics and Locker Area	One
Control Room Area	One
Administration/Control Building, Third Floor East Office Space and Storage	One
Diesel-Generator Room No. 1	One
Diesel-Generator Room No. 2	One
Sphere Enclosure Cable Penetration Area	Four
Administration/Control Building, Second Floor North Stairwell	One

TABLE 3.14.2

FIRE DETECTION INSTRUMENTS

Zone	Location	Minimum Instruments Operable: Ionization Smoke Detectors	Infrared Flame Detectors	Ultraviolet Flame Detectors
1	DC switchgear and battery room	3		
2	480-V switchgear room	8*		
3	4160-V switchgear room	18		
4	Exciter and MCC3 area	16**		
7	Control room and third floor administration building	16		
8	Turbine lube oil reservoir	29	4	
9	Containment sphere inside secondary shield	6		
10	Containment sphere outside secondary shield	6	2	
11	Reactor auxiliary building and storage rooms	8		
16	Sphere enclosure building	12		
22	Service transformers 2 and 3			2
DG1	Diesel Generator Room No. 1	2	2	
DG2	Diesel Generator Room No. 2	2	2	

Note: The Fire Detection Zones not identified either (1) do not contain safety related equipment, nor involve potential fire hazards to safety related equipment, or (2) the detection systems in these zones have been deferred for review as a part of the Systematic Evaluation Program (SEP).

*Includes one detector outside the room, but in the loop.
**Includes one high flow smoke detector

4.15 FIRE PROTECTION SYSTEMS SURVEILLANCE

Applicability: Applies to the surveillance of fire detection and extinguishing systems and equipment.

Objective: To ensure the operability of fire detection and extinguishing systems and equipment.

Specification: A. The Fire Suppression Water System shall be demonstrated to be operable.

(1) With the San Onofre Unit 1 fire water pumps satisfying the pump requirements of Technical Specification 3.14.A(1), at least once per seven days by verifying the water supply volume in the San Onofre Unit 1 Service Water Reservoir. With the San Onofre Units 2 and 3 fire water pumps satisfying the pump requirements of Technical Specification 3.14.A(1), by initially verifying the water supply volume in the San Onofre Units 2 and 3 service and firewater storage tanks and at least once per seven days thereafter.

(2) At least once per 31 days on a staggered test basis by starting each pump satisfying the pump requirements of Technical Specification 3.14.A(1) and operating it for at least fifteen minutes.

(3) At least once per 31 days by verifying that each valve (manual, power operated or automatic) is in its correct position. For valves located inside the containment sphere, verification shall be made consistent with the 31-day requirement when possible during available plant outages or during containment entrances for other reasons.

(4) At least once per 12 months by cycling each testable valve through one complete cycle of full travel.

(5) At least once per 18 months by performing a system functional test which includes simulated actuation of the system and:

a. Verifying that each valve in the flow path is in its correct position.

b. Verifying that each pump develops at least 90% of the flow and head at some point on the manufacturer's pump performance curves.

c. Cycling each valve in the flow path that is not testable during plant operation through at least one complete cycle of full travel, and

d. Verifying that each pump starts to supply the fire suppression water system at $\geq$50 psig.

(6) At least once per 36 months by performing flow tests of the system in accordance with Chapter 5, Section 11 of Fire Protection Handbook, 14th Edition, published by National Fire Protection Association.

B. The Spray and/or Sprinkler Systems indicated in Technical Specification 3.14.A(2) shall be demonstrated to be operable:

(1) At least once per 12 months by cycling each testable valve in the flow path through at least one complete cycle of full travel. For the valves located in the containment sphere, testing shall be performed consistent with the 12-month requirement when possible during available plant outages.

(2) At least once per 18 months.

a. By performing a system functional test which includes simulated automatic actuation of the system, and:

1. Verifying that the automatic valves in the flow path actuate to their correct positions on a smoke and infrared test signal, and

2. Cycling each valve in the flow path that is not testable during plant operation through at least one complete cycle of full travel.

b. By inspection of the spray headers to verify their integrity, and

(3) By inspection of each nozzle at least once every refueling outage to verify no blockage.

(4) At least once every second refueling outage by performing an air flow test through each accessible spray/sprinkler header and verifying that the spray/ sprinkler nozzles are unobstructed.

C. The Foam Suppression Systems shall be demonstrated to be operable:

(1) At least once per month:

a. Verify that the foam storage tank level reads full (100 gallons).

b. Inspect automatic deluge valve normal position indicators and pins for proper location.

(2) At each refueling outage:

a. By performing a functional test which includes:

1. A performance evaluation of the AFFF concentrate and/or premix solution quality, and

2. Verification that automatic valves in the flow path actuate to their correct positions on a test signal.

b. By inspection of piping to verify integrity.

c. By inspection of each nozzle to verify no blockage.

(3) At least once every second refueling outage by performing a functional test on the foam nozzles.

D. The Halon systems shall be demonstrated operable:

(1) At least once per three months by verifying each Halon storage tank weight and pressure.

(2) At least once per 18 months by:

a. Verifying the system, including associated ventilation dampers, actuates automatically to a simulated test signal.

b. Performance of a flow test through headers and nozzles to assure no blockage.

c. Verifying the operability of the manual initiating system.

E. Each Fire Hose Station indicated in Table 3.14.1 shall be verified to be operable:

(1) At least once per 31 days by visual inspection of the station to assure all equipment is at the station. For the station located in the containment sphere, inspection shall be performed consistent with the 31 days requirement when possible during available plant outages or during containment entrances for other reasons.

(2) At least once per 18 months by removing the hose for inspection and re-racking and replacing all degraded gaskets in the couplings.

(3) At least once per 36 months, partially open each hose station valve to verify valve operability and no blockage. For the hose station located in the containment sphere, this verification shall be performed every other refueling outage.

(4) At least once per 36 months conduct a hose hydrostatic test at a pressure at least 50 psig greater than the maximum pressure available at that hose station. For the hose station located in the containment sphere, this test shall be performed every other refueling outage.

F. Each of the Fire Detection Instruments indicated in Table 3.14.2 shall be demonstrated to be operable:

(1) At least once per six months by performance of a channel functional test. For the instrumentation located in the containment sphere, the test shall be conducted consistent with the six-month requirement when possible during available plant outages.

G. The penetration fire barriers indicated in Technical Specification 3.14.C., shall be verified to be functional by a visual inspection;

(1) At least once per 18 months, and

(2) Prior to declaring a fire penetration seal functional following repairs and maintenance.

H. Penetration fire barriers that perform a pressure sealing function shall be verified to be functional by performance of a local leakage test prior to declaring a penetration fire barrier functional following repairs or maintenance.

Basis: Refer to the Basis for Technical Specification 3.14.

Reference: 1. Refer to Reference 1 for Technical Specification 3.14.