

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR REACTOR REGULATION  
Thomas E. Murley, Director

In the Matter of )  
ARIZONA PUBLIC SERVICE COMPANY, ) Docket Nos. 50-528,  
ET AL. ) 50-529 and 50-530  
(Palo Verde Nuclear Generating Station, ) (10 CFR 2.206)  
Units 1, 2, and 3 )

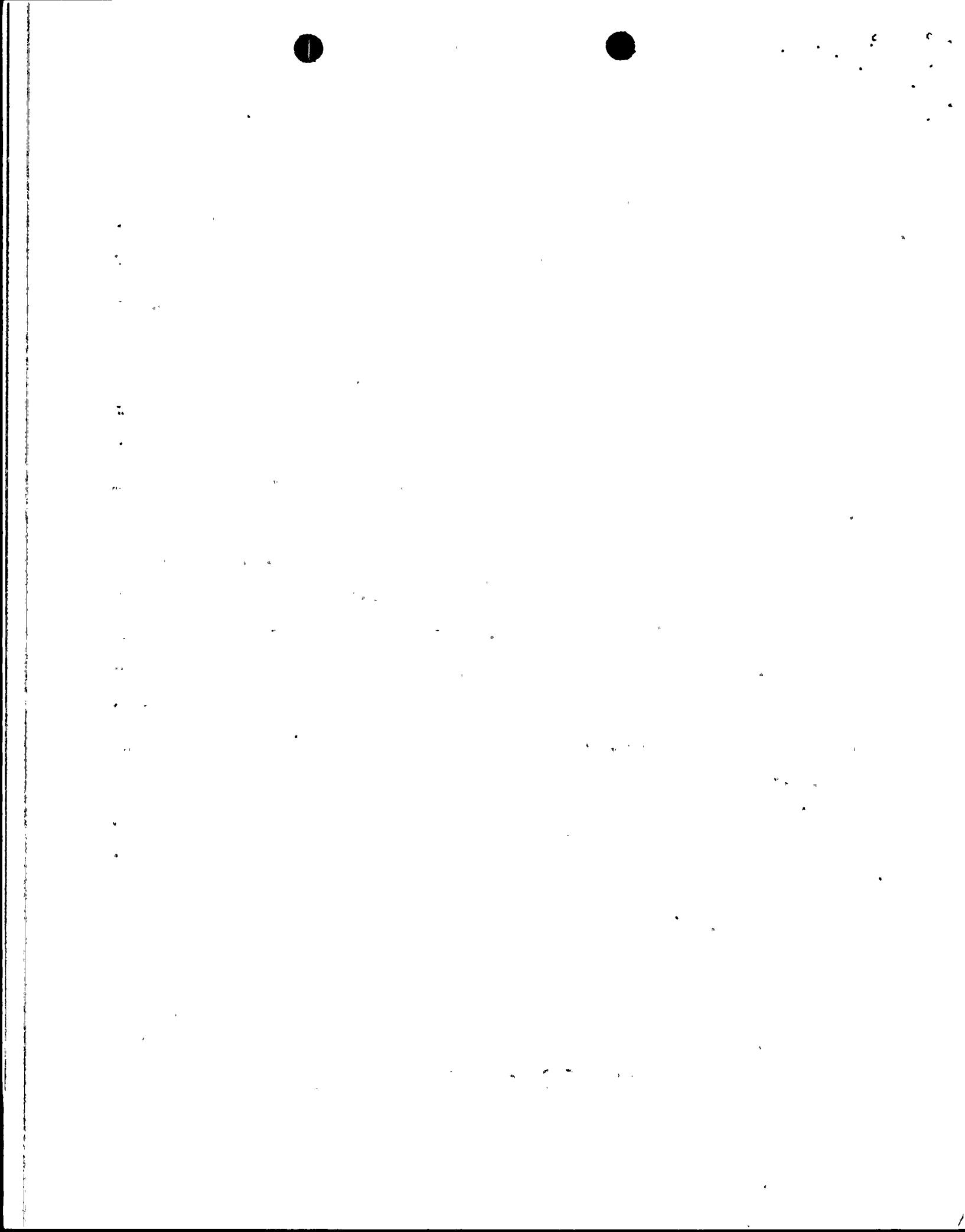
DIRECTOR'S DECISION UNDER 10 CFR 2.206

I. INTRODUCTION

On June 6, 1991, Messrs. David K. Colapinto and Stephen M. Kohn sent a letter addressed to the Chairman of the U.S. Nuclear Regulatory Commission (NRC) which presented 10 allegations regarding various facets of plant operation at the Palo Verde Nuclear Generating Station, and requested that the three units be immediately shut down until matters raised in the letter are resolved. The letter also stated that a special investigative team should be appointed to monitor and inspect conditions at the plant. The letter is being treated as a request for action (petition) under the NRC's regulations contained in Section 2.206 of Title 10 of the Code of Federal Regulations (10 CFR 2.206). By letter dated August 15, 1991, Petitioner's request for emergency action to shut down Palo Verde Units 1, 2, and 3 was denied, and receipt of the petition was acknowledged.

9203230291 920316  
PDR ADDCK 05000528  
PDR

9110020248

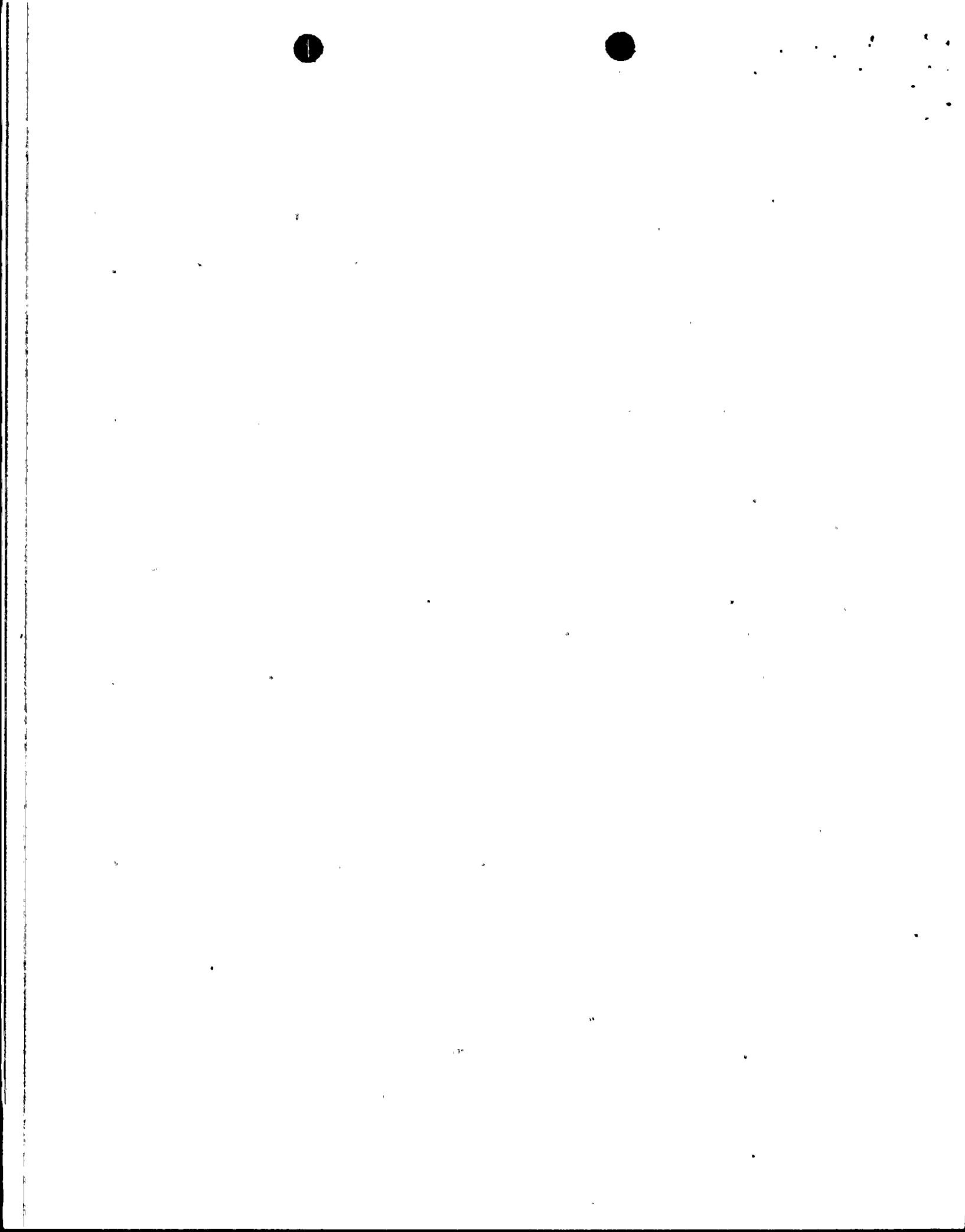


## II. DISCUSSION

In the June 6, 1991, letter the Petitioner presented 10 concerns as bases for petitioner's request. Petitioner's concerns are summarized as follows: a hydrogen leak in the main generator of Unit 1 could pose a fire hazard. Fire pumps at the plant have malfunctioned and cannot pump water in the event of a fire. The cooling towers are crumbling and are unsafe. The plants have been operating outside of safety regulations under "justifications for continued operation." The Arizona Public Service Company (APS, the licensee) has not identified the electrical circuit breakers for fire protection such that, in the event of a fire, it would not know what equipment could be damaged. It is rumored that Unit 2 has a primary-to-secondary leak of 2 gallons per minute. The licensee has willfully operated Palo Verde in violation of unspecified licensing requirements and willfully failed to report unspecified safety violations to the NRC through licensee event reports, as required. The licensee has never moved the portable hydrogen recombiner from one unit to another, has no procedure to do so, and has no backup recombiner. The licensee failed to correctly implement a design change for the reactor control element drive mechanisms on Unit 3. The licensee has engaged in widespread harassment and retaliation against employees who raise safety concerns.<sup>1</sup> Additional details regarding the condition of the cooling towers were provided in a supplemental letter of January 14, 1992.

---

<sup>1</sup>The NRC's Office of Investigations is investigating the matter of alleged intimidation, harassment, and retaliation against employees who raise safety concerns at Palo Verde in response to a Petition of May 22, 1990, filed under 10 CFR 2.206 by Mr. Colapinto on behalf of Ms. Linda Mitchell. As stated in the Director's Decision issued on October 31, 1990 (DD-90-7), this matter will be the subject of a separate Director's Decision. Therefore, this decision will not address that allegation.



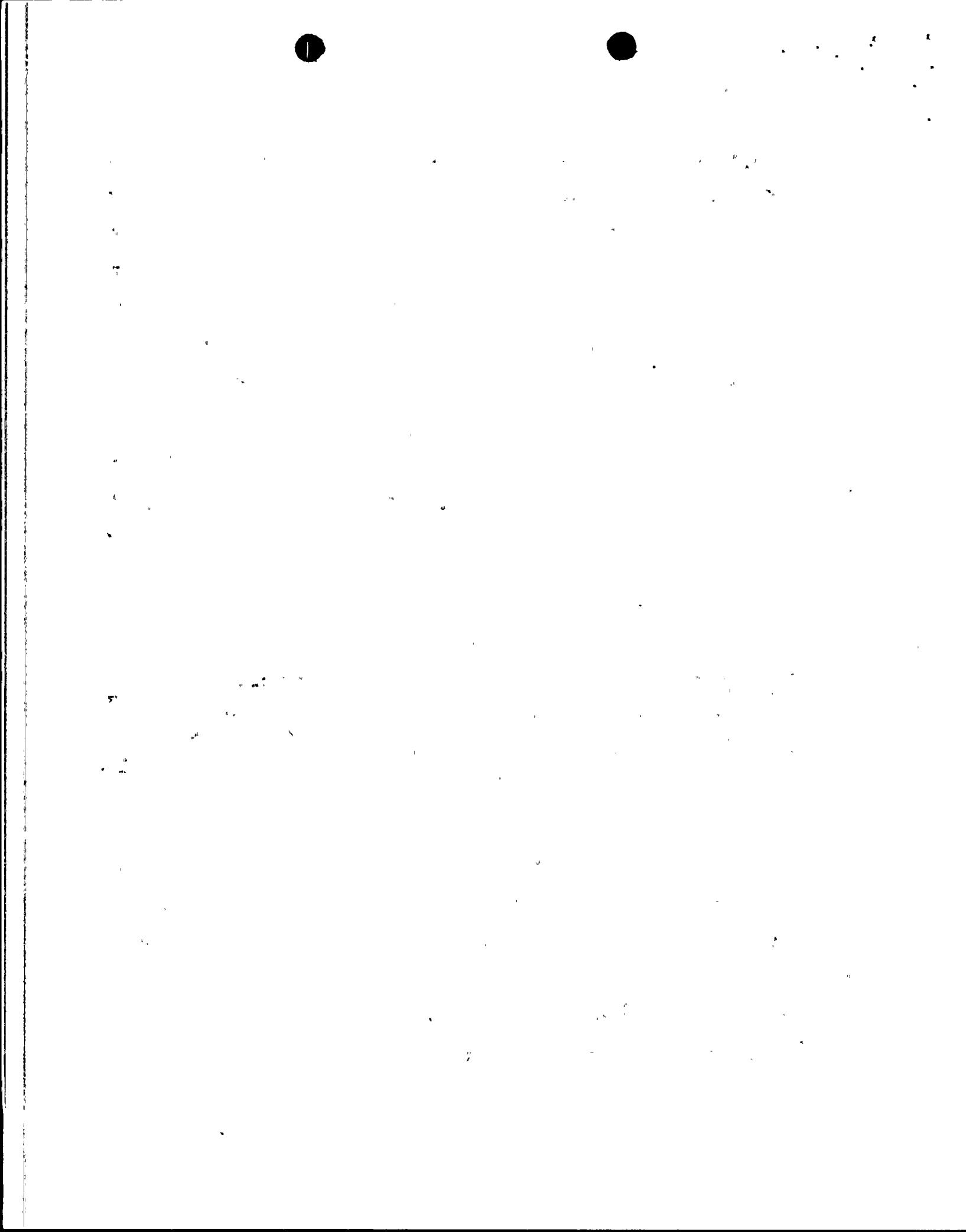
I will address each of these items below.

A. Unit Number One Hydrogen Leak

Petitioners allege the following:

A hydrogen leak in Palo Verde Unit 1 has been ongoing since late 1990 or early 1991. This has created an extremely dangerous and volatile condition which could ignite in a catastrophic fire. It is believed that APS has known of this condition for at least six months but has not fixed the problem. Moreover, APS had an opportunity to resolve the problem during a planned outage earlier this year but failed to do so.

The NRC has no specific regulations regarding hydrogen leakage from the generator portion of the turbine generator. However, good fire protection practices would require that such fire and explosion hazards be minimized. Hydrogen leakage from generators is normal, and hydrogen does leak from the Unit 1 generator. The rate of hydrogen leakage has been as high as 4600 cfd (cubic feet per day). Contrary to the allegation, the licensee performed extensive work during the Unit 1 outage in February 1991 to reduce the hydrogen leakage to approximately one-third (1300 cfd) of its former value. The leakage rate had increased to about 2000 cfd just prior to the unit shutdown for refueling in February 1992. During this refueling, a modification is being made to the unit generator which is expected to reduce hydrogen leakage. The generator area is well ventilated and has notices posted regarding the possible presence of hydrogen and a prohibition of smoking in the area. Specific portions of the generator hydrogen seal oil system are vented outside of the turbine building in an isolated area to minimize the fire hazard. Additionally, the licensee has procedures for monitoring the hydrogen concentration levels during plant operation. The levels of hydrogen detected to date are indicative of no significant risk of fire.



A lack of hydrogen purity in the generator is an explosion hazard. Procedures at Palo Verde require that the hydrogen concentration in the main generator be maintained between 90 percent and 100 percent to ensure adequate cooling of the generator and to avoid a flammable mixture of hydrogen and oxygen. The concentration is normally 97 percent, which is above the specified minimum 90 percent and well above a flammable limit of 75 percent. APS has not had a problem maintaining the generator hydrogen purity for Palo Verde.

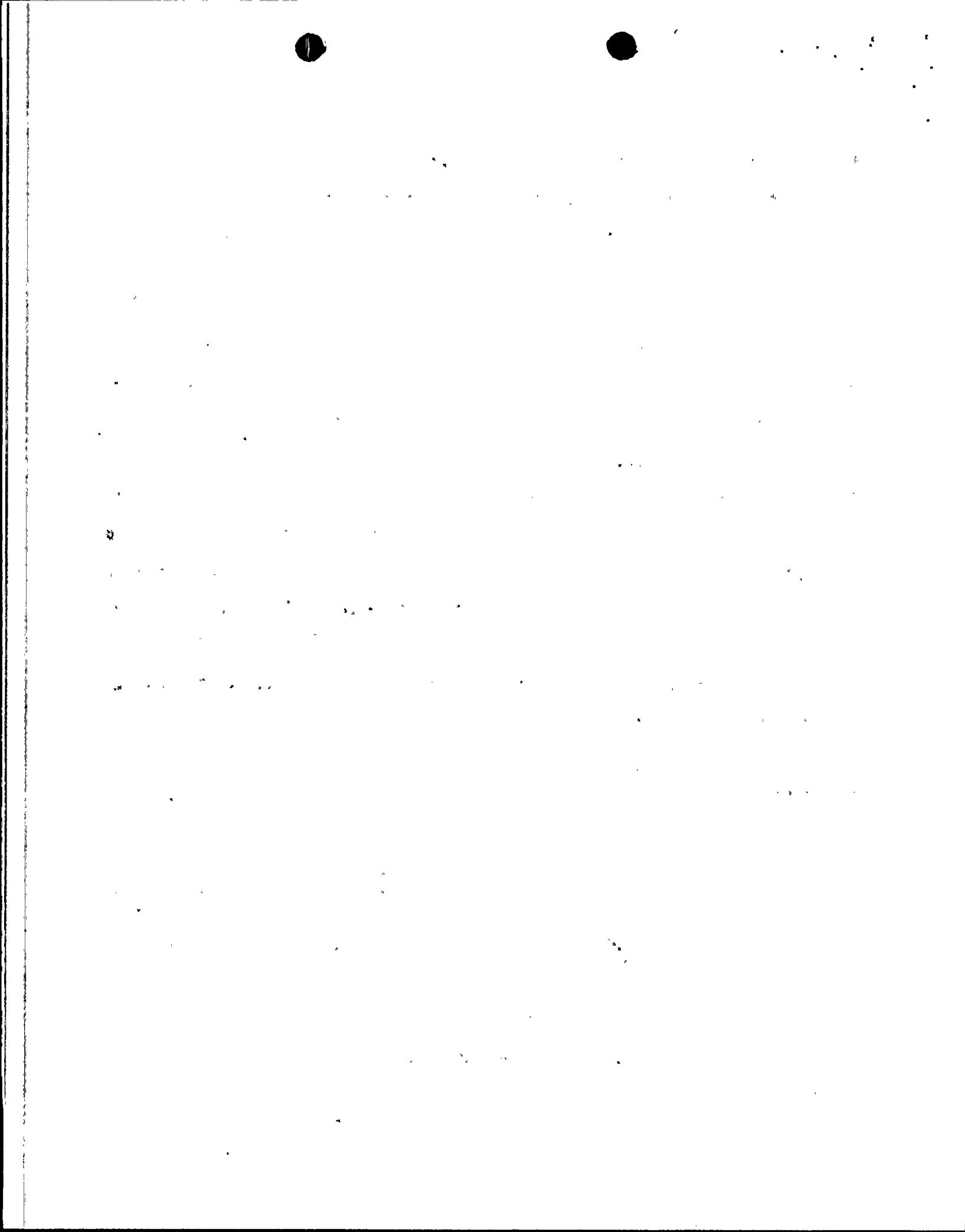
Consequently, based on all of the above there is no basis to conclude that the hydrogen leak in the Unit 1 generator is either a fire hazard or a substantial safety concern.

#### B. Fire Pump Reliability

Petitioners allege the following:

It has been recently discovered that the plant's fire pumps malfunction due to a lack of adequate maintenance. Although this equipment was upgraded to quality augmented system in 1990 APS has failed to perform adequate QA and routine maintenance. Thus, in the event of a fire at the plant there exists an unacceptable risk that the fire pumps would be unable to pump water to extinguish a fire.

Palo Verde has three permanently installed 50-percent capacity fire pumps, one powered by a motor and two powered by diesels. The site's fire pumper truck is also a backup pump that the licensee can connect to the fire main system to compensate for the extended loss of a single pump. The three-pump concept allows for one pump to fail because two of the pumps will provide 100-percent capability. The NRC reviewed pump test data and found that the maintenance history for these pumps has varied annually. Since 1987, the



licensee has initiated 4 to 12 individual pump outages each year for corrective maintenance. The total number of hours for corrective maintenance outages for all three pumps has varied from 624 to 2706 hours each year since 1987.

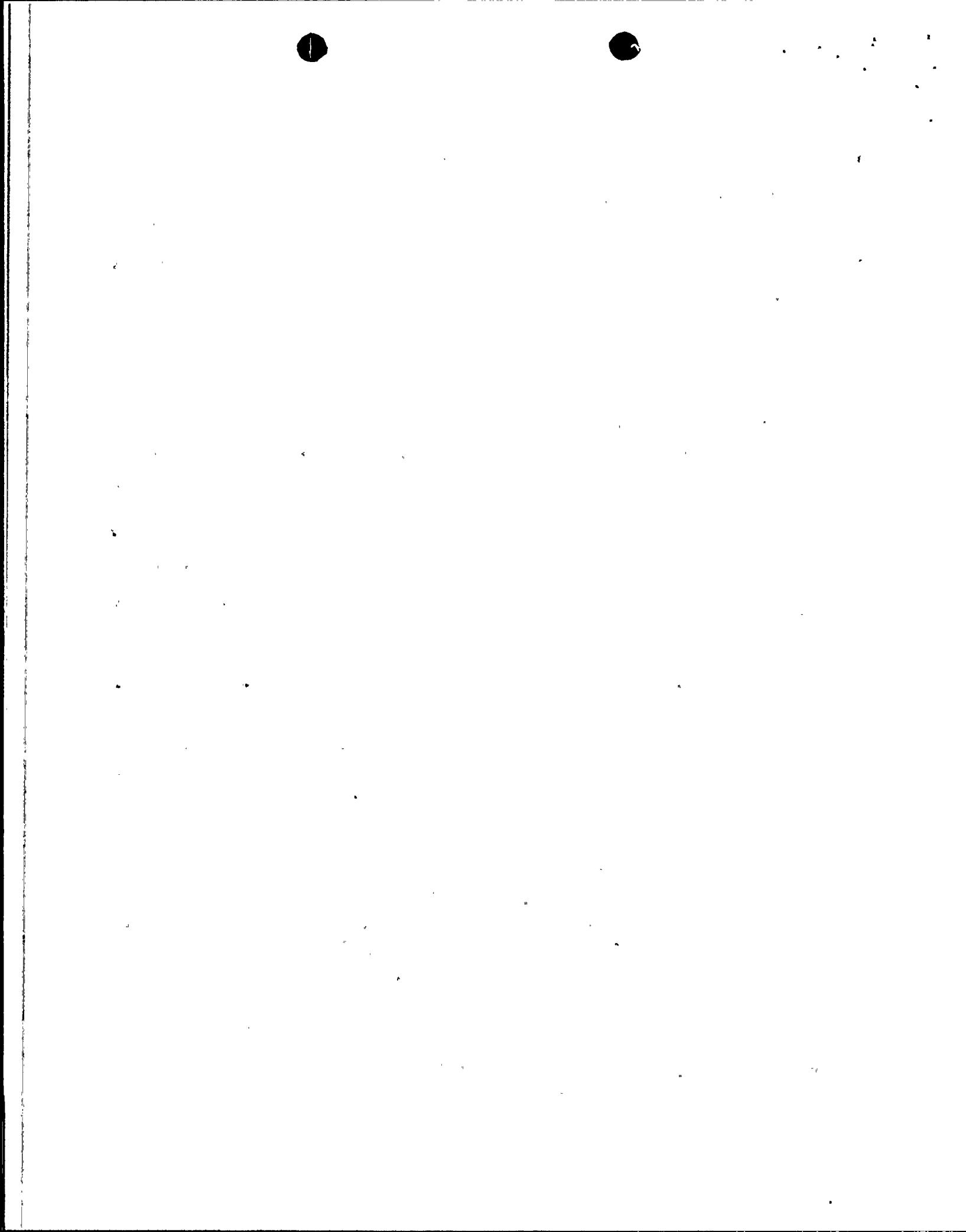
The licensee also periodically tests the pumps in accordance with its NRC-approved fire protection program which requires monthly testing of the pumps. The Palo Verde fire insurer, American Nuclear Insurers, requires weekly pump tests. During both the weekly and monthly tests, individual pumps have failed to produce the required flow six times since 1988. This number of failures is a very small percentage of the total number of test starts over the period. The maintenance history of the pumps indicates that the licensee could give a higher priority to completing required maintenance. However, in its review, the NRC did not identify any occasions when the licensee failed to meet the NRC's requirement of 100-percent available capacity for the fire pumps. Therefore, the Petitioners have raised no substantial safety concern regarding the reliability of the plant's fire pumps.

C. COOLING TOWERS

Petitioners allege the following:

The cooling towers for all three Palo Verde units are crumbling and are unsafe. In fact, a portion of one of the cooling towers for Unit 1 recently collapsed. APS has not proposed a solution to this problem, and it is believed that APS plans to continue to operate Unit 1 at full power even though a portion of its cooling tower is incapacitated. It is also believed that APS has known for an extended period of time about the weaknesses in the concrete material used to construct the cooling towers but has failed to correct these deficiencies.

The cooling towers at Palo Verde are not safety-related structures. If the cooling tower were incapacitated, this could result in Unit 1 operating



less efficiently than possible, which would be an economic penalty to APS but not a safety problem. However, falling debris is a hazard to personnel. Two sections of louvers, which direct air and deflect cooling water back into the tower, deteriorated and fell from a Unit 1 cooling tower. The licensee addressed this problem by restricting access to the area surrounding the cooling towers with rope barriers for personnel safety.

The licensee also found indications of concrete spalling caused by the corrosion of the reinforced steel within the precast concrete. APS is conducting an engineering evaluation to determine corrective measures for the cooling tower deterioration. A schedule will follow when the corrective measures have been determined.

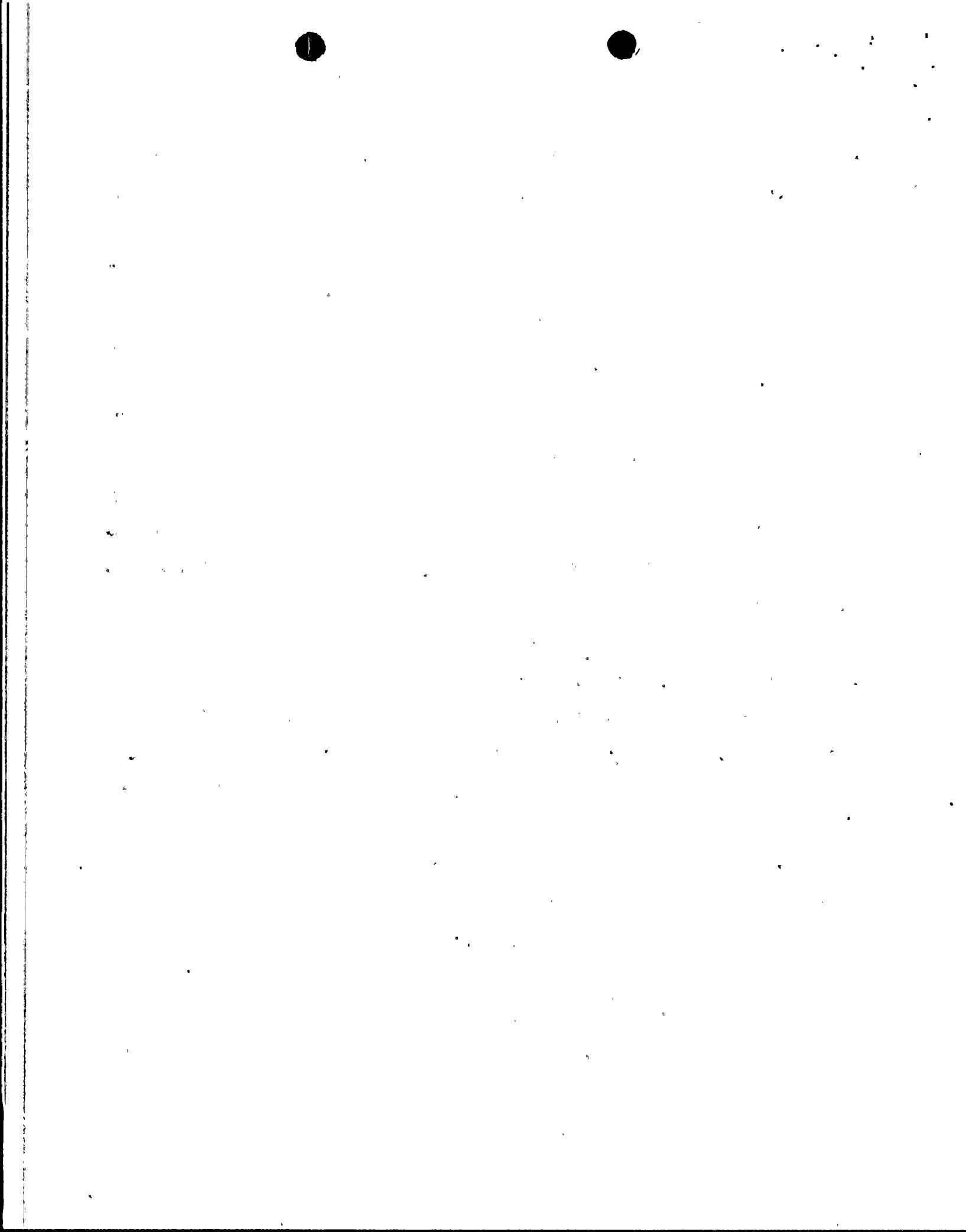
In summary, the cooling towers have no safety function and consequently there is no substantial nuclear safety concern with their condition.

#### D. Justifications for Continued Operation

Petitioners allege the following:

In numerous areas the NRC has permitted APS to operate Palo Verde outside safety regulations by accepting letters of Justification for Continued Operation ("JCO"). This is an unacceptable and highly dangerous practice. First, APS has not fully committed to permanent solutions for these JCO's. For example, APS has not proposed a permanent solution for the JCO governing problems with its Reactor Coolant Seals. Second, APS has been permitted to violate Technical Specifications and other licensing conditions for unreasonable and extensive periods of time and JCO's are not resolved in a timely fashion. Third, neither APS nor the NRC has conducted safety evaluations of these JCO's. Fourth, there are no procedures governing the writing and control of JCO's. Fifth, given the sheer volume of JCO's in effect it is believed that the operators are not fully cognizant of operating conditions.

Petitioners allege that the APS's use of JCOs has created an unacceptable and dangerous practice. Appendix B to 10 CFR Part 50 requires

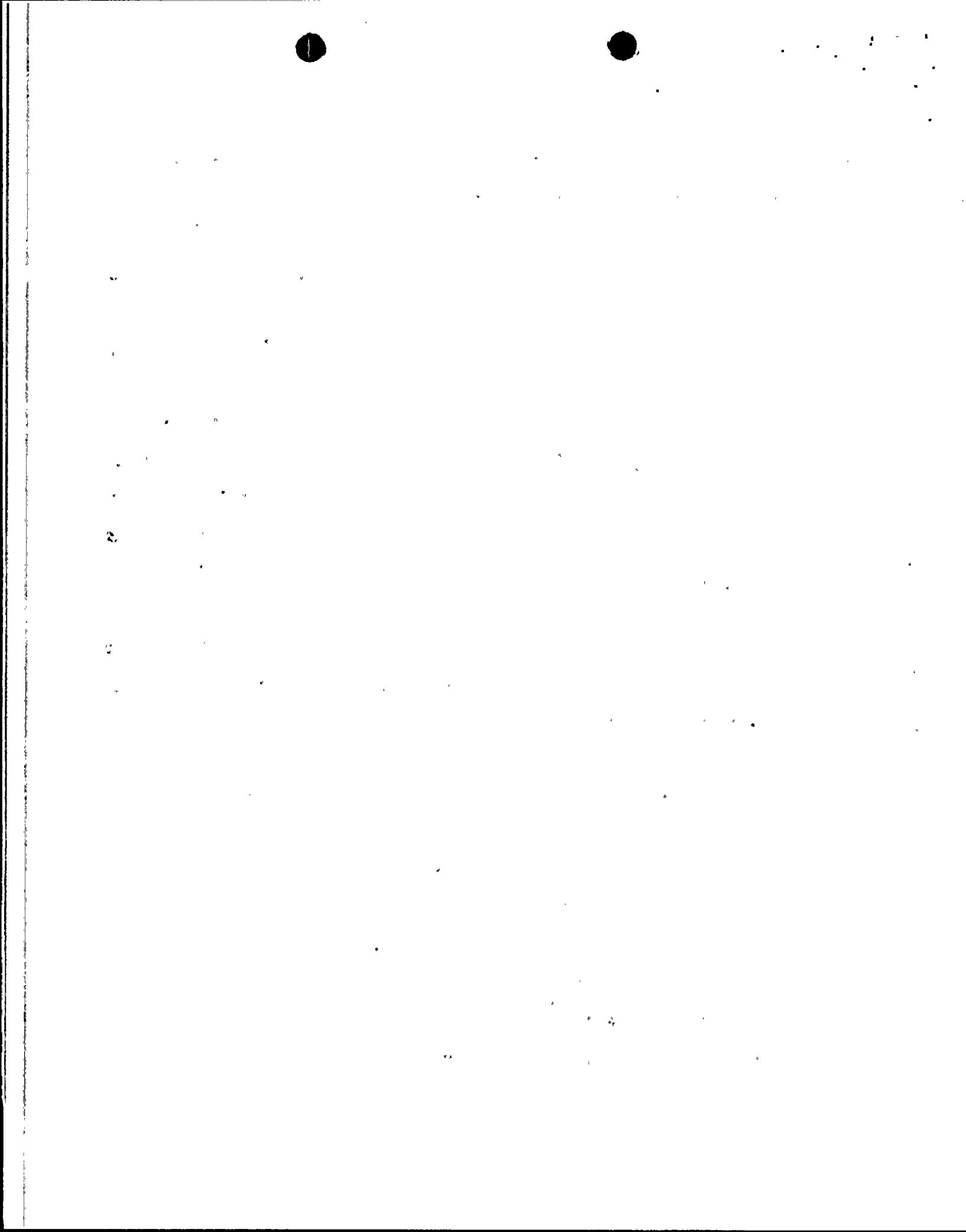


APS to establish measures to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected.

However, resolution of some of these issues may take a considerable amount of time to develop design changes and procedures and install hardware. APS prepares Justifications for Continued Operation (JCOs) which document the manner in which it can continue to safely operate the plant until it resolves such deficiencies. JCOs are also prepared in support of Temporary Waivers of Compliance (discussed in 2. below).

1. Reactor Coolant Pump Seals.

Petitioners allege that APS has not proposed a permanent solution for the JCO governing the reactor coolant pump seals. Neither APS nor NRC is aware of any JCO on reactor coolant pump seals. The JCO to which the petitioner refers appears to be the JCO submitted to the NRC for the interface between the nuclear cooling water system and the high pressure seal cooler for the reactor coolant pump (RCP). The rupture of the high pressure seal cooler for the RCP was a postulated accident that was not considered for Palo Verde. However, the licensee analyzed this scenario in response to the NRC's Information Notice 89-54, "Potential Overpressurization of the Component Cooling Water System," of June 23, 1989. APS has presented analyses demonstrating that the doses from such an accident are well within the 10 CFR Part 100 guidelines but are subject to certain operating constraints. The NRC technical staff has reviewed this matter and has documented its approval in safety evaluations of March 12, May 20, and October 9, 1991. APS has committed to correct the design deficiency on Unit 1 during its refueling



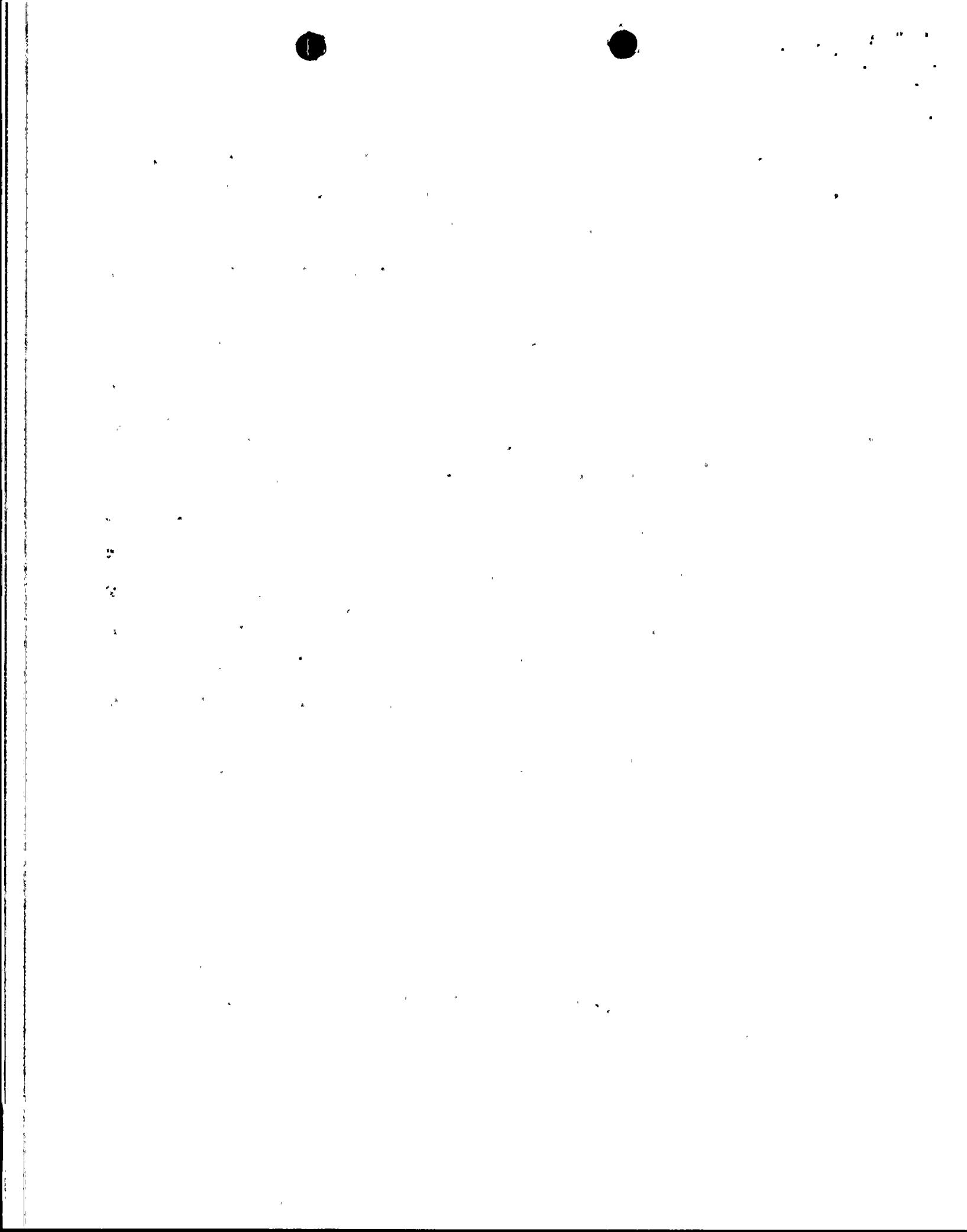
outage beginning February 1992. APS will modify Units 2 and 3 during their next refueling outages.

2. Violation of Technical Specifications.

Petitioners allege that APS has been permitted to violate technical specifications and other license conditions for unreasonable and extensive periods of time. The allegation appears to refer to NRC issuance of Temporary Waivers of Compliance (TWOC). A TWOC is issued upon request and justification by a utility to the NRC and allows the utility to deviate from its technical specifications or other license conditions for a short time if the deviation will result in no significant hazards or irreversible environmental consequences. The TWOC requires a written request from a utility which includes the following:

- a. a discussion of the requirements for which a waiver is requested,
- b. a discussion of the circumstances surrounding the situation including the need for prompt action and a description of the reasons that the situation could not have been avoided,
- c. a discussion of any compensatory actions,
- d. an evaluation of the safety significance and consequences of the proposed request,
- e. a discussion which justifies the duration of the request,
- f. the basis for the licensee's conclusion that the request does not involve a significant hazards consideration, and
- g. the basis for the licensee's conclusion that the request does not involve irreversible environmental consequences.

Such requests are reviewed by the NRC and approved in writing. The NRC will not act on a utility's request until the licensee has confirmed that the



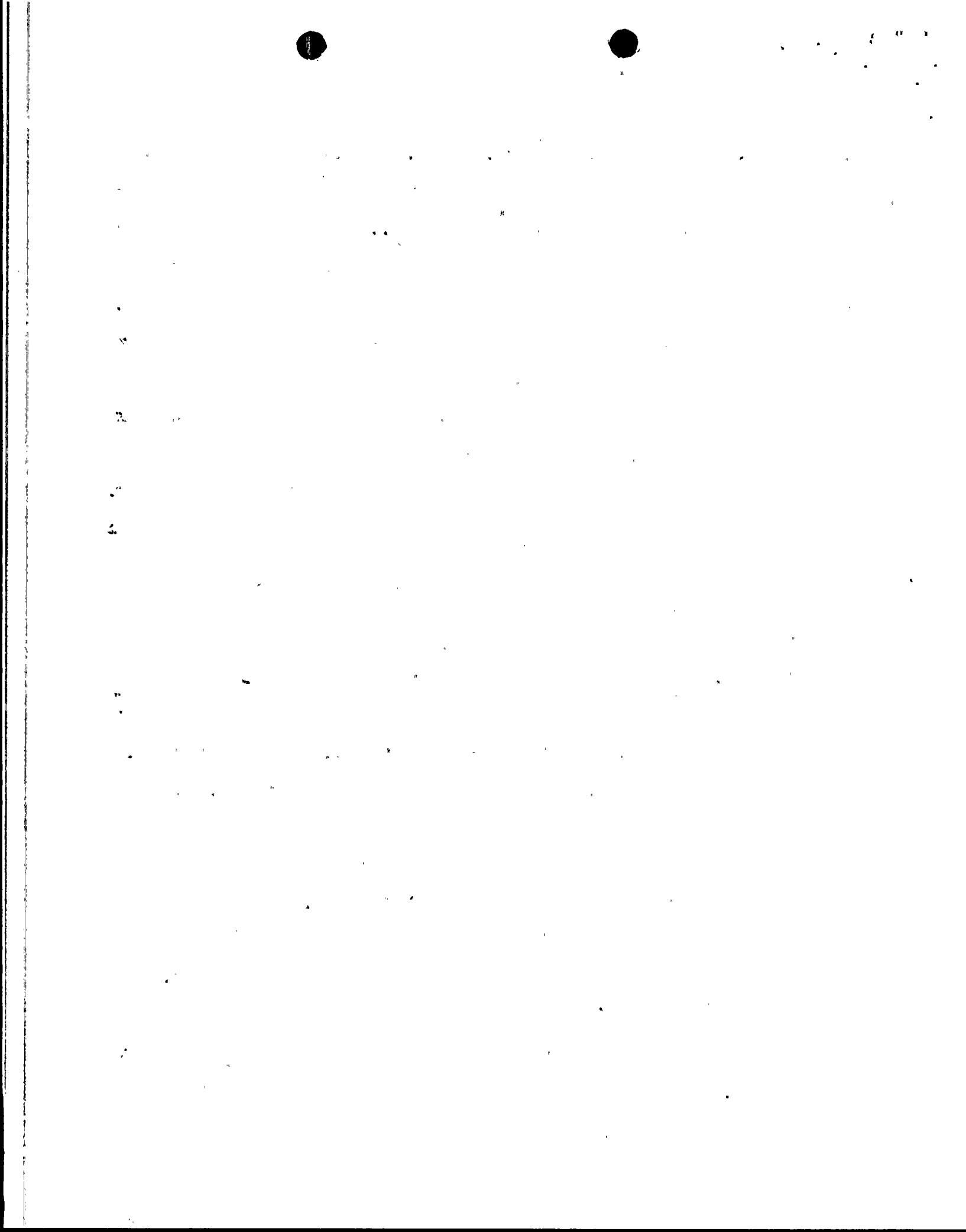
action has been reviewed and approved by the Plant Operations Review Committee (PORC) or its equivalent and the NRC is clearly satisfied that issuance of a TWOC is consistent with protecting the public health and safety.

The NRC issues a TWOC to allow a utility a short period of time beyond that allowed by technical specifications to fix equipment without requiring a plant shutdown or preventing startup. In many cases, shutting down the plant would involve more risk than allowing a short period of time to fix equipment.

3. Safety Evaluation of JCOs, Timeliness of Resolution and Procedures for Writing and Control of JCOs

Petitioners allege that neither APS nor the NRC conducts safety evaluations of JCOs, APS does not resolve JCOs in a timely fashion, and APS has no procedures governing the writing and control of JCOs. APS has a procedure that establishes the process for preparing, reviewing, and approving JCOs. Licensing Department personnel prepare JCOs for Palo Verde. The JCOs are reviewed by the affected plant managers, managers of departments providing technical support, and the Nuclear Safety Group and are approved by the Plant Review Board. The JCOs are made available to the NRC upon request. NRC can and has reviewed the licensee's JCOs. In some cases, this review has resulted in changes in some of the JCOs.

Petitioners allege that operators are not fully cognizant of operating conditions because the JCOs do not require them to be. When a JCO requires compensatory measures, APS provides instructions to address the specific condition by revising appropriate Palo Verde procedures such as those for operating, maintenance, and surveillance testing. Operations personnel are also briefed about the deficient condition. APS has instructions for



initiating and processing JCOs, and operators know of the JCOs because they are distributed to the control room and are kept in marked binders.

The time needed to resolve the issues discussed in a JCO might involve design changes, revised procedures, or hardware changes. Resolution time varies depending on such matters. The JCO which has been active for the longest period was approved in July 1990 to justify interim operation while APS better defined and implemented the requirements in the quality assurance program for fire protection and related systems. The time required is not unreasonable considering the work that needed to be done.

Petitioners do not identify any issue regarding writing, controlling, evaluating, or using JCOs which raises a substantial safety concern.

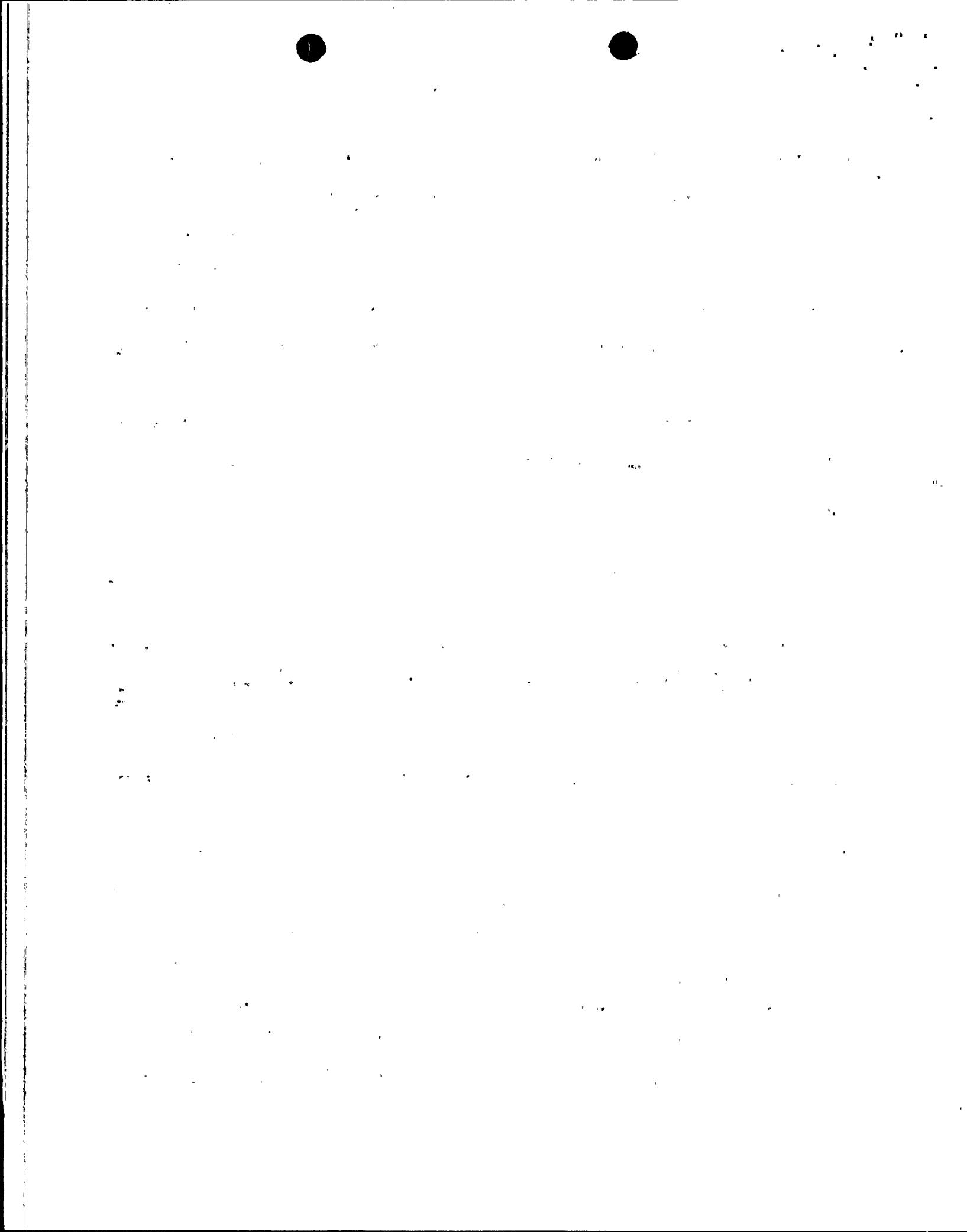
#### E. Appendix R Electrical Circuit Breakers

Petitioners allege the following:

- APS has not identified nor coordinated Appendix R breakers throughout the units. Thus, in the event of a fire APS would not know what pieces of equipment would be lost.

The licensee has studied circuits for fire protection, spurious actuations, and breaker coordination to ensure that the plant can be shut down safely in the event of a fire. In March 1985, the NRC inspected the licensee's analyses for associated circuits and fuse and breaker coordination and found them acceptable (Inspection Report 50-528/85-06).

Technical Specification 3.3.3.5 lists the electrical equipment, including switches, breakers, and circuits, needed to shut down the plant safely in the event of a fire or any other event that requires the operators to leave the control room. The Palo Verde pre-fire strategies manual lists equipment that would be unavailable or could malfunction during a fire. This



manual also lists the equipment or set of components that the licensee would use to achieve safe shutdown (safe shutdown train B). The NRC has reviewed the licensee's safe shutdown analysis methodology and spurious actuation analyses and accepted them (Supplemental Safety Evaluation Reports 5 and 7, of November 1983 and December 1984, respectively). Contrary to the allegation, APS has identified the equipment affected by a postulated fire and evaluated the methods to be used to achieve safe shutdown.

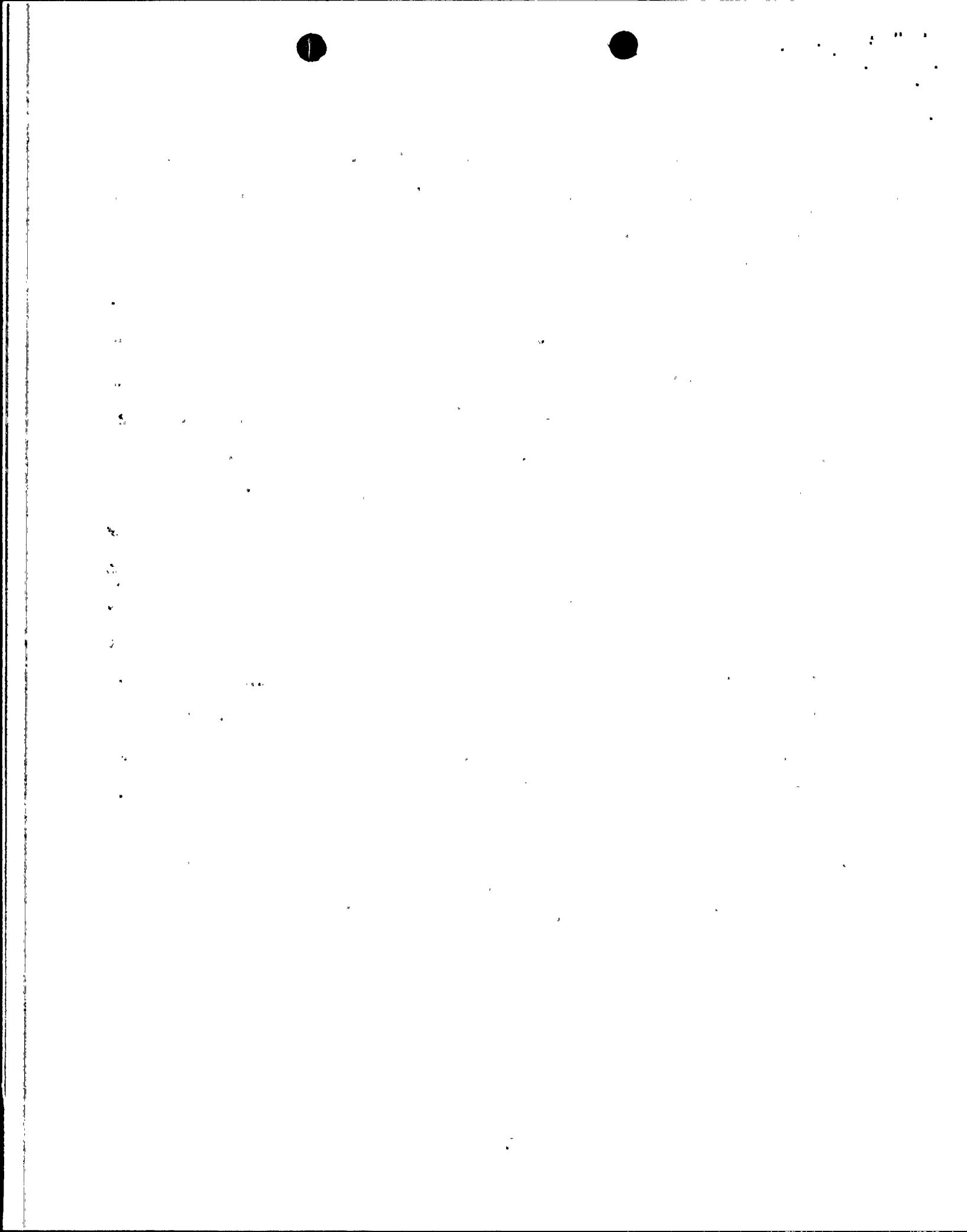
Therefore, the NRC finds no reason to conclude that Petitioners have raised a substantial safety concern with regard to Appendix R electrical circuit breakers.

F. Rumor of a Primary-to-Secondary Leak

Petitioners allege the following:

It has been rumored that APS has experienced a primary to secondary leak over 2 gpm in Unit 2 but has failed to properly notify the NRC or shut down the unit. If this is true, then the secondary system in Unit 2 has been contaminated with radiation.

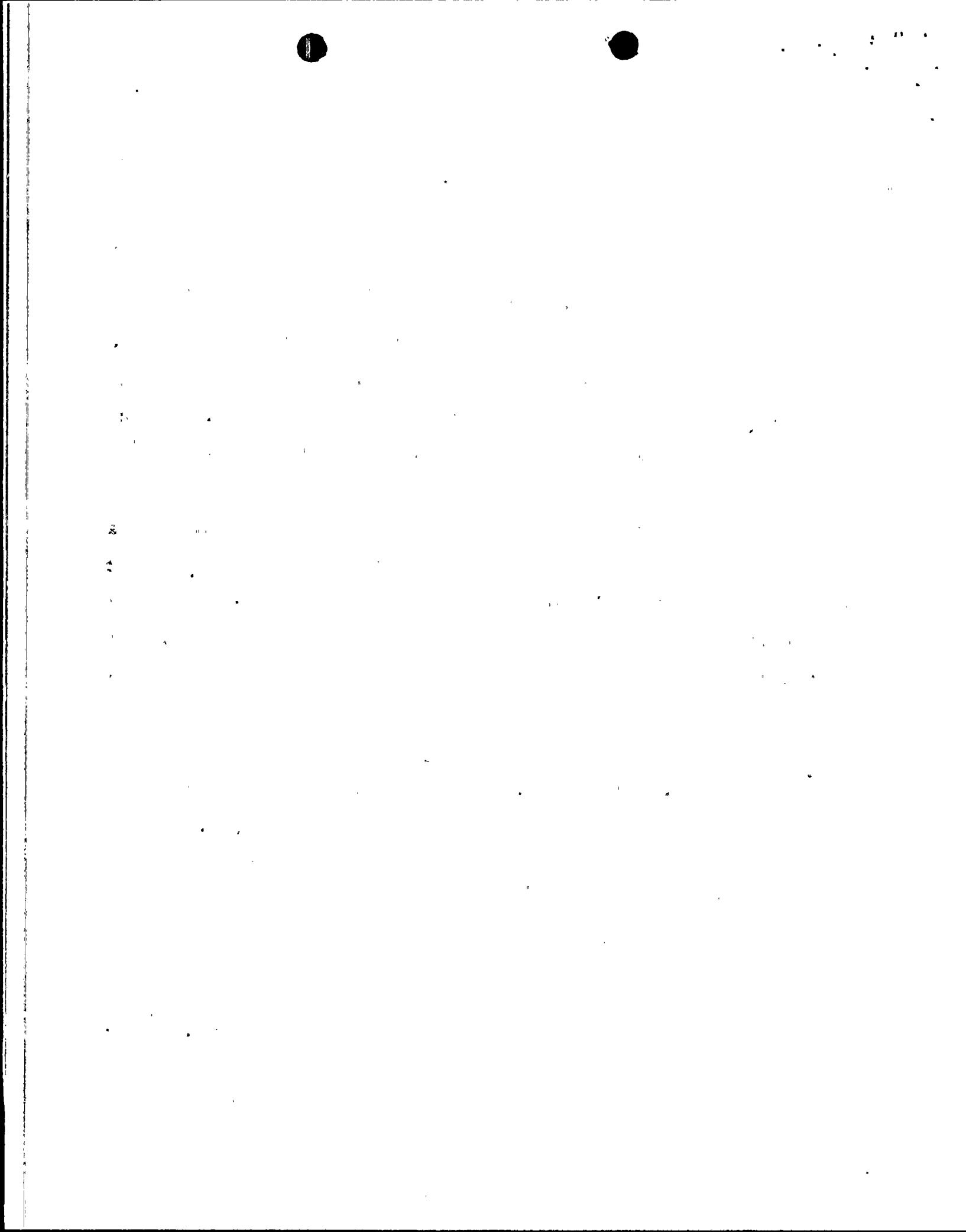
The Palo Verde technical specifications state that leakage from the reactor coolant system shall be limited to a rate of 1 gallon per minute (gpm) of total primary-to-secondary leakage through all steam generators, and of 720 gallons per day through any one steam generator. The Palo Verde technical specifications also require the plant to be shut down if the rate of primary-to-secondary leakage exceeds the technical specification limit. Palo Verde has detection equipment installed in each unit that would alert operators of primary-to-secondary leakage. This system enables the licensee to detect leakage on the order of hundredths of a gallon per minute. The licensee can also detect primary-to-secondary leakage by conducting radiochemical analyses



of the secondary system, which the technical specifications require to be performed at least once every 3 days. The NRC has examined plant data from Palo Verde Unit 2 and could not verify the rumored primary-to-secondary leakage.

The rumor may have arisen because of coolant from the Palo Verde Unit 2 primary system which leaked at a rate of approximately 2.9 gpm to collection systems. However, this coolant did not leak to the secondary system. Palo Verde has technical specification limits on the primary system leakage of 10.0 gpm on identified primary system leakage and 1.0 gpm on unidentified leakage (TS 3.4.5.2). APS found 2.8 gpm of the 2.9 gpm leakage resulted from a leaking thermal relief valve for the seal injection heat exchanger of the reactor coolant pump. During an outage in August 1991, APS replaced this valve and reduced the primary system leakage substantially.

The Petitioner stated that the secondary side of Unit 2 could become contaminated in the event of primary-to-secondary leakage. This would be true for any pressurized water reactor (PWR) experiencing primary-to-secondary leakage. However, Unit 2 did not have a 2 gpm primary-to-secondary leak, but had only a leak to collection systems, and was within limits. Although such contamination would represent an operational inconvenience, it does not present a significant safety concern. Consequently, there is no reason to conclude that Petitioners have raised a substantial safety concern.



G. Willful Violations of Safety Requirements and Willful Failure to Report Safety Violations to the NRC

Petitioners allege the following:

APS has covered up and knowingly failed to report safety violations to the NRC via Licensee Event Reports ("LERs"). APS has knowingly and willfully operated Palo Verde while not in compliance with its licensing requirements.

Petitioners must "set forth the facts that constitute the basis" for their request according to 10 CFR 2.206(a). However, the Petitioners have made a general allegation and provided no facts to support it. Moreover, NRC maintains resident inspectors at Palo Verde, who monitor the licensee's operations to ensure that the facility operates in conformance with its technical specifications and licensing requirements. The NRC knows of no instance in which APS has covered up safety violations or willfully violated the Palo Verde licensing requirements.

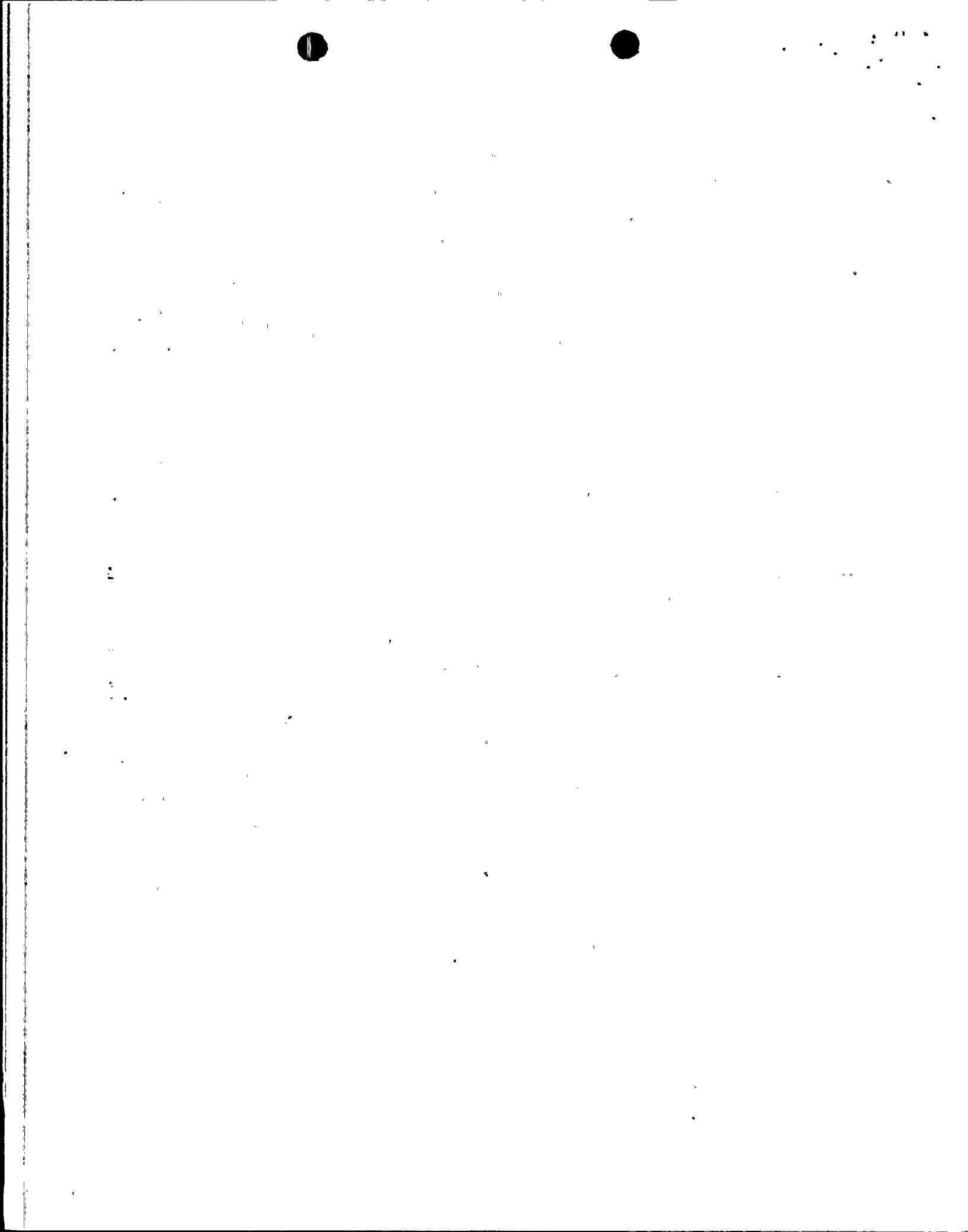
Accordingly, the NRC has no basis to conclude that Petitioners have raised a substantial safety concern.

H. Portable Hydrogen Recombiner

Petitioners allege the following:

Although APS committed to be able to move its hydrogen recombiner from one unit to another in a 72 hour period, it has never done so and has no procedure to move it. Moreover, APS does not have a back up hydrogen recombiner (although it committed to have one).

For a multi-unit site, the NRC requires only one set of recombiners. Palo Verde has a redundant set consisting of two recombiners installed in Unit 1. The NRC has no requirement to move the recombiners periodically and allows the recombiners to reside at one unit. However, the NRC reviewed and approved a plant-specific analysis in which the licensee committed to be able to move



the recombiners to one of the other units within 72 hours if accident conditions require it. The licensee also has procedures by which to disconnect and reconnect the recombiners. The licensee has demonstrated through a mockup of the recombiners that the recombiners for Unit 1 could be moved to Units 2 and 3 within 72 hours. The licensee found that a lighting panel interfered with its ability to move the recombiner from Unit 1. The licensee has since removed the interfering lighting panel. Palo Verde meets its licensing requirements for recombiners.

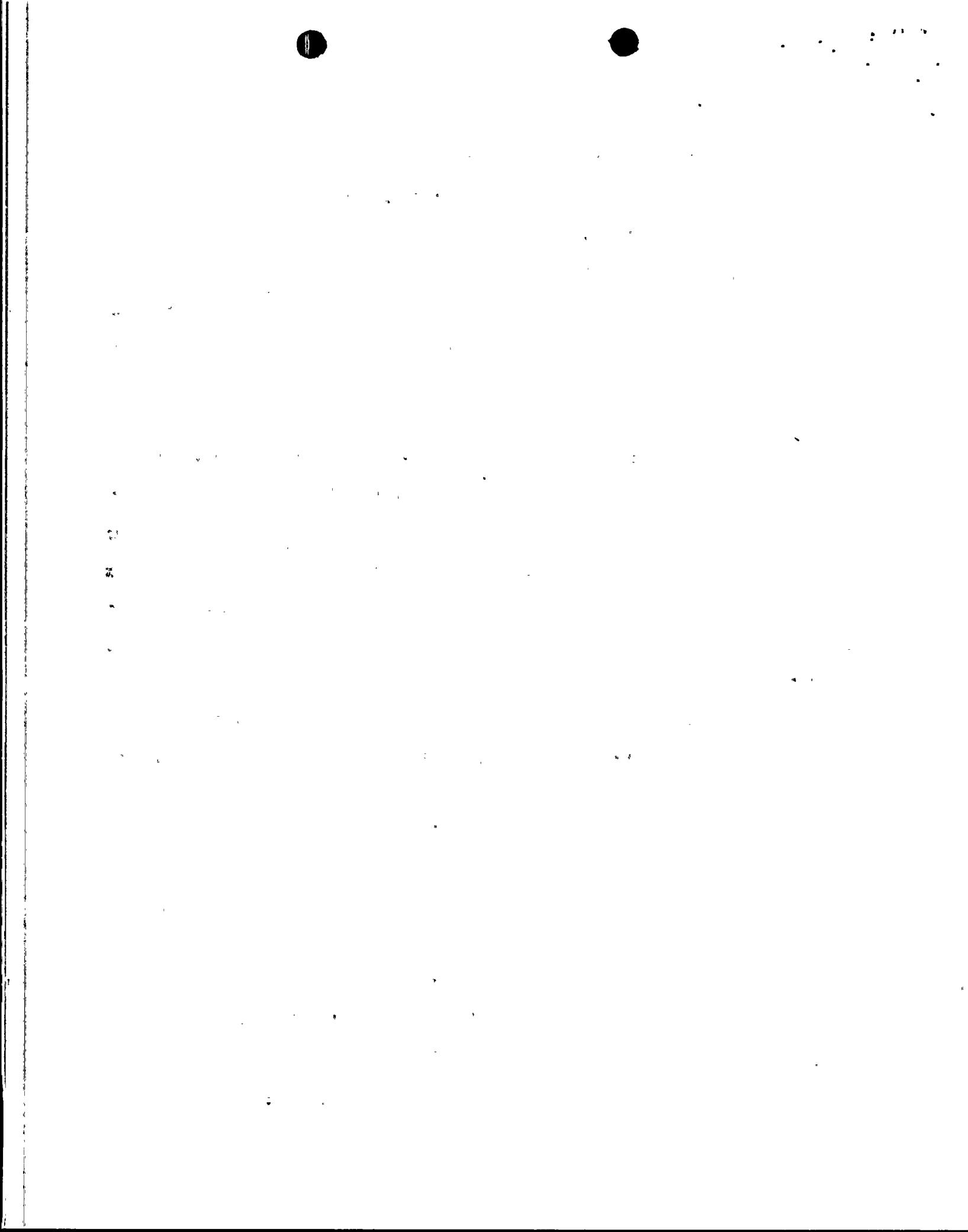
The NRC finds no reason to conclude that there is a substantial safety concern related to the hydrogen recombiners.

#### I. Implementation of Control Element Assembly Design Change

Petitioners allege the following:

APS failed to properly implement its Design Change Package ("DCP") for Control Element Drive Mechanisms ("CEDM's") in Unit 3 (RCTS #039846). This DCP was designed incorrectly resulting in pulling the wrong group of rods during testing. However, rather than resolve this problem APS removed the DCP in order to restart Unit 3 without committing to permanent resolution. It is alleged that the CEDM problem is a generic one at Palo Verde.

During the Unit 3 refueling outage in March and April 1991, the licensee performed substantial work on the control system for the control element drive mechanisms. This work included reversing the polarity of the current to the lower gripper coil on all control element assemblies (CEAs). The licensee also removed and realigned all CEA timing cards, overhauled power supplies, modified the ground fault detector, calibrated the undervoltage relays, and tested individual CEA circuit breakers with some replacements. In performing this work, APS caused a large number of expected problems with rod control during initial CEA testing and obtained preliminary timing settings



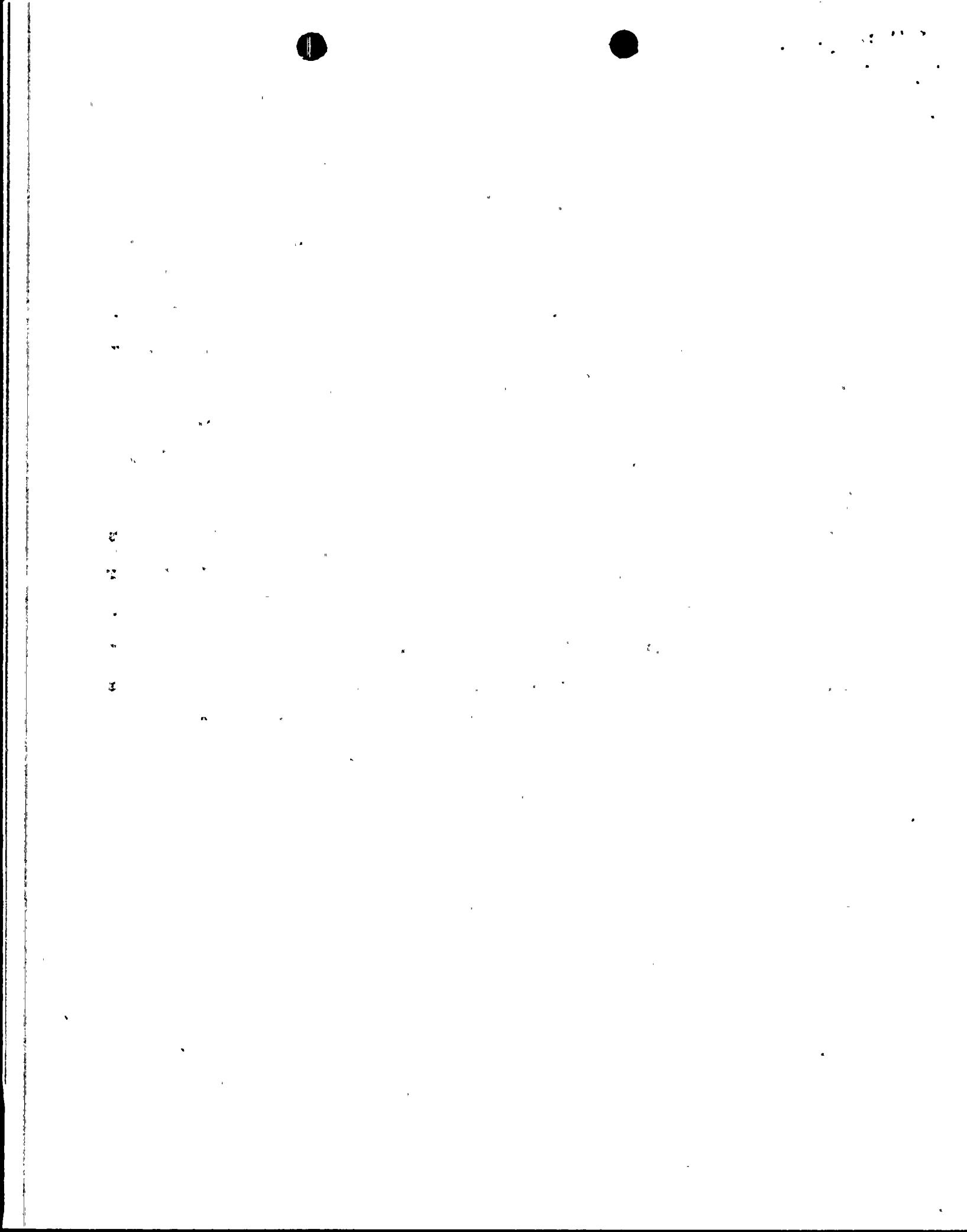
that could be refined only during testing. A few timing cards had not been properly seated and some failed and had to be replaced. The licensee anticipated and corrected these problems before startup. During the tests, some CEAs did not move when called upon to move and some slipped when called upon to move, as alleged. The licensee corrected each of these anomalies.

During and after startup, all CEAs moved as called upon by the control switches. A position indication anomaly occurred after startup during low power physics testing. The licensee performed trouble shooting and found that the problem resulted from the recent work that it had performed to reverse the polarity of the CEA lower gripper coil. The licensee restored the CEA coil wiring to the configuration used successfully during the last operating cycle. The vendor, Combustion Engineering, Incorporated, concurred with this decision. After restoring the coil polarity to the previous state, the licensee tested all CEAs again and found that CEA control and position indication were normal.

Accordingly, the NRC finds no basis in fact to conclude that there is a substantial safety concern regarding the control element drive mechanisms.

### III. CONCLUSION

Petitioners requested an immediate shutdown of the Palo Verde Generating Station and appointment of an investigative team to inspect and monitor operations at Palo Verde. The institution of proceedings in response to a request for action under 10 CFR 2.206 is appropriate only when substantial health and safety issues have been raised. See Consolidated Edison Co. of New York, (Indian Point, Units 1, 2 and 3), CLI-75-8, 2 NRC 173, 176 (1975) and Washington Public Power Supply System (WPPSS Nuclear Project No. 2), DD-84-7,



19 NRC 899, 923 (1984). I have applied this standard to determine if any action is warranted in response to safety allegations in the request. The NRC staff and resident inspectors at Palo Verde investigated thoroughly the Petitioners' allegations. All available information is sufficient to conclude that no substantial safety issue has been raised regarding safe operation of Palo Verde. Therefore, I conclude that, for the reasons discussed above, no basis exists for taking the actions requested by the Petitioners. Petitioners' requests for immediate shutdown of the Palo Verde Nuclear Generating Station and for an investigative team to inspect and monitor Palo Verde are denied.

A copy of this Decision will be filed with the Secretary of the Commission for the Commission to review in accordance with 10 CFR 2.206(c). As provided by this regulation, this decision will constitute the final action of the Commission 25 days after issuance, unless the Commission, on its own motion, institutes a review of the decision within that time.

FOR THE NUCLEAR REGULATORY COMMISSION



Thomas E. Murley, Director  
Office of Nuclear Reactor Regulation

Dated at Rockville, Maryland,  
this 16th day of March, 1992.

