FEB 12 1985

Docket No. 50-323

MEMORANDUM FOR: Thomas M. Novak, Assistant Director
for Licensing
Division of Licensing

FROM: William V. Johnston, Assistant Director
Materials, Chemical & Environmental Technology
Division of Engineering

SUBJECT: REQUEST FOR APPROVED DEVIATIONS FROM THE REQUIREMENTS OF APPENDIX R TO 10 CFR 50 - DIABLO CANYON UNIT 2

Facility: Diablo Canyon Unit 2
Licensee: Pacific Gas & Electric Co.
Docket No.: 50-323
Responsible Branch & Project Manager: LB #3; H. Schierling
CMEB Reviewer: D. J. Kubicki
Status: Complete - 21 deviations requested; 21 recommended for approval

By letter dated December 6, 1984, the applicant provided an Appendix R evaluation for Unit 2. The applicant requested approval for deviations from Section III.G in seventeen areas. Two other deviations from this section were identified for conditions that were not area specific. Approval was also requested for deviations from the techncial requirements of Sections III.J and III.O.

The applicant's description of eleven of the Section III.G deviations did not reveal any significant difference between conditions in both units. This also was true of the one deviation from Section III.O. Therefore, our evaluations of the following deviations, as contained in Supplement No. 23 (NUREG-0675), are the same:

1. RHR pump 1-1 and heat exchanger room
2. RHR pump 1-2 and heat exchanger room
3. centrifugal charging pumps room
4. reciprocal charging pump room
5. turbine-driven auxiliary feed pump
6. control room complex
7,8. auxiliary saltwater pump rooms
9. auxiliary building and fuel handling building
10. steel hatches
11. unlabeled fire doors
12. RCP oil collection system (containment)

Contact: D. J. Kubicki
x27743

Enclosed is our evaluation of the remaining eight Section III.G deviations and the one deviation pertaining to Secion III.J. Based on our evaluation, we conclude that the applicant's proposed alternate fire protection configuration will achieve an acceptable level of fire protection and, therefore, the applicant's request for a deviation in the following areas should be granted:

1. shower, locker, and access control
2. hot shutdown panel and nonvital switchgear room
3. electrical area west of the battery room
4. corridor outside the diesel generator room
5. component cooling water heat exchanger
6,7. diesel generator rooms
8. penetration area
9. emergency lighting

On November 6, 1984, we received a 10 CFR 21 report, which indicated that, under actual fire conditions, fire dampers of a type installed at the plant may not close. However, by letter dated January 29, 1985, the applicant committed to implement modifications on the dampers to preclude such failures. These modifications will be completed prior to fuel load. We find this acceptable.

Also included is the proposed license condition for fire protection and our SALP input.

William V. Johnston, Assistant Director
Materials, Chemical & Environmental
Technology
Division of Engineering

Enclosure: As stated

cc: J. P. Knight
R. Ferguson
S. Pawlicki
O. Parr
G. Knighton
F. Rosa
S. Ebneter, Region I
T. Conlon, Region II
C. Norelius, Region III
E. Johnson, Region IV
D. Kirsch, Region V
P. Qualls, Region V
V. Benaroya
T. Wambach
T. Sullivan
D. Kubicki
H. Schierling
M. Srinivasan

OFC	:DE:CMEB	:DE:CMEB	:DE:CMEB	:DE:ADM:NCET	:	:	:
NAME	:DKubicki:bjp	RFerguson	:VBenaroya	:WVJohnston	:	:	: :
DATE	:2/11/85	:2/11/85	:2/11/85	:2/12/85	:	:	:

Enclosure

Chemical Engineering Branch/Fire Protection Section
Request for Approved Deviations
Diablo Canyon Unit 2
Docket No. 50-323

1.0 Introduction

By letter dated December 6, 1984, the applicant provided an Appendix R evaluation for Unit 2. The applicant requested approved for deviations from Section III.G in seventeen areas. Two other deviations from this section were identified for conditions that were not area specific. Approval was also requested for deviations from the technical requirements of Section III.J and III.O of Appendix R.

The applicant's description of eleven of the Section III.G deviations did not reveal any significant difference between conditions in both units. This was also true of the one deviation from Section III.O. Therefore, our evaluations of the deviations in the following areas, as contained in Supplement No. 23 (NUREG-0675) are the same:

1. RHR pump 1-1 and heat exchanger room
2. RHR pump 1-2 and heat exchanger room
3. centrifugal charging pumps room
4. reciprocal charging pump room
5. turbine-driven auxiliary feed pump room
6. control room complex

7,8. auxiliary saltwater pump rooms

9. auxiliary building and fuel handling building
10. steel hatches
11. unlabeled fire doors
12. RCP oil collection system (containment)

Our evaluation of the remaining eight Section III.G deviations and the one deviation pertaining to Section III.J is as follows:

Section III.G.2 of Appendix R requires that one train of cables and equipment necessary to achieve and maintain safe shutdown be maintained free of fire damage by one of the following means:

(1) Separation of cables and equipment and associated nonsafety circuits of redundant trains by a fire barrier having a 3-hour rating. Structural steel forming a part of or supporting such fire barriers shall be protected to provide fire resistance equivalent to that required of the barrier.

(2) Separation of cables and equipment and associated nonsafety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustibles or fire hazards. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area.

(3) Enclosure of cable and equipment and associated nonsafety circuits of one redundant train in a fire barrier having a 1-hour rating. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area.

If these conditions are not met, Section III.G.3 requires that there be an alternative shutdown capability independent of the fire area of concern. It also requires that a fixed suppression system be installed in the fire area of concern if it contains a large concentration of cables or other combustibles. These alternative requirements are not deemed to be equivalent; however, they provide equivalent protection for those configurations in which they are accepted.

Because it is not possible to predict the specific conditions under which fires may occur and propagate, the design-basis protective features rather than the design-basis fire are specified in the rule. Plant-specific features may

require protection different from the measures specified in Section III.G. In such a case, the licensee must demonstrate, by means of a detailed fire hazards analysis, that existing protection or existing protection in conjunction with proposed modifications will provide a level of safty equivalent to the technical requirements of Section III.G of Appendix R.

In summary, Section III.G is related to fire protection features for ensuring that systems and associated circuits used to achieve and maintain safe shutdown are free of fire damage. Either fire protection configurations must meet the specific requirements of Section III.G or an alternative fire protection configuration must be justified by a fire hazard analysis. Generally, the staff will accept an alternative fire protection configuration if:

(1) The alternative ensures that one train of equipment necessary to achieve hot shutdown from either the control room or emergency control stations is free of fire damage.

(2) The alternative ensures that fire damage to at least one train of equipment necessary to achieve cold shutdown is limited so that it can be repaired within a reasonable time (minor repairs using components stored on the site).

(3) Fire-retardant coatings are not used as fire barriers.

(4) Modifications required to meet Section III.G would not enhance fire protection safety levels above that provided by either existing or proposed alternatives.

(5) Modifications required to meet Section III.G would be detrimental to overall facility safety.

The following sections of this report address each of the applicant's requests for deviations and present the staff's evaluation and conclusion regarding each request.

2.0 Penetration Area (Fire Area 3-CC)

2.1 Requested Deviation

The applicant requested approval for a deviation from Section III.G.2 in this area to the extent that it requires the separation of redundant shutdown divisions by 20 feet, free of intervening combustibles, and the installation of area-wide fire detection and suppression systems.

2.2 Discussion

Fire area 3-CC consists of three levels that comprise the area between the containment structure and the auxiliary building from elevation 85 feet to elevation 115 feet. This fire area is bounded on the south by the containment building wall, which is separated by an 8-inch seismic and vent gap at each floor level. It is separated from the auxiliary building to the north and the fuel handling building to the east by concrete 3-hour fire-rated walls with 1½-hour rated doors. This fire area is separated from the turbine building to the west by a 3-hour fire-rated barrier. The floor and ceiling of this area are 3-hour fire-rated barriers. The floors separating the three levels are concrete slabs with numerous unsealed penetrations.

Exceptions to the 3-hour fire-rated barriers in this area are as follows:

(1) 1-½-hour-fire-rated doors in perimeter wall doorway openings at elevations 85 feet, 104 feet, and 115 feet

(2) ventilation louvers without fire dampers in the southwest external wall at all three elevations

(3) unsealed pipe penetrations in the south ceiling at elevation 140 feet.

(4) unsealed pipe penetrations located in the floor at elevation 85 feet which penetrates into the component cooling water pump room.

(5) blowout panels at elevation 115 feet which communicate with the main steam pipe tunnel and ultimately the outdoors. A door adjacent to the blowout panels has its latch removed to allow the door to swing open in the event of a high energy line break.

These openings are in walls and ceiling that form the perimeter of adjoining plant locations that the licensee has designated as separate fire areas.

Safe shutdown equipment located in the area includes piping and valves associated with the auxiliary feedwater system, RHR system, charging and boration system, component cooling water system, and main steam system, as well as shutdown-related circuits listed in Table 3-4 of the licensee's Appendix R report.

The fire loads in the area, by elevation, are given below; they consist primarily of cable, grease, rubber, and hydrogen.

Elevation, ft.	Combustible Btu/ft^2	Equivalent fire severity, min.
85	negligible	negligible
100	9900	7.4
115	9900	7.4

Existing fire protection includes a partial smoke detection system that is located at elevations 100 and 115 feet in the vicinity of the cable trays located near the ceiling at the west side of each elevation. Smoke detection is also provided in the post-LOCA sampling room in the southwest corner at elevation 85 feet.

Additional protection consists of an automatic, wet-pipe sprinkler system that provides area-wide coverage at elevations 100 and 115 feet, manual hose stations, and portable fire extinguishers.

In the Appendix R report, the applicant committed to implement the following modifications:

1. To install additional smoke detectors at elevation 115 feet such that complete area-wide coverage will be achieved for this elevation west of column line L.

2. Pull box covers located in the ceiling of elevation 100 feet for steam level transmitter circuits will be protected by a 1-hour fire-rated barrier.

3. Conduits, junction box, and penetration box with circuits from reactor coolant temperature elements will be protected by a 1-hour fire barrier so as to isolate loop 1 from loop 2 elements.

4. Source range neutron flux monitors NE-31 and 32 will be supplemented by two additional flux monitors which will have circuits routed to maintain a 20-foot minimum separation, free of intervening combustibles, through this fire area to the hot shutdown panel.

5. Containment penetration boxes BTG 12E, BTG 19E, and BTG 26E, located at elevation 115 feet, will be protected by a 1-hour fire-rated barrier.

6. An automatic closed-head sprinkler system will be provided across the opening created by the blow-out panels and adjacent door.

The applicant justifies the deviations on the bases of the low fire load, the proposed and existing fire protection, the fire stopping installed in cable

trays, the enclosure of shutdown-related cabling in steel conduit, and the degree of spatial separation and/or noncombustible barriers between redundant shutdown divisions.

2.3 Evaluation

The technical requirements of Section III.G.2 are not met in this area because of

(1) the absence of a complete fire detection and a fire suppression system in elevation 85 feet

(2) the partial smoke detection systems at elevations 100 feet and 115 feet

(3) the lack of 20 feet of separation distance free of intervening combustibles between circuits for the three redundant reactor coolant pressure transmitters on elevation 115 feet

(4) the unrated steel access covers to the pull boxes on elevation 85 feet

(5) the absence of 3-hour fire-rated doors and dampers to protect the openings in the 3-hour fire-rated perimeter walls and ceiling

We had three concerns about the level of fire protection in this area:

1. A fire at elevation 85 feet would damage redundant shutdown divisions in the pull boxes. However, these pull boxes are located below grade with an 8-inch concrete curb above the floor. This provides us with reasonable assurance that if a flammable liquid spill occurred, with ignition, the resulting fire would not directly affect the steel pull box covers. Also, the effects of any potential fire would be directed upward into the ceiling and away from the covers. We, therefore, have

reasonable assurance that pending arrival of the fire brigade and eventual fire extinguishment, the steel covers will prevent damage to at least one shutdown division.

2. A fire on elevation 115 feet would damage vulnerable reactor coolant pressure transmitter circuits. However, if such a fire occurred, it would be detected in its formative stages by the fire detection system. The fire brigade would then extinguish the fire using manual fire fighting equipment. If rapid fire propagation occurred, the automatic sprinkler system would actuate to both suppress the fire and to protect the vulnerable circuits. Until the sprinkler system actuated and/or the fire brigade arrived, the existing spatial separation would provide sufficient passive protection to prevent damage to more than one shutdown division.

3. The damaging effects of a fire might spread beyond the perimeter walls into adjoining plant locations. However, because of the limited fire load and the existing and proposed smoke detection and sprinkler systems, we expect the smoke and heat from a fire to be largely confined within the perimeter of this area. Because all openings in the perimeter walls have not been protected, some smoke would be expected to infiltrate into adjoining plant locations. But this smoke would be diffused and cooled so it would not pose a significant threat to the adjoining areas, other than to reduce visibility to some limited extent.

3.4 Conclusion

Based on our evaluation, we conclude that the existing fire protection, along with the proposed modifications, provides an acceptable level of fire safety equivalent to that provided by Section III.G.2. Therefore, the applicant's request for a deviation in the penetration area (fire area 3.CC) should be approved.

SHOWERS, LOCKERS, AND ACCESS CONTROL (FIRE AREA 4-B)

4.1 Requested Deviation

The applicant requested approval for a deviation from Section III.G.2(c) to the extent that it requires the installation of an automatic fire detection and suppression system and the protection of one shutdown division by a 1-hour fire-rated barrier. This deviation pertains to the Unit 2 shutdown circuits which were not addressed in our evaluation of the area in Supplement No. 23.

4.2 Discussion

Fire area 4-B is the radiological control access area for Units 1 and 2. This area contains personnel showers, lockers, restrooms, offices, and storage areas. It is bounded by walls, floor, and ceiling with a 3-hour fire rating with the following exceptions:

(1) a 2-hour rated north wall separating this area from the chemical laboratory, with 1½-hour rated fire doors and 1½-hour rated fire dampers in all but four of the duct penetrations

(2) an unrated door providing access to stairway S-2 and a 1½-hour fire-rated door providing access to stairway S-1

(3) several equipment hatches and ceiling penetrations with unrated steel covers

(4) ventilation ducts without fire dampers penetrating the south wall of this area into the Unit 2 containment penetration area

Safe shutdown systems located in the area consist of cables associated with the following systems:

- auxiliary feedwater
- auxiliary saltwater
- component cooling water
- emergency power
- ventilation equipment

The fire loading within this area is approximately 4,590 Btu/ft^2 with an equivalent fire severity of 3.4 minutes on the ASTM E-119 time-temperature curve. The combustible load consists primarily of wood counters, electric cable insulation, and anti-contamination clothing and respirators.

Existing fire protection includes an area-wide automatic sprinkler system, with sprinkler heads located below the suspended ceiling; a partial smoke detection system located in the office in the northwest corner of this area; portable fire extinguishers and manual hose stations.

In the December 6, 1985 Appendix R Report the applicant committed to implement the following modifications:

1. An area-wide smoke detection system will be installed above and below the suspended ceiling.

2. The 4.16 KV power supply to 480 V load center 2G will be protected by a 1-hour fire rated barrier.

3. The wall separating the "G" and "H" bus compartments from this fire area will be upgraded to a full 2-hour fire rating above the ceiling.

The applicant justified the deviation on the basis of the low fire load, the existing and proposed protection, and the ability to be able to maintain a safe shutdown capability after a fire.

4.3 Evaluation

The technical requirements of Section III.G.2(c) are not met in this area because of the insufficient physical separation between redundant circuits of the auxiliary saltwater and charging water systems.

The staff had two concerns in this area.

1. A fire would damage redundant circuits for the systems referenced above. However, if a fire occurred it would be detected in its formative stages before significant propagation or temperature rise occurred. It would then be extinguished by the plant fire brigade using manual fire fighting equipment. If a significant temperature rise occurred prior to the arrival of the brigade, the automatic sprinkler system would actuate to suppress the fire and to protect vulnerable shutdown circuits. If the sprinkler system did not actuate in time or if the fire occurred near the ceiling, the circuits for the auxiliary saltwater and charging water systems might be damaged. However, the flow paths for these systems could be re-established by manual actions outside of the fire area.

2. The fire might propagate outside of the area and damage redundant shutdown systems in adjoining locations. However, the fire load in this area is low. Consequently, we do not expect any postulated fire to generate excessive quantities of smoke and hot gases. If it should, the sprinkler system would activate to reduce temperatures and limit damage. The perimeter construction described above provides reasonable assurance that most of the effects of a fire would be confined to the

area of origin. Because of the lack of fire dampers in some duct penetrations of the fire walls, a quantity of smoke and hot gases may filter into an adjoining area (fire area 4-A). But the products of combustion would be cooled and dissipated as they expand into this area. Therefore, shutdown systems would not likely be threatened. In addition, fire area 4-A is equipped with automatic smoke detection systems above and below the ceiling, which would provide early fire warning and an automatic sprinkler system. Also, the ceiling registers from the ventilation system in fire area 4-A have been provided with fire dampers. Therefore, if hot gases from a fire in the area were to propagate through the duct system, the fire damper in the ceiling would close to limit damage below the ceiling.

4.4 Conclusion

Based on our evaluation, we conclude that the existing fire protection with the proposed modifications will provide an acceptable level of fire safety equivalent to that provided by Section III.G.2 and, therefore, the licensee's request for a deviation in the showers, lockers and access control area (fire area 4-B) should be approved.

5.0 HOT SHUTDOWN PANEL AND NONVITAL SWITCHGEAR ROOM (FIRE AREA 5-A-4)

5.1 Exemption Requested

The applicant requested approval for a deviation from Section III.G.2(c) to the extent that it requires that redundant shutdown divisions be separated by a 1-hour fire barrier and the area protected by automatic fire detection and suppression systems.

5.2 Discussion

The hot shutdown panel and nonvital switchgear room is bounded by walls, floor, and ceiling of 3-hour fire-rated construction with the following exceptions:

(1) equipment access openings with unrated steel hatches in the floor and ceiling

(2) a ventilation register without a fire damper in a common wall with stairway S-1

(3) .3-hour fire-rated doors with filled metal panels in the perimeter walls

(4) ventilation ducts without fire dampers or with 1½-hour rated dampers penetration the perimeter walls and ceiling

Safe shutdown systems in the area consist of the hot shutdown panel and cables listed in Table 3-4 of the Appendix R report.

The fire loading in the area is approximately 25,167 BTU/ft² or an equivalent severity of 19 minutes on the ASTM E-119 time-temperature curve. The fire load consists primarily of cable in raceways evenly distributed over the entire 2,702-square-foot area.

Existing fire protection includes an area-wide smoke detection system, manual hose stations, and portable fire extinguishers.

In the Appendix R Report, the applicant committed to implement the following modifications:

1. An isolator will be provided on each diesel generator RPM tach-pack to preclude a trip of the diesel generators due to a fire-induced circuit failure of the RPM indication circuity that passes through the subject fire area.

2. The control switch in the hot shutdown panel associated with ASW pump 2-1 will be switched to a normally cut out position to prevent loss of control of this pump from the control room.

3. A 1-hour fire barrier will br provided for conduit K7438 along its entire length in fire areas 5-B-4 (Unit 2) and 5-A-4 (Unit 1), to preclude the loss of the emergency diesel fuel oil transfer pumps.

4. Filled metal panels that are adjacent to fire doors will be replaced with a 3-hour rated wall assembly. The door frame will be replaced by a labeled assembly for a single door in lieu of the existing frame which supports the existing combined door and panel.

The applicant justifies the deviation in this area on the basis of the low fire loading, existing fire protection, proposed modifications and the ability to achieve safe shutdown in the event of a fire in this area.

5.3 Evaluation

The technical requirements of Section III.G.2 are not met because of the absence of an automatic fire suppression system and the inadequate physical separation between redundant circuits for the auxiliary saltwater supply valves FCV-602 and FCV-603.

We had two concerns with the level of fire safety in this area:

1. That a fire would damage redundant shutdown-related systems. However, if a fire damaged the shutdown systems in this area the applicant would rely upon the normal shutdown equipment which is physically and electrically independent of the fire area. If the redundant circuits for the auxiliary saltwater system were damaged, the applicant would re-establish the flow path by manual actions outside of the fire area.

2. That a fire would propagate outside of the area and damage redundant shutdown systems in other locations. However, the fire hazard in these areas is low. Because of the dispersion of the combustible materials that may ignite, a potential fire would tend to develop slowly. Because of the smoke detection system, a fire would be detected in its initial stages and extinguished before serious damaged occurred. Pending arrival

of the brigade, the perimeter construction of room would be able to confire a significant quantity of the products of combustion. Because of the lack of complete fire-rated construction at the perimeter, a small quanity of smoke and hot gases might be expected to spread out from this location. If this did occur, the products of combustion would either spread into areas where no shutdown system are located or would be so cooled and dissipated as to pose no threat to shutdown systems.

5.4 Conclusion

Based on our evaluation, we conclude that the existing fire protection with the proposed modifiation will provide an acceptable level of safety equivalent to that achieved by compliance with Section III.G.2 and, therefore, the applicant's request for deviations in the hot shutdown panel and switchgear room (fire area 5-B-4) should be approved.

6.0 ELECTRICAL AREA WEST OF THE BATTERY ROOM (FIRE AREA 6-B-5),

6.1 Requested Deviation

The applicant requested approval for a deviation from Section III.G.2 to the extent that it requires that redundant shutdown divisions be separated by 3-hour fire-rated barriers.

6.2 Discussion

This area is located in the southwest corner of the auxiliary building at elevation 115 feet. The perimeter walls, floor, and ceiling are 3-hour-rated fire barriers with the following exceptions:

(1) equipment access openings with unrated 1-inch-thick steel hatches in the floor and ceiling in this area

(2) several ventilation duct penetrations without fire dmapers in the perimeter walls and floor. (The ducting within the area and its supports are protected with a 1-hour fire-rated material.)

These penetrations are in walls that form the boundaries of adjacent fire areas.

Safe shutdown systems in this room are listed in Table 3-4 of the licensee's Appendix R Report.

The fire loading within this area is 11,960 BTU/ft^2, or an equivalent fire severity of 9 minutes on the ASTM E-119 time-temperature curve. The fire load consists of electrial cable insulation and small amounts of lubricating oil.

Existing fire protection includes an area-wide smoke detection system. manual hose stations, and portable fire extinguishers.

In the December 6 Appendix R Report, the applicant committed to provide an isolator on each diesel generator RPM tach-pack to preclude a trip of the diesel generators due to a fire-induced circuit failure of the RPM indication circuitry that passes through this area.

The applicant justified the exemptions on the bases of the low fire loading, the existing fire protection, and the ability of the duct system to limit fire spread.

6.3 Evaluation

The technical requirements of Section III.G.2 are not met in this area because shutdown-related systems in this fire area are not separated from redundant systems in adjoining locations by 3-hour fire-rated barriers. Also, circuits for redundant auxiliary saltwater supply valves area not separated per the requirements of Section III.G.2.

We were concerned that if a fire occurred, the loss of the above referenced circuits would adversely affect the component cooling water heat exchangers. However, if this occurred, the applicant would re-establish the flow path by manual actions outside of the fire area.

We were also concerned that a fire might propagate beyond the area boundaries and affect redundant shutdown systems in adjoining plant locations. However, the amount of ignitable materials is limited and widely dispersed. Thus, a fire would not be expected to be of significant magnitude or duration. Because of the smoke detection system, which covers the entire area, a fire would be detected in its initial stages before serious damage occurs. Although the perimeter construction of this room is not completely 3-hour fire rated, it is substantial enough to confine most of the effects of a fire within the area of fire origin.

Because of the lack of fire dampers in the ventilation duct penetrations of the walls, some quantity of smoke and hot gases might flow out of the room through the ventilation system. However, the products of combustion would not post a threat to shutdown systems in other fire areas because of (1) the limited amount of combustibles, (2) the 1-hour fire-rated enclosure of the ducts in the room, and (3) early fire detection and early response by the fire brigade. In addition, compensating fire protection is available in adjoining locations to mitigate the hazard posed by damage to the ventilation duct system. This protection includes a sprinkler sytem, enclosure of ducts in a 1-hour fire-rated barrier, and fire dampers in the ceiling registers.

6.4 Conclusion

Based on our evaluation, we conclude that the existing fire protection with the proposed modification will provide an acceptable level of safety equivalent to that provided by Section III.G.2 and, therefore, the applicant's request for a deviation in the electrical area west of the battery room (fire area 6-B-5) should be approved.

7.0 COMPONENT COOLING WATER HEAT EXCHANGER ROOM (FIRE AREA 19-E)

7.1 Requested Deviation

The applicant requested approval for a deviation from Section III.G.2(c) to the extent that it requires that one train of redundant shutdown equipment

be completely enclosed in a 1-hour fire-rated barrier and requires the area to be protected by automatic fire suppression and detection systems.

7.2 Discussion

This room is in the souteast corner of the Unit 1 turbine building at elevation 85 feet. It is bounded by construction that has a 3-hour fire-resistance rating with all penetrations protected.

The equipment in this zone includes the two component cooling water (CCW) heat exchangers and the three motor-operated and two air-operated valves associated with the CCW system and auxiliary saltwater system for safe shutdown. In addition, cables associated with the auxiliary saltwater system, CCW system, and diesel generator tachometer indication are located within the area.

A reinforced-concrete missile shield separates the redundant heat exchangers, and extends approximately 2.5 feet beyond the ends of the heat exchangers.

The fire loading in the room is approximately 16,000 BTU/ft^2 with an equivalent fire severity of 12 minutes. The fire load is primarily cables in trays evenly distributed over an area of approximately 1,700 square feet.

Existing fire protection includes a partial smoke detection system and an automatic sprinkler system that provides complete, area-wide coverage. Manual fire fighting equipment includes portable extinguishers and fire hose stations.

The applicant justified the deviation on the bases of the low fire loading, existing fire protection, and the ability to maintain or maually restore flow paths for the component cooling water and auxiliary saltwater system after a fire.

7.3 Evalaution

The technical requirements of Section III.G.2 are not met in this area because a complete 1-hour fire barrier has not been provided around one shutdown division. Auxiliary saltwater valves FCV-602 and FCV-603 and the associated conduits are located less than 10 feet apart. Component cooling water motor-operated valves FCV-430 and FCV-431 and the associated conduits are located less than 20 feet apart, and the component cooling water heat exchangers are less than 5 feet apart. Also a complete fire detection system has not been provided.

We were concerned that a fire in this area would damage the above-referenced shutdown systems. However, the fire load is low. Combustible materials that could ignite are widely scattered. This provides reasonable assurance that if a fire should occur, it would propagate slowly, with initially low heat generation. Because of the smoke detection system, a fire would be detected and extinguished in its initial stages before serious damage occurred. If a fire were to propagate rapidly and room temperature rose, the automatic sprinkler system would activate, both to suppress the fire and to protect the vulnerable shutdown systems. Until the suppression system activated or the fire brigade arrived, the concrete shield wall and the existing spatial separation between redundant divisions would provide a degree of passive protection sufficient to keep one division free of damage. If the fire should result in damage to the valve circuits to the CCW motor-operated valves, the valves will fail as is. Because one is normally open and the other normally closed, and because flow through only one CCW heat exchanger is required, safe shutdown capability would be maintained.

If the fire should result in failure of the circuits to the auxiliary saltwater valves, time is available after the fire is extinguished to manually open the valves.

7.4 Conclusion

Based on our evaluation, we conclude that the existing fire protection provides an acceptable level of fire safety equivalent to that provided by Section III.G.2 and, therefore, the applicant's request for a deviation in the component cooling water heat exchanger room (fire area 19-E) should be approved.

8.0 CORRIDOR OUTSIDE THE DIESEL GENERATOR ROOM (FIRE AREA 22-C)

8.1 Requested Deviation

The applicant requested approval for a deviation from Section III.G.2(c) to the extent that it requires the installation of a complete fire detection system.

8.2 Discussion

The corridor is bounded by walls, floor, and ceiling of 3-hour fire-rated construction with the following exceptions:

1. a ventilation duct penetrating the east wall is equipped with a 1½-hour rated fire damper.

2. the door leading to stairwell S-7 is 1½-hour rated.

3. a duct penetration without a fire damper exists in the ceiling.

Safe shutdown systems in the corridor consist of cables, in conduit, that are listed in Table 3-4 of the Appendix R report. The cables include vital bus circuitry for all three diesel generators and both diesel fuel transfer pumps. In addition, the diesel generator emergency stop switches are located in this area.

The only fire hazard in the corridor would be transient combustible material consisting of lube oil, solvent, and rags. The fire load equals 16,050 Btu/ft^2 with an equivalent severity of 12 minutes on the ASTM E-119 time-temperature curve.

Existing fire protection includes an area-wide automatic sprinkler system, manual hose stations, and portable fire extinguishers.

In the Appendix R report, the licensee committed to enclose each of the circuits for the diesel generators in a 2-hour fire-rated barrier. A 2-hour barrier already encloses the circuits for the fuel transfer pump. In addition, the applicant committed to enclose the emergency stop push-button switches for two diesel generators in a 1-hour barrier to prevent a short circuit across the push-button contact from prematurely tripping the diesel. The licensee also committed to install isolators for diesel generator indication circuitry to prevent a short circuit there from tripping the diesel generators.

The applicant justified the deviations on the bases of the low fire loading, the existing fire protection, and the proposed modifications.

8.3 Evaluation

The technical requirements of Section III.G.2 are not met in the corridor because of the absence of an area-wide fire detection system. In addition, the perimeter construction is not completely 3-hour fire rated.

We were concerned that because of the absence of a smoke detection system, a fire could damage redundant shutdown systems or propagate beyond the boundaries of the fire area. However, if a fire should occur, the automatic sprinkler system would be expected to operate and extinguish the fire as well as protect the vulnerable systems. When the sprinkler system activated,

a waterflow alarm would annunciate in the control room and summon the plant fire brigade. Until the brigade arrived, the circuits for the diesel generators and fuel transfer pumps would be protected by the fire barriers.

Because of the limited amount of combustibles in the corridor and the protection provided by the sprinkler system, even if the perimeter construction were not completely 3-hour fire-rated, it would be sufficient to confine the effects of a fire to the area of origin. Any smoke or hot gases that filter out of the area would be dissipated and cooled so they would not pose a threat to shutdown-related systems in adjoining fire areas.

8.4 Conclusion

Based on our evaluation, we conclude that the existing fire protection with the proposed modifications will provide an acceptable level of fire safety equivalent to that provided by Section III.G.2 and, therefore, the applicant's request for a deviation in the corridor (fire area 22-C) should be approved.

9.0 DIESEL GENERATOR ROOMS (FIRE AREAS TB-8 AND TB-9)

9.1 Requested Deviation

The applicant requested approval for deviations from Section III.G.2(a) in these areas to the extent that it requires that redundant shutdown divisions be separated by complete 3-hour fire-rated barriers.

9.2 Discussion

Fire areas TB-8 and TB-9 are separate fire areas containing the emergency diesel generators and their associated air supply and exhaust equipment. Two of the three diesel generators are required for safe shutdown. A third diesel, located in Unit 1, Fire Area TB-3, is common to both units.

These areas are located at the southwest corner of the Unit 2 turbine building at elevations 85 and 107 feet. They are divided into two fire zones each to differentiate between the generator rooms and the ventilation intake and exhaust rooms.

The areas are bounded by walls, floors, and ceilings of 3-hour-fire-rated construction with the following exceptions:

(1) unprotected louvers to the outside on the south and west perimeter walls

(2) separation from an adjoining fire area at elevation 107 feet by a 3-hour fire-rated barrier with unrated metal hatches

(3) an unrated steel hatch at elevation 85 feet in the common wall between the plenum area and an anteroom.

The fire loading in each area is approximately 150,800 Btu/ft^2 with an equivalent severity of 113 minutes. The fire loading is comprised primarily of diesel fuel and lubricating oil.

Existing fire protection includes complete automatic fire detection and carbon dioxide fire suppression systems in the diesel generator room, manual hose stations, and portable fire extinguishers. The rooms have a floor drain system and are also provided with curbs at door openings at elevation 85 feet to contain oil spills.

In the Appendix R report, the applicant committed to replace the equipment hatches at elevation 107 feet with 3-hour rated double doors. The personnel hatches will be removed and replaced by a 3-hour fire barrier.

The applicant justified the deviations on the basis of the existing fire protection and the proposed modifications.

10.3 Evaluation

The technical requirements of Section III.G.2 are not met in these areas because the redundant shutdown systems in adjoining fire areas are not separated by a 3-hour fire rated barrier.

The principal concern is that a fire that originates within any one of these areas would propagate beyond the perimeter walls and damage redundant shutdown systems in other fire areas. However, within the generator rooms themselves, any postulated fire would be detected and extinguished by the automatic carbon dioxide system. Activation of the carbon dioxide system would be annunciated in the control room, which would summon the fire brigade. Until the fire brigade arrived, the walls, floor, and ceiling would confine the damage to the area of origin.

Within the ventilation intake and exhaust rooms, the fire hazard is minimal. Because of the limited amount of combustibles, any postulated fire would be of limited magnitude and extent. Smoke and hot gases would either be vented outside through the louvers in the exterior wall or confined within the area by the fire-rated perimeter construction and doors until the fire brigade arrived.

10.4 Conclusion

Based on our evaluation, we conclude that the existing fire protection, with the proposed modification, will provide an acceptable level of safety equivalent to that provided by Section III.G.2 and, therefore, the licensee's request for deviations in the diesel generator rooms (fire areas TB-8 and TB-9) should be approved.

11.0 EMERGENCY LIGHTING

11.1 Requested Deviation

The applicant requested approval for a deviation from Section III.J to the extent that it requires that emergency lighting units with at least an 8-hour battery supply be provided in all areas needed for operation of safe shutdown equipment and in access and egress routes thereto.

11.2 Discussion

Emergency lighting at the plant consists of three independent systems:

(1) emergency ac lighting

(2) emergency dc lighting

(3) emergency self-contained lighting (sealed beam lights with an 8-hour battery supply)

Locations required for safe shutdown that are provided with self-contained lighting units are listed in Section 4.0 of the Appendix R report. In addition, the applicant evaluated other areas where credit was taken for manual operation of equipment to achieve safe shutdown. These locations are listed in Section 4.2 of the Appendix R report. They were evaluated for potential loss of the emergency ac lighting system to determine if 8-hour battery pack lights were required or a modification of the emergency ac lighting system were necessary to prevent fire damage.

As a result of that analysis, the applicant committed, by letter dated January 28, 1985, to either provide additional battery-powered emergency lighting units or modify the ac system (by protecting or rewiring circuits) in the areas that were found to be deficient.

For the remaining areas the licensee concluded on the basis of its analysis that the existing ac lighting was sufficiently reliable to justify the absence of 8-hour battery powered lighting units.

11.3 Evaluation

The emergency lighting system at the plant consists of the three independent systems:

The emergency ac lighting system is powered from vital buses. Upon loss of normal power supply to the vital buses, the emergency diesel generators will provide power to the vital buses. Thus, the emergency ac lighting system will be continuously energized.

The emergency dc lighting system is energized upon loss of the emergency ac lighting system (station blackout) and is de-energized after a 5-second delay, upon return of power to the emergency ac lighting system, These lights are powered from the nonvital station batteries and will provide sufficient emergency lighting for at least 1 hour.

The emergency self-contained lighting units are located in various areas of the plant where lighting may be required to achieve safe shutdown. This lighting is supplemental to the emergency lighting system as discussed above, so that light would be available should damage occur to the emergency lighting circuits serving a particular area. The emergency self-contained lights are energized upon failure of the emergency ac lighting system and subsequently de-energized when the emergency ac lighting system is returned to service. These lighting units are provided in the following areas:

Area	Fire Area/Zone
Control room	CR-1
Battery rooms	6-B-1, 6-B-2, 6-B-3
Cable spreading room	7-B
Hot shutdown panel	5-B-4
Vital switchgear rooms	TB-10, TB-11, TB-12
Auxiliary feedwater pump rooms	3-Q-1, 3-Q-2
Diesel generator rooms	TB-8, TB-9
Dedicated shutdown instrument panel	3-CC, elevation 100
480-V vital switchgear rooms	5-B-1, 5-B-2, 5-B-3

The applicant provided the results of an analysis regarding the effects of fire on the emergency ac lighting system that indicated that in the event of a fire, emergency lighting will be available in the necessary areas. The applicant has stated that to ensure lighting along the entire access and egress routes, emergency ac lighting circuitry affected by the fire will not affect other emergency ac lighting circuits. Where interactions have been identified, modifications will be made to those circuits required for areas of access and egress, or safe shutdown functions.

For the two outdoor plant perimeter access and egress areas, emergency lighting will be provided by another plant lighting system that is independent of the offsite power supply.

Further, the applicant committed to review the plant emergency lighting (including that portion of the security lighting system where credit is taken in order to satisfy the requirements of Appendix R) to verify that the levels of illumination were sufficient for implementing actions required for operation of safe shutdown equipment and along access routes to such equipment. The guidelines of NFPA 101, Section 5-9, "Emergency Lighting," 1981 will be used as the bases for this evaluation.

Two separate field tests will be conducted as part of this evaluation. These tests will be scheduled at night with simulated loss of light due to loss of offsite power and fire damaged lighting circuits. If, on the bases of the initial test, deficiencies in the level of illumination are found, the applicant commits to provide additional lighting units. A second field test will then be conducted to ensure the adequacy of the emergency lighting.

11.4 Conclusions

Based on our review, we conclude that the use of the proposed emergency lighting systems and the field verification of the adequacy of the lighting provide an acceptable margin of safety equivalent to that provided by the technical requirements of Section III.J. Therefore, the applicant's request for a deviation should be approved.

12.0 FIRE DAMPERS

12.1 Discussion

On November 6, 1984, we received a 10 CFR 21 report from the Ruskin Manufacturing Company which indicated that Ruskin fire dampers of a type installed in the plant would not close under certain conditions. As described in this report, the fire dampers may not close because of:

1. the interference of conduit for the electro-thermal link on the verticle dampers, and

2. insufficiently strong "negator" springs on the horizontal dampers.

By letter dated January 29, 1985, the applicant stated that such dampers are now being tested and committed to modify the dampers by removing the

conduits in both the verticle and horizontal dampers and by providing new negator springs and modified locking mechanisms if modifications are deemed necessary. This work will be completed by fuel load. Because these modifications will correct the problem, we find this acceptable.

12.2 Conclusion

Based on the applicant's commitments, the fire dampers will conform to the requirements of Appendix A to BTP APCSB 9.5-1 and are, therefore, acceptable.

13.0 SUMMARY

Because the applicant has not identified any significant difference between the physical attributes of the following areas in both units, our evaluation of the Unit 1 Appendix R deviations in these areas, as contained in Supplement No. 23 are the same for Unit 2.

1. RHR pump 1-1 and heat exchanger room
2. RHR pump 1-2 and heat exchanger room
3. Centrifugal charging pumps room
4. Reciprocal charging pump room
5. Turbine-driven auxiliary feed pump
6. Control room complex
7.8. Auxiliary saltwater pump rooms
9. Auxiliary building and fuel handling building
10. Steel hatches
11. Unlabeled fire doors
12. RCP oil collection system (containment)

Based on our evaluation, we conclude that the applicant's alternate fire protection configuration in the remaining areas for which deviations were requested will achieve an acceptable level of fire protection and, therefore,

the applicant's request for a deviation in the following areas should be granted:

1. Shower, locker, and access control
2. Hot shutdown panel and nonvital switchgear room
3. Electrical area west of the battery room
4. Corridor outside the diesel generator room
5. Component cooling water heat exchanger
6.7. Diesel generator rooms
8. Penetration area
9. Emergency lighting

Based on the commitments contained in the applicant's letter dated January 29, 1985, the Ruskin fire damper issue is closed.

Diablo Canyon Unit 2 License Condition

Fire Protection Section 9.5.1. SSER

(a) The licensee shall maintain in effect all provisions of the approved fire protection program as described in its Final Safety Analysis Report for the facility through Amendment ____, and as described in the December 6, 1984 Appendix R Report, subject to provisions (b) and (c) below.

(b) The licensee may make no change to the approved fire protection program which would decrease the level of fire protection in the plant without prior approval of the Commission. To make such a change, PG&E must submit an application for a license amendment pursuant to 10 CFR 50.90.

(c) The licensee may make changes to features of the approved fire protection program which do not decrease the level of fire protection without prior Commission approval provided:

(1) such changes do not otherwise involve a change in a license condition or technical specification or result in an unreviewed safety question (see 10 CFR 50.59); and

(2) such changes do not result in failure to complete the fire protection program approved by the Commission prior to license issuance.

The licensee shall maintain, in a auditable form, a current record of all changes including an analysis of the effects of the change on the fire protection program and shall make such records available to NRC inspectors upon request. All changes to the approved program made without prior Commission aproval shall be reported annually to the Director of Nuclear Reactor Regulation, together with supporting analyses.

Input to the SALP Process--Diablo Canyon Unit 2

A. Functional Area: Fire Protection

1. Management involvement in assuring quality: Throughout the review process, the applicant's activities exhibited evidence of prior planning and assignment of priorities. Decisions which were made were usually at a level that ensured adequate management review. Management was aware of the importance of fire protection and took steps to see that our review and site audit went well, including making contractor representatives available as needed.

Rating Category 2

2. Approach to resolution of technical issues: During the various meetings, telecons, and in the several documents submitted in conjunction with the resolution of our fire protection review issues, the applicant's representatives displayed a clear understanding of our concerns with the level of fire safety. The applicant's additional fire protection commitments revealed a consistently conservative approach toward providing an adequate level of safety. The justification provided in support of the applicant's fire protection program was based on sound fire protection engineering principles. With the exception of the Ruskin fire damper isue, where additional analyses was necessary, all outstanding issues were resolved in a timely manner.

Rating Category 1

3. Responsiveness to NRC initiatives: The applicant provided timely written and oral responses to our requests for information. Most of the proposals offered to resolve our fire protection concerns were viable.

Rating Category 2