

AUG 29 1983

Docket Nos.: 50-528, 50-529  
and 50-530

APPLICANT: Arizona Public Service Company  
FACILITY: Palo Verde, Units 1, 2 and 3  
SUBJECT: SUMMARY OF MEETING ON FIRE PROTECTION PROGRAM

A meeting was held with the applicant on August 3, 1983 in Bethesda, Maryland to discuss the Fire Protection Program for Palo Verde. The purpose of the meeting was to discuss the applicant's responses to the staff findings resulting from a site audit of the Palo Verde Fire Protection Program held in February 1983. The findings were transmitted to the applicant on April 11, 1983 and the applicant's responses were forwarded by letter dated June 15, 1983. Attendees for the meeting are shown on Enclosure 1. The meeting is summarized as follows.

Summary

Prior to the meeting, the applicant was informed that its responses to Questions 1 through 5, 8, 10, 16, 21, 23 and 25 (in its June 15, 1983 submittal) did not completely resolve the staff's concerns. To address this matter, the applicant provided draft revised responses to those questions at the meeting (Enclosure 2), except for Questions 8 and 23.

Following discussion of the proposed revisions, the staff concluded that the revised responses to Questions 2, 10, 16 and 23 would resolve the staff's concerns. Also, the revised responses to Questions 1 and 25 would be acceptable with the inclusion of manufacturer letters with Response 1, and the deletion of the work "intent" in Response 25. For Questions 3, 4, 5, 8, 21 and 23 additional information would be required to complete the responses. The applicant indicated that it would provide additional information in those areas by the end of August 1983 to resolve the staff's concerns.

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For a number of these fire protection items, the applicant indicated that the required actions would not be complete prior to fuel load. The staff stated it can only grant relief for such items up to 5% power operation, provided that the applicant, (1) shows why they cannot be completed before fuel load and (2) provides compensatory measures until the action is completed

Original signed by:

E. A. Licitra

E. A. Licitra, Project Manager  
Licensing Branch No. 3  
Division of Licensing

Enclosures:

- (1) Meeting Attendees
- (2) Proposed Revised Responses

|         |                    |                   |  |  |  |  |  |
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| OFFICE  | DL:LB#3 <i>EAL</i> | DL:LB#3 <i>GW</i> |  |  |  |  |  |
| SURNAME | EALicitra/yt       | GWKnighton        |  |  |  |  |  |
| DATE    | 8/26/83            | 8/26/83           |  |  |  |  |  |



Palo Verde

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Meeting Attendees

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GAGE-Babcock & Assoc.

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EPRI

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N. Baldasari

APS

Joy Morita  
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CE

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VERIFICATION THAT INSTALLED FIRE  
PROTECTION PLANT FEATURES SATISFY  
PREVIOUS COMMITMENTS

## Question 1:

Verify that doors in fire rated walls and partitions are listed for use in that type of wall or partition.

## Response:

All fire doors are, or will be, labeled fire doors of the fire rating required for the wall rating, (i.e., 3 hour wall: A label, 3 hour door; 2 hour wall: B label, 1-1/2 hour door; 1 hour wall: C label, 3/4 hour door) with the exception of doors that have removable transoms and/or have both louver and glass view plates. These exceptions have been certified by the manufacturer to be of UL or FM construction (but without label) offering the corresponding fire rating protection. These doors are listed in the accompanying table:

| FIRE ZONE | DOOR # | WALL RATING | DOOR RATING | REMARKS |
|-----------|--------|-------------|-------------|---------|
| 28        | F105   | 2 HR        | B           | WG&L    |
| 29        | F201   | 2 HR        | B           | WG&L    |
| 42D/42A   | A102   | 2 HR        | B           | RT      |
| 42D       | A104   | 2 HR        | B           | RT/WG&L |
| 42A/42D   | A110   | 2 HR        | B           | RT      |
| 42B/42C   | A118   | 2 HR        | B           | RT      |
| 52A/47A   | A201   | 2 HR        | B           | RT      |
| 49        | A204   | 3 HR        | A           | RT      |
| 54/52D    | A213   | 2 HR        | B           | RT      |
| 47B/52D   | A216   | 2 HR        | B           | RT      |
| 55        | A302   | 1 HR        | C           | WG&L    |
| 57A       | A317   | 1 HR        | C           | WG&L    |
| 57G       | A320   | 1 HR        | C           | WG&L    |
| HP OFFICE | A323   | 1 HR        | C           | WG&L    |
| 57A/57    | A327   | 1 HR        | C           | WG&L    |
| MEN'S LKR | A335   | 1 HR        | C           | WG&L    |
| 74        | C111   | 3 HR        | A           | RT      |
| 59/62     | R107   | 2 HR        | B           | WG&L    |
| 61A       | R121   | 2 HR        | B           | WG&L    |

where RT = removable transom  
WG&L = wire glass and louver

Note: Fenestra letter, July 15, 1983, certifies that the series S6 doors supplied are made with construction, material and workmanship approved by UL for classification as 3 hour (A label) or 1-1/2 hour (B label) labeled doors.



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Question 2:

Verify that the lack of structural steel fire proofing will not cause structural collapse during a postulated fire in the following plant areas:

- a. Floors and roof of Diesel Generator Building
- b. Elevation 140 feet in the Main Steam Support Structure
- c. Auxiliary Building Zones: 42A & 42B  
47A & 47B  
55 & 56B

Response:

- a. The reinforced concrete floors and roof of the Diesel Generator Building are self supporting. Other structural steel material is not required.
- b. The Main Steam Support Structure (MSSS) is provided with water suppression on all levels. Even an exposure fire cannot reach the roof support columns and/or structural beams. This structure is also open to the atmosphere at the roof line providing natural heat ventilation. Additionally, water spray from the spray nozzles for elevation 140 ft. are arranged such that the columns and beams will be sprayed. These features will ensure that the structure steel will not collapse.
- c. The Structural steel in zones 42 A&B and 47 A&B is now protected with cable tray and column sprinklers. Area sprinkler protection will be added by the end of the first refueling outage of Unit 1, and prior to fuel load for Units 2 and 3. These systems will be modified to preaction with activation by smoke detection or heat sensed by the cable tray protectowire system, which gives early warning to the control room. The preaction valves are located in a relatively clean area. They will be inspected monthly and trip tested semi-annually to assure reliability. Even without active automatic suppression, the equivalent fire severity is approximately 30 minutes consisting of fire resistant cable jacketing. These zones are readily accessible for manual fire fighting and have a hose station located just outside the door. The structural members are also very heavy steel beams and columns and are not easily deformed within the parameters of a design basis fire in these zones. The above will prevent structural collapse during a postulated fire in these zones.

Columns in Zones 55 and 56B have adequate protection from the wet pipe water suppression system installed.

(FPER figures 15 and 16 will be revised in the next amendment.)



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Question 3:

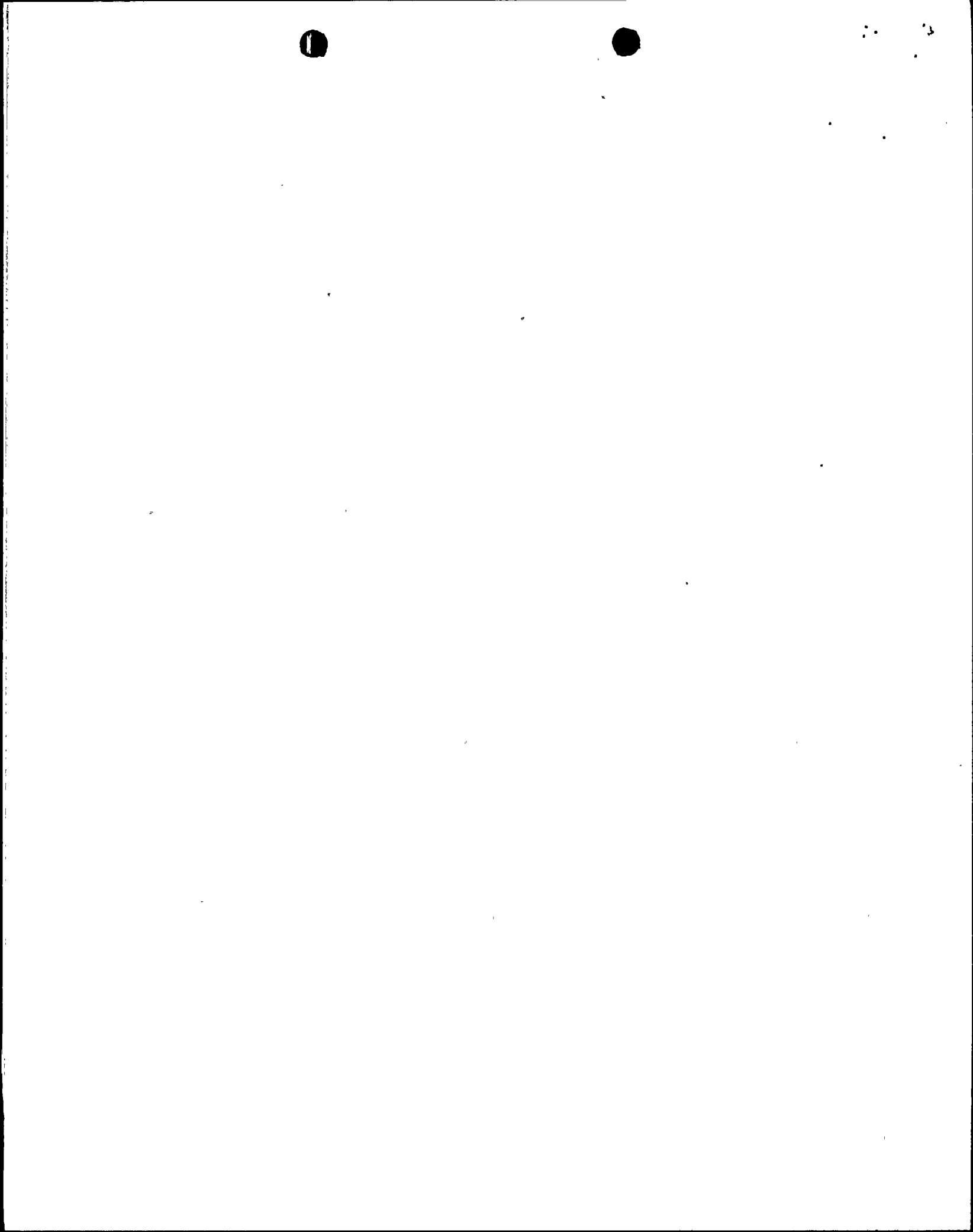
Verify that the fire dampers installed in the plant are listed for the following uses:

- a. Grouped dampers at floor/wall penetrations
- b. Single dampers at 3-hour fire rated wall/floor penetrations
- c. Dampers in drywall and metal lath and plaster partitions

Response:

- a. The design for ganged fire dampers is being testing by Waldinger. The forecast date for completion of the test report is August 30, 1983. The results will be forwarded to the NRC for review following Waldinger's formal submittal to APS.
- b. Single dampers at 3-hour rated wall/floor penetrations are rated for 3 hours. Those dampers presently labeled with 1-1/2-hour ratings are constructed to 3 hour standards. The labels will be upgraded to 3-hour ratings prior to operation above 5% power.
- c. Dampers installed in drywall and metal lath and plaster partitions will be rated for the rating of the partition, e.g., a 1-1/2-hour damper is installed in a 2-hour partition. Waldinger drawing (F-TWC-100 [Bechtel log #13-10407-M598-1861-6]) indicates that to provide adequate fire seals, gaps which exceed 1/2 inch will be filled with carborundum fiberfrax durablanket (6 lbs density). When small void areas do not allow the use of fiberfrax durablanket, fiberfrax bulk may be used to fill the void area by tamping full.

In the actual installation of the dampers in the drywall and the metal lath and plaster partitions, the dampers are not supported by the walls. The dampers are supported as part of the duct work which is independently supported and the studwalls are built around the duct/dampers. (Bechtel drawing 13-A-ZJD-501 shows typical cross-sections of duct penetrations through the studwalls, including the structural independence of the dampers and the studwalls.) The construction of the studwalls also contains barriers against fire penetration (see Bechtel drawing 13-A-ZYD-019). (Also see response to Question 4)



Question 4:

Verify that drywall and hollow concrete block partitions are 3-hour fire rated.

Response:

The noted partitions are 3-hour fire rated because:

(1) Block Walls

- Designed per UBC-1973 (Table 43B(a) item #27 through 30). The walls are fully grouted and reinforced throughout.
- Penetrations for conduit piping and cable trays are sealed in the same manner and with the same materials as those used for concrete walls.
- UL-rated fire dampers are installed in an approved design wherever HVAC ducting penetrates the barrier. (See response to Question 3c).

(2) Drywall/Metal Lath and Plaster (ML&P) Partitions

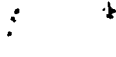
- Designed per UBC-1973 (Table 43B(a) item #61)

Notes:

- (a) All existing joints on the fire wall between the Remote Shutdown Panels will be removed and replaced with approved No. 15 closed joints.
- (b) Other ML&P walls are reclassified as 2-hour fire barriers. (FPER Figures 2, 3, 4, 5, 13, 15, 16 and 17 will be revised in the next amendment).
- (c) The acceptance criteria (UBC Section 43.114) for the testing performed for non-bearing walls and partitions are as follows:
  1. The wall or partition shall have withstood the fire-endurance test without passage of flame or gases hot enough to ignite cotton waste, for a period equal to that for which classification is desired.
  2. The wall or partition shall have withstood the fire and hose stream test as specified in Section 43.108, without passage of flame, of gases hot

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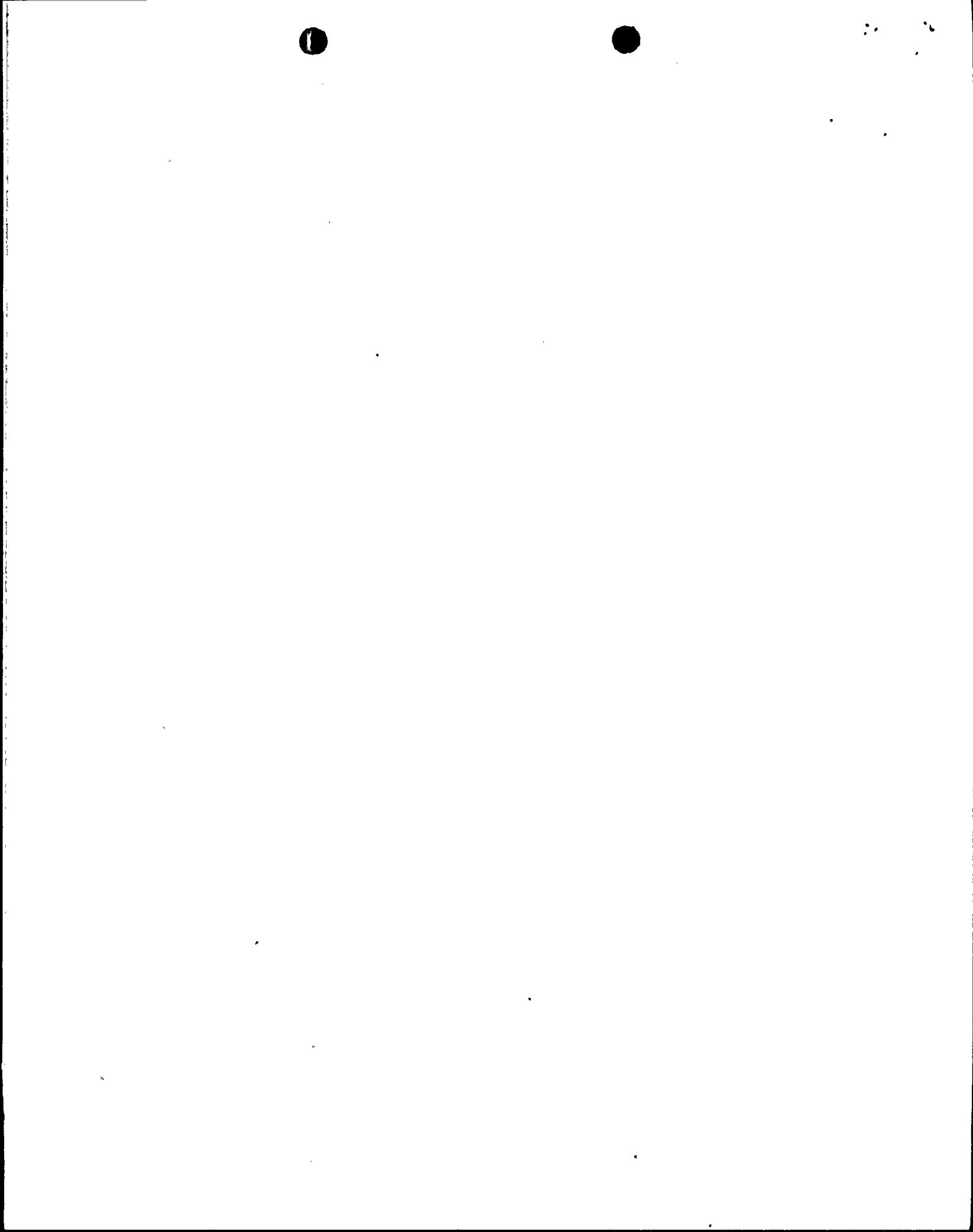
a. Testing for UBC fire ratings was performed in accordance with ASTM Standard E119 (equivalent to UL 263 "Fire Tests of Building Construction Materials") as noted in UBC Standard No. 43-1.





enough to ignite cotton waste, or of the hose stream. The assembly shall be considered to have failed the hose stream test if an opening develops that permits a projection of water from the stream beyond the unexposed surface during the time of the hose stream test.

3. Transmission of heat through the wall or partition during the fire-endurance test shall not have been such as to raise the temperature or its unexposed surface more than 250°F above the initial temperature.
- Conduit penetration seals are installed in a metal retaining sleeve as shown in ICMS drawing No. M-01-90 Specification No. AM-208. (This design has been approved with a 3-hour rating by ANI for use in ML&P walls.)
  - There are no cable trays which pass through 3-hour rated ML&P walls
  - UL-rated fire\_dampers are installed in an approved design wherever HVAC ducting penetrates the barrier.



Question 5:

Verify that cable tray penetration seals will not fail upon tray collapse.

Response:

The as-built cable tray configurations are supported at varying distances from the fire barrier.

To assure these configurations will maintain integrity of the seal, one or more of the following alternatives will be employed:

- (A) Conduct specific tests with as-built arrangements.
- (B) Coat the support nearest the fire barrier with a 3-hour barrier of fire retardant material (e.g. Thermolag) to assure their integrity and that of the penetration seal.
- (C) Add additional support(s) such that the as-built design is represented by a successfully tested configuration (as described in (A)).

One or more of these alternatives will be implemented prior to exceeding 5% power. This action will assure cable tray penetration seals will not fail upon tray collapse.



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Question 10:

To meet Section E.3 of BTP ASB 9.5-1, the applicant committed to equip hose stations with not more than 100 feet of fire hose. The applicant should verify that the existing hose stations will be able to protect all of the following areas with not more than 100 feet of hose:

- a. Zones 21/22 and 24
- b. Zone 74
- c. Zone 37

Response:

The PVNGS commitment to BTP APCSB 9.5-1 stipulated that no more than 100 ft of 1-1/2 inch hose would be used for interior hose stations. That commitment has been addressed in the following manner:

- a. Zones 21/22 and 24

Zones 21, 22, 23 and 25 and the diesel generator air intake filter room (zone 24) can be reached from hose station #90 (in the control building) which will be provided with a 125 foot length of hose. (The hose routing is not tortuous, and the flow resistance change from 100 feet to 125 feet is minimal. This exception to the PVNGS commitment to BTP APCSB 9.5-1 will be indicated in an upcoming FPER amendment.)

Additionally, APS will install another hose station with 100 ft. hose in the control building near the exit to the diesel building (see FPER Figure 2, column lines J4/JD). This hose will be able to reach Zones 21 and 22. Installation will be completed prior to exceeding 5% power. The FPER will be revised to show the new hose station in the next amendment.

- b. Zone 74

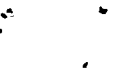
Main Steam Support (MSSS) Zone 74 can be reached within all areas of the 100 foot (grade) level and 140 foot level from standpipe and hose stations at those levels located at the northwest corner of the turbine building. These hose reels will be equipped with 100 feet of 1-1/2 inch hose. The 120 foot level of the MSSS is entirely an open grating and hose streams can be directed at all areas of that level upward from the 100 foot level and downward from the 140 foot level (which is also an open grating). The hose nozzles will reach within 20 feet of all areas of the building.

- c. Zone 37

All areas of Auxiliary Building, Zone 37, can be reached within 30 feet by a 125 foot of 1-1/2 inch hose from hose station No. 25. (Again, the hose station is not tortuous, and the change



in flow resistance is minimal. This zone has only piping and normally contains no combustible material. This exception to PVNGS commitment to BTP APCSB 9.5-1 will be reflected in an upcoming FPER amendment.)





Question 16:

Unprotected openings were observed in the following fire walls:

- a. Wall separating Zones 1 & 2 (Control Building elevation 74 ft.) from adjoining pipe chase.
- b. Wall opening between elevation 120 ft of the Main Steam Support Structure and the turbine building.
- c. Wall opening between elevation 88 ft of the auxiliary building and radwaste building.
- d. Seismic gap (both horizontal & vertical) at the containment building.

Response:

- a. The openings from fire zones 1 or 2 into the pipe chase area between the Control and Auxiliary Buildings is to be sealed to a three hour rating.
- b. The wall opening between fire zone 74 and the turbine building is utilized for normal exhaust from zone 74 to keep the main steam line penetrations cool. As air flow is away from the safety related equipment in zone 74, and there are negligible combustibles adjacent to the openings in the turbine building, the openings are acceptable.
- c. The openings between the pipe chase at elevation 88 of the auxiliary building and the radwaste building are to be sealed to a three hour rating prior to fuel load.
- d. The 6" (nominal) gap between the auxiliary building and containment building is required for seismic movement and pressure relief of postulated high energy pipe breaks in the auxiliary building piping penetration rooms. The gap is covered with sheet metal, but not sealed to a fire rating.

Fire protection for the narrow seismic gap in the concrete floors between the containment building and auxiliary building zones 42 A&B and 47 A&B will be provided by adding area sprinkler protection to these zones. This will be done by the end of the first refueling outage. Combustible loading consisting of fire resistant cable in these zones is relatively low (30 minutes) and is now protected by an automatic water spray suppression system activated by smoke and heat detection systems. These also provide early warning to the control room. These zones are readily accessible for manual fire fighting and a hose station is located just outside the door. These automatic and manual fire protection features will preclude fire spread upward through the seismic gap. Horizontal fire propagation at elevations 70' through 140' is precluded by two 2 ft. thick concrete walls (with a 6-inch seismic gap between the wall and containment) and a 40 ft. intervening void space.

(Also see response to Question 2C for additional discussion of area sprinkler system to be installed above elevation 100 ft.)



Question 21:

In Amendment 3 to the Fire Protection Evaluation, the applicant committed to comply with Section III.0 of Appendix R concerning an oil collection system for the reactor coolant pumps. We were concerned that the piping, oil collection tank and protection for the lift pumps would not collect oil leakage after a safe shutdown earthquake. The applicant agreed to respond to our concern by providing design details of the system.

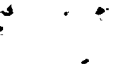
Response:

The pressurized<sup>(a)</sup> and unpressurized portions of RCP lube oil system (for pump and motor) have been analyzed to determine whether or not the components would survive an SSE without pressurized spray or leakage. Based upon that analysis, various mechanical joints (e.g. flanges), RTD connections, and sight glasses in the unpressurized section were identified as potential leakage paths. Piping and welded joints within the pressurized section were determined to remain intact. The lift pump discharge connection flange is considered subject to failure and is shrouded with a silicon-treated, glass cloth shield. The shroud is seismic Category I and provides an envelope for the oil spray, and serves to collect and direct the oil to the collection system like any other oil leakage.

To collect any leakage from the postulated leakage points, the criteria given in Section III.0 of 10CFR50 Appendix R was applied. Postulated leakage points are provided with open "cans," catch trays, or enclosed in shields. These devices drain by gravity to a piping system. The interface point between the RCP collection devices and the piping system is an open funnel. The piping system drains by gravity to two collection tanks. Each tank can contain all the oil from two RCPs, plus 10%, and is equipped with a flame arrestor and sight glass. The tanks are located below the RCPs, and are not near any ignition sources. No flanges are provided in the collection piping, except at the collection tanks.

In addition to collecting devices, some modifications were made to eliminate leakage points by seal welding threaded joints or removing flanges and replacing the flange by a welded connection. Part of the collection system within the pump housing utilizes compression-type tube fittings. (As the drain system is not pressurized, compression-type tube fittings are justified for this application.)

- a. The external portions of the RCP lube oil system which can be considered pressurized, are only operated for about 30 minutes prior to starting the RCP, and for about 30 minutes during the RCP shutdown sequence. All other pressurized portions of the system are internal to the pump and motor. The lift pump is normally secured.



Question 25:

In Amendment 3. to the Fire Protection Evaluation, the applicant proposed to utilize administrative controls to prevent fire damage to redundant shutdown division inside containment.

Administrative controls alone are insufficient to justify an exemption from the Appendix R requirements for protection of redundant safe shutdown systems in containment. The applicant should provide the technical requirements in section III.G.2 for inside containment to provide reasonable assurance that one train of equipment will be free of fire damage.

Response:

APS has reassessed areas of vulnerability within the containment. With the exception of the pressurizer auxiliary spray solenoid valves (CHA-HV-205, CHB-HV-203), the current design and commitments meet the intent of 10CFR50 Appendix R and BTP CMEB 9.5-1. APS commits to provide assurance that one train of the pressurizer auxiliary spray system will be free of fire damage by providing reflectorized and/or Thermolag insulation for the area in which both trains are subject to the same postulated exposure fire. Installation will be completed prior to fuel load.



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