



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

September 30, 1978

Docket No. 50-206

LICENSEE: Southern California Edison Company (SCEC)

FACILITY: San Onofre, Unit 1 (SO-1)

SUMMARY OF AUGUST 29, 1978 MEETING CONCERNING FIRE PROTECTION PROGRAM  
FOR SO-1

On August 29, 1978, the NRC staff met with representatives of SCEC to discuss and resolve "open" items identified in our review of SCEC's fire protection program and our fire protection site visit on July 10, 1978 through July 13, 1978.

A list of attendees is attached.

Our letter to SCEC dated July 31, 1978, includes a list of each staff position which was developed during our site visit and identifies if the item is "open" or if SCEC has agreed to accept our position. As indicated in our letter to SCEC, dated August 11, 1978, the "open" items were to be evaluated by SCEC for discussion and resolution at the August 29, 1978 meeting.

During the meeting SCEC presented its responses to the "open" items identified in our July 31, 1978 letter. The attached SCEC handout "Fire Protection Program, NRC Positions - SCEC Responses" provides a summary of SCEC's presentation and includes SCEC's responses and the basis for each of the "open" items.

SCEC agreed to provide a five man fire brigade consisting of 2 operators of the minimum shift crew supplemented by 3 members from the security force, thereby resolving item 43. Training of the fire brigade members is to be accomplished such that a trained 5 man fire brigade will be in place by January 1, 1979.

As a result of detailed discussions of SCEC responses, the following resolutions concerning each "open" item identified in the SCEC's handout were reached:

Items 1, 2, and 8 are acceptable.


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- Item 8           Acceptable on the basis that SCEC will provide pump test gear at the pump installation which meets the requirement of NPFA 20.
- Item 10           Acceptable on the basis that SCEC will provide either fire detection capability for the diesel generator filter room or curbing to contain oil within the room.
- Item 18           SCEC will provide, in about 30 days, information on the methods for protection of the lube oil area (Zone 9A) and an evaluation of the capability of structural steel and cable routing to withstand the effects of fire.
- Item 21.A.        Acceptable.
- Item 21.B.        The transformers adjoining the 480V switchgear room should be provided with deluge protection in addition to being curbed in the event that non-combustible oil is not used in station service transformers 2 and 3.
- Item 23           SCEC will provide a 1 hour fire rated door (east door to the 480V switchgear room).
- Item 24           Acceptable, based on SCEC's verification that the contour at the east door to the 480V switchgear room is sufficient to carry combustible liquid material away from the door.
- Item 25           Acceptable, based on SCEC providing a curb at the ramp of the southeast door and a 3 hour fire rated door on the southwest end of the 4160V switchgear room.
- Item 27           To limit potential fire involvement between cable trays in the 4160V switchgear room, consideration should be given to covering cables with a flame retardant coating, and marinite board or fire stops should be provided every 10 feet of cable tray to limit the fire hazard. The halon gas suppression system should be a double shot system.

- Item 29 SCEC will respond to this item in conjunction with response to Item 18.
- Item 31 Acceptable.
- Item 33 Acceptable on the basis that SCEC will provide isolation devices independent of the 4160V switchgear room and the safe shutdown panel.
- Item 37, Item 39 and Item 43 are acceptable.
- Item 44 SCEC will evaluate potential effect of fire on structural steel of turbine building without benefit of a fire suppression system to verify that such a system is not necessary to maintain the structural integrity of the turbine building.
- Item 47 Acceptable on the basis that SCEC will either upgrade the penetrations or provide sprinklers over the 480V and the 4160V switchgear room walls facing the turbine building, with sprinkler fed independently of the existing sprinkler systems.
- Item 49 SCEC agreed to provide a curb at the gas engine driven screen wash pumps to prevent potential gas spills from affecting the operability of the salt water cooling pumps.
- Item 50 SCEC will evaluate feasibility of providing an offsite 480V power source to the 480V switchgear room to provide the capability for maintaining hot shutdown with offsite power for a period of 72 hours.

During the meeting SCEC presented a preliminary schedule for implementation of planned modifications for fire protection at SO-1. The information is included in the attached SCEC handout. As a result of discussions, SCEC indicated that it would reevaluate the schedule with objective of identifying the items that could be completed during the forthcoming refueling outage, items for which implementation could be accelerated, and items which SCEC proposes be deferred for consideration of impact of the Systematic Evaluation Program (SEP).

SCEC indicated that when the reevaluation is completed it would be presented in a meeting with the staff.

  
Alfred Burger, Project Manager  
Operating Reactors Branch #2  
Division of Operating Reactors

Enclosures:

1. Attendance List
2. SCEC Handouts

cc w/enclosures:  
See next page

cc w/enclosures:

Rollin E. Woodbury, Vice President  
and General Counsel  
Southern California Edison Company  
Post Office Box 800  
Rosemead, California 91770

David R. Pigott  
Samuel B. Casey  
Chickering & Gregory  
Three Embarcadero Center  
Twenty-Third Floor  
San Francisco, California 94111

David W. Gilman  
Robert G. Lacy  
San Diego Gas & Electric Company  
P. O. Box 1831  
San Diego, California 92112

Mission Viejo Branch Library  
24851 Chrisanta Drive  
Mission Viejo, California 92676

Southern California Edison Company  
ATTN: Mr. James H. Drake  
Vice President  
2244 Walnut Grove Avenue  
Post Office Box 800  
Rosemead, California 91770

ATTENDANCE LIST  
MEETING WITH SOUTHERN CALIFORNIA EDISON COMPANY  
FIRE PROTECTION FOR SO-1  
AUGUST 29, 1978

Southern California Edison Company

J. Hornbuckle  
O. Ortega  
M. Wharton  
K. Baskin  
R. Krieger

Gage Babcock & Associates

M. Antonetti

NRC

A. Burger  
D. Ziemann  
V. Panciera  
T. Dunning  
L. Derderian



SCE PLANNED MODIFICATIONS

FIRE PROTECTION PROGRAM IMPLEMENTATION SCHEDULE

(ITEMS NOT IMPACTED BY FUTURE WORK)

NRC "Staff Positions" As Agreed To

<u>Staff Position Numbers</u>	<u>Completion Date</u>
1	Complete
5	September 1, 1978
7	Complete
9	September 1, 1978
11	September 1, 1978
12	Complete
13	December 1, 1978
14	Complete
15	October 1, 1978
16	December 1, 1978
17	December 1, 1978
20	December 1, 1978
22	November 15, 1978
26	October 1, 1978
28	December 1, 1978
34	December 1, 1978
35	December 1, 1978
38	December 1, 1978
40	Not Determined
41	November 1, 1978
42	Complete
45	September 1, 1978
46	October 15, 1978
48	November 1, 1978



SCE PLANNED MODIFICATIONS

FIRE PROTECTION PROGRAM IMPLEMENTATION SCHEDULE

(ITEMS IMPACTED BY FUTURE WORK)

ITEM NUMBERS

6.1.1.a	6.1.13.b	6.2.1
6.1.2.a	6.1.14	6.2.2.c
6.1.3.a	6.1.15.a	6.2.3
6.1.3.b	6.1.15.b	NRC "Staff Position 4"
6.1.4.b	6.1.17.a (Modification will not be implemented)	NRC "Staff Position 21.A"
6.1.4.c	6.1.18	NRC "Staff Position 37"
6.1.10.a	6.1.19.a	NRC "Staff Position 47"
6.1.10.c	6.1.19.b	NRC "Staff Position 50"
6.1.10.d	6.1.20	
6.1.10.e	6.1.21	
6.1.10.f	6.1.22	
6.1.11.a	6.1.23	
6.1.11.c	6.1.24.a	
6.1.11.d	6.1.24.c	
6.1.11.e	6.1.25.a	
6.1.11.f	6.1.26	
6.1.12.a	6.1.27	
6.1.12.b	6.1.28	
6.1.12.d (NRC "Staff Position 36")	6.1.29	
6.1.12.e	6.1.30	
6.1.13.a	6.1.31.a	

## 6.0 PLANNED MODIFICATIONS

This section summarizes the modifications planned to improve the fire safety of San Onofre Unit 1.

### 6.1 FIRE PROTECTION

The modifications that are planned for each of the plant areas are listed below. Fire areas or zones are as shown in Section 4.4.

#### 6.1.1 Containment Sphere (Area 1)

- a. Install fire detectors that monitor the residual heat removal pumps and reactor coolant pump C and the cable trays and electrical penetration areas inside the containment.
- b. Install oil splash shields to prevent reactor coolant pump lubricating oil from impinging on reactor coolant piping.

#### 6.1.2 Reactor Auxiliary Building Lower Level (Zone 2A)

- a. Install a fire detector over motor control center MCC2A.
- b. Install curbing or drain pans at the base of charging and test pumps to contain lubricating oil in case of spill.
- c. Install a fire shield between the north charging pump and the test pump.

#### 6.1.3 Solid Waste Baling Room (Zone 2C)

- a. Install fire detectors in room.
- b. Install a 1-hour rated door between the solid waste baling room and the boric acid injection pump room.

#### 6.1.4 Pipe Tunnel (Zone 2E)

- a. Install a standpipe and hose reel with access to the pipe tunnel manholes.
- b. Install fire detectors in the pipe tunnel.
- c. Provide fire stops for cable penetrations into the pipe tunnel.
- d. Develop a station procedure to remove smoke from the pipe tunnel by means of portable blowers.

- 6.1.5 Station Service Transformer 1, 2 and 3 Area (Zone 3B)
- a. Provide curbing to contain oil spill.
  - b. Replace transformer oil with less combustible oil.
- 6.1.6 Lubricating-Oil Storage Tank Area (Zone 3D)
- Install curbing to contain oil spill.
- 6.1.7 Circulating Water Pump Well (Area 4)
- Remove gasoline tank from the well.
- 6.1.8 Spent Fuel Storage Room (Area 5)
- Install portable fire extinguisher in the room.
- 6.1.9 New Fuel Storage Room (Area 6)
- Install portable fire extinguisher in the room.
- 6.1.10 480-V Switchgear Room (Area 7)
- a. Install automatic Halon total-flooding system in the room.
  - b. Provide hose reel at the southwest or northwest entrance to the room.
  - c. Provide rated fire doors in the east and west walls.
  - d. Install fire dampers on ventilation openings and in the duct to the new fuel storage room.
  - e. Provide all cable penetrations with fire stops.
  - f. Install horizontal spray shields to protect electrical cabinets, panels, etc., from dripping fire water.
- 6.1.11 4160-V Switchgear Room (Area 8)
- a. Install automatic Halon total-flooding system in the room.
  - b. Install standpipe and hose reel near the southeast entrance to the room.
  - c. Provide all cable penetrations with fire stops.
  - d. Install fire dampers to ensure gastightness.

- e. Install 3-hour rated fire dampers in the control room ventilation exhaust duct transitting the overhead of this area.
  - f. Install horizontal spray shields to protect electrical cabinets, panels, etc., from dripping fire water.
  - g. Provide rated fire door at the southwest entrance.
- 6.1.12 Chemical Feed and Lubricating-Oil Reservoir Area (Zone 9A)
- a. Install automatic water or foam fire-suppression equipment over the turbine lubricating-oil reservoir and conditioner area.
  - b. Relocate smoke detectors in cable tray area to better monitor trays.
  - c. Install curbing to contain oil spill.
  - d. Provide fire stops for cable tray penetrations through the north wall to the sphere.
  - e. Close or otherwise protect discontinuities in the north wall.
- 6.1.13 East Feedwater Pump/Condenser Area (Zone 9B)
- a. Install fire detector in lubricating-oil storage shed.
  - b. Install 3-hour fire barrier roof and door on lubricating-oil storage shed.
- 6.1.14 West Feedwater Pump/Condenser Area (Zone 9C)
- Install fire detectors in area of air compressors.
- 6.1.15 Hydrogen Seal Oil Unit Area (Zone 9D)
- a. Install an automatic water or foam fire-suppression system over the hydrogen seal oil unit.
  - b. Install spray shield over the UPS battery.
  - c. Install curbing to confine lubricating-oil spills.
- 6.1.16 Condensate Storage Tank Area (Area 10)
- a. Install increased capacity curbing around transformer C to contain oil spills.
  - b. Install excess flow check valve in the hydrogen supply line from the hydrogen bank to stop flow in case of a line break downstream.

- c. Install curbing around sulfuric acid storage to contain acid spill.
- 6.1.17 Main Transformer Area (Area 11)
- a. Upgrade the east wall of the exciter area, including doors, penetrations, and other openings, to a 3-hour rating.
  - b. Modify curbing to exclude turbine building fire water header.
- 6.1.18 DC Switchgear Room (Zone 13A)
- Provide fire stops for cable tray penetrations from the switchgear room to the administration/control building corridor.
- 6.1.19 DC Battery Room Number 1 (Zone 13B)
- a. Install hydrogen monitor with remote reading in the control room.
  - b. Provide a fire damper on two inlet vents.
  - c. Provide protective shield over positive or negative battery terminals to prevent short-circuits.
- 6.1.20 Administration/Control Building First Floor (Zone 14A)
- Provide fire stops for cable penetrations from corridor into the 4160-V room (included in the 4160-V room modifications - Section 6.1.11.c).
- 6.1.21 Administration/Control Building Second Floor - Instrument Shop (Zone 15A)
- Install fire detector in room.
- 6.1.22 Administration/Control Building - Heating and Ventilating Room (Zone 15B)
- Install fire detectors in room.
- 6.1.23 Administration/Control Building - Second Floor Office (Zone 15C)
- Install fire detector in room.
- 6.1.24 Control Room (Zone 16A)
- a. Provide cable penetrations to cable spreading area with seals having a fire rating commensurate with the fire

hazard (included in 4160-V switchgear room modifications - Section 6.1.11.c).

- b. Upgrade control room enclosure - walls, doors, and penetrations to a fire rating (including the existing viewing window wall) commensurate with the hazard.
  - c. Install a fire detector in the vital bus cabinet.
- 6.1.25 Administration/Control Building - Visitors' Viewing Area (Zone 16B)
- a. Install fire detectors in area.
  - b. Remove cabinets and closets from the room.
- 6.1.26 Administration/Control Building - Third Floor Offices (Zone 16C)
- Install fire detectors in each office.
- 6.1.27 Administration/Control Building - Third Floor Instrumentation Repair Room and Locker Room (Zones 16F and 16G)
- Install fire detectors in these rooms.
- 6.1.28 Battery Room 2 (North Diesel-Generator Building) (Zone 17B)
- Install fire detector in room.
- 6.1.29 Sphere Cable Penetration Area (Area 19)
- Provide fire detectors over cable trays in both the east and the west cable tray areas from the turbine building to the sphere.
- 6.1.30 Ventilation Equipment Room (Area 20)
- Install fire detectors in room.
- 6.1.31 Fire-Water System
- a. Install a jockey pump to maintain the water main at working pressure.
  - b. Provide second source to administration/control building header (connect to east portion of yard water main) and provide isolation valves for maintenance.
  - c. Extend header that serves hose station standpipes on the west side of the turbine building to the yard water main near hydrant 7.

### 6.1.32 Other

- a. Increase number of administratively controlled portable lights to meet contingency of loss of station lighting.
- b. Add lighted escape route markers in the administration/control building.
- c. Provide portable smoke removal equipment for the pipe tunnel (zone 2E).
- d. Modify station procedures to include administrative measures to prohibit the bulk storage of combustible materials inside or adjacent to safety-related buildings or systems during operation or maintenance periods and to include requirement for keeping the turbine building lubricating-oil storage shed door closed.

## 6.2 SAFE SHUTDOWN CAPABILITY

### 6.2.1 Control Circuits

Control circuits for pumps and valves listed below will be modified as required to allow local manual control at the switchgear or motor control center from where the pump is powered.

<u>Item</u>	<u>Power Source</u>
Test pump MG42	MCC2
Component cooling pump G15B	SWGR2
Saltwater cooling pump G13B	SWGR2
SV25 (POV-6)	At G13B starter
Residual heat removal pump MG14B	SWGR2
Air compressor K1B	SWGR2
MOV/LCV 1100D	MCC3

### 6.2.2 Valve Configuration

The following modifications or additions will be implemented on valve configurations to ensure system operability to a safe shutdown condition. (These modifications are as described in SCE letter, K. P. Baskin to A. Schwencer, dated December 21, 1976, Single Failure Analysis.)

- a. A valve will be provided in parallel with CV305 (auxiliary pressurizer spray) with an override control option at the auxiliary control panel.
- b. A valve will be provided in parallel with FCV 1112 (charging line) with an override control option at the auxiliary panel.



- c. A valve will be provided in series with MOV/LCV1100C (volume control tank to charging pumps) with an override control option at the 430-V switchgear room.

### 6.2.3 Wire Rerouting

The following wire rerouting is required to ensure the redundant components required for safe shutdown have protection from wiring damage due to a single fire in a common fire zone:

- a. In order to provide continued operation of the required shutdown equipment in the event of a fire in the 4160-V switchgear room, switchgear 2 will be provided with a power source not associated with the 4160-V switchgear room.
- b. The existing DC control power feed from DC bus 2 to switchgear 2 and 3 will be rerouted such that the cables do not enter the 4160-V room.
- c. Power cabling for MOV/LCV1100D will be rerouted to separate it from that for MOV/LCV1100B (together in several areas).
- d. The power cabling for component cooling pump MG15A will be rerouted to separate it from that for MG15B.
- e. Suitable separation/protection will be provided for the cabling for charging pump 8A and test pump G42 (fire zone 2A).
- f. Cabling for MOV720A and MOV720B will be rerouted or provided with separation/protection (fire zone 3A).
- g. In the containment penetration area, the auxiliary panel instrumentation leads for pressurizer pressure, pressurizer level, and water level for each steam generator will be rerouted from the west penetration area to the east penetration area.

### 6.3 POST-EVALUATION MODIFICATION CRITERIA

The initial phase of modifications will be conducted by specifying the design criteria and creating a preliminary design.

This initial phase will serve to translate the evaluation functional requirements into specific design requirements.

Thus, modification details have not been specified herein in terms of specific code requirements in the STP. During the creation of



the project specifications, the following codes, standards, and guides will be considered, among others:

Branch Technical Position APCSB 9.5-1, Appendix A

National Fire Protection Association standards

Branch Technical Position APCSB 3-1, "Protection Against Postulated Piping Failures in Fluid Systems Outside Containment"

Factory Mutual System Approval Guide - "Equipment, Materials, Services for Conservation of Property"

"Power Plants," National Nuclear Risks Insurance Pools, 2nd Report (IGL)

NEL-PIA Specifications for Fire Protection of New Plants

Underwriters' Laboratories Rating List

American National Standards Institute Standard ANSI N13.10 (draft, October 1, 1976), "Generic Requirements for Nuclear Power Plant Fire Protection"

U.S. Nuclear Regulatory Commission Regulatory Guide 1.75 and others

Institute of Electrical and Electronics Engineers codes (e.g., IEEE-279, IEEE-383)

Nuclear Mutual Limited - Property Loss Prevention Standards

FIRE PROTECTION PROGRAM  
NRC STAFF POSITIONS - SCE RESPONSES  
SAN ONOFRE NUCLEAR GENERATING STATION UNIT 1

NRC STAFF POSITION

1. The fire water system should be dedicated to fire water services. System should not be used for other services.

2. The intertie between Units 2 and 3 fire water main should be kept open at all times.

NOTE: Tech Specs should be revised to delete screen wash pumps and add Units 2 and 3 fire pump(s) (at least one) and water source.

8. A UL listed control panel should be provided to meet the requirements of NEPA 20 for the fire pump installation.

NRC CONCERN

1. The fire water system must be available for fire fighting purposes.

2. Need second fire water source. Unit 1 system has a single feed and water source to 2 fire pumps. A fire pump for Unit 1 does not have sufficient capacity to meet system demand.

8. A UL listed control panel will provide better control through the use of equipment specifically designed for fire pump duty.

SCE RESPONSE

1. Administrative controls on the use of the fire system will be implemented to comply with the intent of this Staff Position.

2. The intertie between Units 2 and 3 and Unit 1 will be automated to meet the Staff Position. This automation will entail opening of the manual valves currently isolating the operating plant from the units under construction and either installing a self actuated pressure valve or installing a check valve with a parallel bypass valve.

The Tech Specs will be revised to comply with NRC Staff Position.

8. The control system used for the fire pumps is more reliable than that which would result from the addition of a control panel. The switchgear breaker used as a controller meets or exceeds the requirements for UL or FM listed controllers. The existing system also provides a better source of system control since annunciation of the operational status of the fire pumps is channeled directly to the control room.

BASIS FOR RESPONSE

1. Because of the remote location of San Onofre Unit 1, there are no viable alternative water sources for such activities as compacting fill dirt following trenching. Station administrative controls will be implemented requiring that: (1) station approval be obtained for all uses of the fire water system other than for fire fighting, (2) these other uses will be minimized, and (3) these other uses will not be on a continuous basis.

2. Each of the proposed modifications meets the Staff Position and also allows for appropriate control of the Unit 1 fire water system since it operates at a higher pressure than the system for Units 2 and 3.

The Tech Spec changes will not prevent the Station from using the screen wash pumps as a secondary backup.

8. There are two fire water pumps which supply water to the fire water system. A jockey pump is to be provided to maintain system pressure. A pressure sensing device is employed to automatically start each pump as system pressure drops. A local manual start switch for each pump overrides all other commands. The following description is provided to illustrate how the system features meet the intent of NEPA 20.

a. Each fire water pump is operated off a separate and independent 480V switchgear breaker which acts as the controller.

b. Each fire water pump and switchgear breaker has its own control circuit.

c. Each pump will automatically start upon actuation of a separate pressure switch.

NRC STAFF POSITIONNRC CONCERNSCE RESPONSEBASIS FOR RESPONSE

8. (Cont'd.)

d. Each pressure switch has a different setting to avoid simultaneous starting of the pumps.

e. Each pump can be manually started or stopped locally. The manual start signal overrides any pressure switch actuation.

f. There is no timer in the control circuit with the pressure switch to cycle the pump off.

g. The control room operator is to be provided with only a manual start switch for the fire water pumps.

h. A fire water pump can be started by mechanically closing the breaker manually should a failure occur in the control circuit.

i. The switchgear breaker rating meets or exceeds that called for in NFPA 20.

NRC STAFF POSITION

10. D-G air intake filter room should have curbs at doors, Class A fire doors, and have appropriate fire detection.

17. Hose stations near control room should have variable adjustable flow fog nozzles and rubber lined hose.

18. Lube oil area (9A) should have backup sprinkler protection piped with independent feed to the yard loop and cover all areas through which lube oil is routed (extends into fire area 9C).

NRC CONCERN

10. The oil in the air intake filters poses a fire hazard to safety related equipment in the D-G building.

17. The variable adjustable flow fog nozzles will provide a better means of applying water to a fire. The rubber lined hose will prevent the possible water damage to equipment which is associated with the initial leakage of linen hose.

18. A fire resulting from ignition of leaking oil in this area may damage safety related systems and equipment. The planned suppression system may not be adequate to protect the safety related systems and equipment in the area surrounding the lube oil reservoir, conditioner, and the lube oil piping. A concern was also expressed with respect to the transient fire hazard associated with the transport of oil drums in the area.

SCE RESPONSE

10. The complete loss of one D-G room would not affect the supply of power to safety-related equipment because of the availability of the redundant D-G room. The NRC proposed modifications are therefore not required to achieve a safe shutdown of the plant.

17. SCE will comply with this Staff Position.

18. The SCE proposed plant modifications in conjunction with the designated backups to fire suppression systems will provide adequate assurances that the maximum credible fire in this area will not reduce the capability to bring the plant to a safe shutdown. The concern with respect to transient fire sources is resolved by the implementation of administrative controls on the transport of oil through the area. Consequently, the NRC proposed modifications are not required for the safe shutdown of the plant.

BASIS FOR RESPONSE

10. The emergency onsite power for Unit 1 is provided by two 6000 KW diesel generators housed in separate missile proof structures with a fire barrier rating in excess of three hours. Air required for diesel combustion is supplied through two 50% oil bath filters, the filters being located at opposite ends of the structure housing the diesel engines. Each filter (housed in a compartment separate from the diesel engine) contains approximately 80 gallons of oil used to clean the incoming combustion air.

A fire involving a filter will remove the associated diesel generator from service. Burning oil could leak from the filter chamber, but would affect only equipment associated with its diesel generator. The redundant diesel generator is isolated from the fire hazard and would not be affected.

17. SCE agrees with the NRC concern and the procurement of the described equipment will not involve the modification of the hose cabinets.

NOTE: This Staff position is included for information only since the NRC considers it a closed item.

18. The maximum credible fire in area 9A involves combustion of the lube oil inventory in the lube oil conditioner and reservoir. The proposed design provides for curbing around both the reservoir and conditioner, which would contain all the oil of a postulated leak within the confines of the curbing. This containment would prevent the spread of any oil to either of the switchgear rooms. In addition, the smoke detectors and suppression system (either foam or deluge) would extinguish a fire in the lube oil conditioner area before it damaged any safety related cable routed above the conditioner or reservoir. The proposed fire suppression system will have the capability to be manually operated from a location outside the area of concern. The additional aspects of this fire hazard are addressed in the response to Staff Position 2.a. The existing hose

NRC STAFF POSITIONNRC CONCERNSCE RESPONSEBASIS FOR RESPONSE

18. (Cont'd.)

18. (Cont'd.)

real and standpipe will also serve as backup for manual fire fighting.

Secondary fire sources are the lube oil transfer piping in areas 9A and 9C and the possibility of a transient fire hazard, such as a drum of oil transported through the area. The lube oil transfer piping contains approximately 250 gals. of oil. If all this oil were assumed to leak onto the floor in area 9A, the maximum fire severity would be approximately 23 minutes. The lube oil piping is 15 ft. above the floor and failure, and subsequent loss of oil from the line, has a low probability. Furthermore, the 250 gals. of oil would not be expected to drain from the total length of line, since there is no driving force to move the oil.

The lube oil in the transfer piping only flows during transfers of lube oil to and from the storage tanks (normally during extended shutdown) and when small amounts of make-up oil are transferred to the oil reservoir. If a leak were to occur during the period of oil transfer, credit can be taken for the presence of an operator in the area since the transfer pumps are located adjacent to the lube oil reservoir in area 9A. This would lead to early detection of the leak and suppression of any associated fire. Also, since these periods of oil transfer constitute a small percentage of the total operating time of the unit, they do not materially impact the hazard analysis. Backup sprinklers are therefore not required for the transfer piping. Transient oil hazard is eliminated because (1) the station will furnish 5 gals. of approved (non-spill) containers for transporting oil to compressors and pumps in the area, and (2) administrative controls will be instituted to prevent transportation of larger quantities. Both secondary sources are partially mitigated by the location of floor drains which would drain away part of the oil before combustion, reducing severity even further.

NRC STAFF POSITION

19. West F.W. pump lube oil cooler should be curbed.

21. Station Service Transformer 2 #3. Modifications to be provided if non-combustible oil is not used in transformers:

A. West door of 480V Switchgear Room should be filled in to give fire rating equivalent to wall.

B. The north and south ends of the transformer areas should be curbed.

NRC CONCERN

19. A leak of the oil in the lube oil cooler may pose a fire hazard to the Auxiliary Feedwater Pumps and other safety related equipment in the area.

21. The stated modifications are required to protect the safety related equipment in the 480V switchgear room from the fire hazard associated with the station service transformers if a less combustible oil is not used.

SCE RESPONSE

19. The drainage system in the area of the lube oil cooler is such that the oil from a leak would drain away from the Auxiliary Feedwater Pumps. A fire associated with this leakage would not affect any equipment whose damage would prevent a safe shutdown of the plant. The curbing is not required for safe shutdown.

21. SCE agreed with this Staff Position and will implement the described modifications if a less combustible oil is not used.

BASIS FOR RESPONSE

19. A test was conducted on July 25, 1978 in response to Staff Position 19 to determine the necessity for a curb around the west feedwater pump lube oil cooler. The test entailed placing a wooden trough six inches wide along the west (and later the east) side of the lube oil cooler. In the bottom of the trough, equally spaced, were drilled 48 1-inch dia. holes. Thirty gals. of water (which is less viscous than the oil in the cooler) was then poured into the trough to simulate the oil spill, and allowed to drain onto the floor. The results of this test indicated that all of the oil would flow into the drain north of the lube oil cooler. Therefore, the oil would be confined to the area immediately adjacent to the lube oil cooler and in particular there would be no drainage to the area adjacent to the auxiliary feedwater pumps. It should be pointed out that a fire associated with this leakage would affect the west F.W. pump and also some other safety related equipment in the area; however, as described in the response to Staff Position 31, this fire poses no threat to safe shutdown of the plant. Consequently, curbing between the feedwater pump lube oil cooler and the auxiliary feedwater pumps is not required.

21.A. The west door of the 480V switchgear room will be filled in if the oil is not replaced with a less combustible oil since the door is not used and because of the close proximity to the fire hazard associated with the service transformers.

B. The curbing of these transformers has already been committed to in Reference 1.

NOTE: The NRC will not require sprinklers for the area if the oil is not replaced. Only the two specified modifications will be required.

NRC STAFF POSITION

23. South door to 480V switchgear room should be replaced with a 3-hr. fire door.

24. East door to the 480V switchgear room should be curbed.

25. All doors to the 4160V switchgear room should be curbed. Southeast doors should be replaced with 1 1/2 hr. doors.

NRC CONCERN

23. The lube oil piping in this area poses a fire hazard in case of leakage. The fire rated door would provide a fire barrier between the external hazard and the safety-related equipment in the 480V switchgear room.

24. The lube oil piping in this area poses a fire hazard in case of leakage. A concern was also expressed with respect to the transient fire hazard associated with the transport of oil drums in the area.

25. The lube oil in the reservoir and conditioner plus the lube oil transfer piping in the area poses a fire hazard to the safety related equipment in the 4160V switchgear room. The curbing would protect the equipment from a possible oil spill in the area. Transient combustibles could pose a problem for the southeast door so a 1 1/2 hr. rated door is required.

SCE RESPONSE

23. The maximum credible fire in this area poses no threat to the safety related equipment in the 480V switchgear room. The NRC proposed modification is not required for the safe shutdown of the plant.

24. The maximum credible fire in this area poses no threat to the safety related equipment in the 480V switchgear room. The NRC proposed modification is not required for the safe shutdown of the plant.

The transient fire hazard will be eliminated by administrative controls.

25. The maximum credible fire in this area poses no threat to the safety-related equipment in the 4160V switchgear room. The NRC proposed curbing is therefore not required for the safe shutdown of the plant. The transient fire hazard will be eliminated by administrative controls.

BASIS FOR RESPONSE

23. The maximum credible fire adjacent to this door would be an oil spill from the lube oil transfer piping. The fire severity is approximately 23 minutes and would be centered about 15 ft. from the door. There are drains in the area and the floor is sloped away from the door. The additional aspects of this fire hazard are included in the response to Staff Position 18.

24. This door is physically removed from the lube oil conditioner and reservoir, which are curbed to prevent the spread of oil. The maximum credible fire adjacent to this door would be an oil spill from the lube oil transfer piping. The fire severity is approximately 23 minutes and would be centered approximately 25 ft. from the door. There are drains in the area and the floor is sloped away from the door. Transient oil can be discounted for two reasons: The station will provide 5 gals. U.L. listed non-spill oil cans for makeup oil to various pumps and compressors within the turbine building. In addition, the station will institute administrative controls to prevent transportation of 55 gal. drums through area 9A. The additional aspects of this fire hazard are included in the response to Staff Position 18.

The proposed modifications include curbing surrounding the major source of oil, the lube oil conditioner and reservoir. A spill in this area would be contained by this curbing. Spills from the lube oil transfer piping would occur to the west of the curbed area, and due to the sloping of the floor, would not flow toward, but away from, the 4160 volt switchgear room to drains in the area. Therefore, curbing for the southwest and southeast doors would provide no benefit.

The southeast door of the 4160V switchgear room is not in close proximity to any credible fire hazard and a rated door is not required. A postulated credible fire involving transient sources will be eliminated by administrative controls.



NRC STAFF POSITION

27. Cables in 4160V switchgear room should be covered with a flame retardant coating.

NRC CONCERN

27. Due to the large fire hazard and importance of this area to plant operation, a backup system is required. A passive fire control design feature such as a flame retardant coating on the cables or an active feature such as sprinklers would be acceptable.

SCE RESPONSE

27. The design of the total flooding Halon suppression system to be installed in the room will be such that it will extinguish any credible fire in the area. The capability for indication of a fire in its early stages, to be provided by the fire detectors, will enable the fire brigade to adequately back up the Halon system using manual fire fighting methods. Furthermore, as is discussed in the response to Staff Position 50, the plant can be maintained in a safe shutdown condition in spite of the complete loss of any fire zone, including the 4160V switchgear room. For the above stated reasons, the additional active or passive fire fighting feature is not required for a safe shutdown of the plant.

BASIS FOR RESPONSE

27. The 4160V switchgear room contains all SR and NSR 4KV switchgear for the plant. In addition, it serves as a cable spreading room. Fire protection at this time consists of an automatic detection system with manual hose reels located outside the room. It is planned to install an automatic Halon fire suppression system in the room to protect the room against a postulated cable fire initiated by a transient ignition source or an electrical fault.

The fire detectors represent an early warning system capable of detecting a fire prior to its becoming deep seated. Halon is particularly effective against this type of fire, extinguishing it before any appreciable involvement of nearby materials. To ensure maximum effectiveness, Halon concentrations would be maintained a minimum of 1 to 2% greater than necessary for extinguishment for a time in excess of 10 minutes per NFPA requirement.

The proposed Halon fire suppression system will have the capability to be manually operated from a location outside the area of concern.

To combat any potential hot spots, the fire brigade, equipped with self contained breathing apparatus, ladders and hose reels, would enter the building, locate the fire and direct a hose stream to the area. This selective method of water application is preferred as it minimizes water damage to sensitive electrical apparatus.

As is described in the response to the NRC Staff Position 50, the plant can be maintained at hot shutdown for 72 hours with the subsequent capability to go to cold shutdown in spite of the complete loss due to fire of any fire zone.

In light of the above, the existing and planned fire protection features are considered sufficient to prevent a fire in the 4160V switchgear room from limiting the capability for safe shutdown of the plant.



NRC STAFF POSITION

29. Cables in area of turbine lube oil reservoir and conditioner (zone 9A) should be covered with a flame retardant coating or protected by a directed water spray suppression system.

NRC CONCERN

29. The cables have to be protected from both exposure to a fire in the lube oil reservoir and conditioner area, and from a fire in the cable tray itself. Either of the two proposed modifications would accomplish this.

SCE RESPONSE

29. The NRC proposed modifications are not the only means of resolving the NRC concern. It is the position of SCE that the methods and modifications described in the fire hazards analysis for this area presented in Reference 1, are sufficient to protect the cables from both concerns. Furthermore, it has been determined that the loss due to fire of the cables which are routed in this area would not limit the capability for safe shutdown of the plant. Therefore, the NRC proposed modifications are not required.

BASIS FOR RESPONSE

29. The proposed fire suppression system (either foam or deluge), would extinguish a fire in the lube oil reservoir and conditioner, before it damaged any safety related cables routed above the area.

The fire detectors above the cable trays would provide early detection of a fire which was independent of a fire in the area below. This would allow manual control of a fire in the cable tray by directed spray using hose reels in the area.

Cables which are supported by these cable trays were identified. The cables associated with equipment needed for safe shutdown will be rerouted per commitment in Reference 1. Though the cabling for the fire pumps is routed through this area, credit is taken for the Units 2 and 3 fire pumps.

NRC STAFF POSITION

31. Water sprinklers should be provided over west feedwater pump lube oil cooler.

33. The wall between area 9E and area 10 should be upgraded to 3 hr. rating. The west door from area 9E should be replaced with a 3 hr. door.

44. Hydrogen seal oil area should have area sprinkler protection (Zone 9D).

NRC CONCERN

31. Water sprinklers are necessary to protect the safety related equipment located above lube oil cooler.

33. The wall between the two areas is not fire rated for 3 hrs. Area 10 has a 3 hr. fire severity. Area 9E contains safety related equipment which should be protected from fire.

44. Area 9D contains safety related equipment which should be protected from fire.

SCE RESPONSE

31. The loss of the equipment located above the lube oil cooler would not limit the capability to achieve and maintain the plant in a safe shutdown condition. Furthermore, the planned and existing fire detection/suppression systems available in the area will provide sufficient capability to control a fire in the area. The NRC proposed modification is therefore not required.

Response to S.P. 33 and 44.

The fire zones 9D and 9E contain equipment whose loss of function due to fire would not impair the safe shutdown of the plant. For that reason, the walls between these zones and areas 10 and 11 need not be 3 hr. rated for fire protection. The NRC proposed modifications are not required for the safe shutdown of the plant.

Note: The east wall, including penetrations of the exciter area, will not be upgraded as previously committed.

BASIS FOR RESPONSE

31. Located in the vicinity of the west feedwater pump lube oil cooler is a single cable tray, conduit and pneumatic valve. The cable tray and conduit provide power to components in this area. However, this cabling is redundant to that found on the east feedwater pump area and loss of this cabling will not affect plant safety. The pneumatic valve with hand wheel regulates steam to the turbine driven auxiliary feedwater pump. This pump would be used to shut the plant down in the event both feedwater pumps and the motor driven auxiliary feedwater pump were unavailable for this function.

Since a fire in the vicinity of the west feedwater pump would not render the east feedwater pump or motor driven auxiliary feedwater pump unavailable (with or without offsite power), there is no adverse affect on safe shutdown from a fire in this area. Consequently, sprinklers are not required in this area. In the event of a fire, the area does contain several pieces of equipment which can be used for fire fighting. A fire detection system will also be provided in this area.

Basis for response to S.P. 33 and 44.

The equipment contained in fire zones 9D and 9E is specified in the fire hazards analysis for these zones, included in Reference 1. Of this equipment, the Auxiliary Control Panel is the only item which appears in Table 5 (Safe Shutdown Equipment) of Reference 1. The description of this panel may result in the loss of capability to control the steam dump valves through override feedback to the main control panel. A suitable isolation device between the steam dump controls of the main panel and the auxiliary control panel will eliminate the steam dump control problem and allow for safe shutdown with no affects from the loss of the Auxiliary Control Panel.

The power and control cables for the Auxiliary Control Panel are the only cables routed through zones 9D and 9E which are connected to equipment listed in Table 5 of Reference 1. As is specified above, the loss of the panel will not affect safe shutdown.

NRC STAFF POSITION

37. Existing detectors in east and west cable penetration area of sphere enclosure should have smoke collection hoods and should be elevated.

39. A curb should be provided between Station Service Transformer #1 and sphere penetration area (zone 19).

47. The 480V and 4160V switchgear room walls facing the turbine building, including penetrations, should be upgraded to provide a 3 hr. rated fire barrier. The east door to 480V switchgear room should be 3 hr. rating (not 2 hr. as proposed).

49. The gas engine screen wash pump area should be curbed to prevent the spread of gas spill from spreading to the area of the salt water cooling pumps.

NRC CONCERN

37. The existing configuration of the smoke detectors is inadequate to provide prompt detection of a fire.

39. The stated modifications are required to protect the safety related cables in the sphere penetration area from the fire hazard associated with the transformer.

47. The walls being used as a fire barrier should have a rating commensurate with the hazard.

49. As is stated in the Staff Position, the concern is that gasoline could flow towards the salt water cooling pumps.

SCE RESPONSE

SCE agrees with the NRC concern and will comply with its intent.

39. SCE will comply with this Staff Position.

47. The walls of the 4160V switchgear room have a 3 hr. fire rating so that the NRC Staff Position is met for this room. The planned penetration barriers will also be 3 hr. rated.

Concerning the 480V switchgear room, SCE agrees with the concern expressed by the NRC and will include appropriate measure in the Fire Protection Program to satisfy the NRC concern.

49. The loss of the salt water cooling pumps would not impair safe shutdown because of the availability of the redundant auxiliary salt water cooling pump. The NRC proposed modification is not required.

BASIS FOR RESPONSE

In situ test will be performed to determine the adequacy of smoke detectors in the area. As a result of these tests, any required modifications will be implemented. This will ensure that the smoke detectors perform their required function.

39. The curbing of this transformer has already been committed to in Reference 1.

47. The walls of the 4160V switchgear room are constructed of reinforced concrete at least 13 inches thick which is more than adequate for a 3 hr. rating (6" required for 3 hr. rating).

The potential fire hazard associated with the lube oil reservoir and conditioner is such that the heat produced from a fire may damage the walls sufficiently to affect the safety related equipment in the 480V switchgear room. In order to protect for the fire hazard, the wall can be upgraded by filling in the block wall with a suitable grout or adding layers of appropriate material. Another alternative is to add a water screen to cool the wall in case of fire.

49. The auxiliary salt water cooling pump is redundant and completely independent of the salt water cooling pumps. It performs the same functions as the salt water cooling pumps for safe shutdown conditions.