

Arizona Public Service Company

PO BOX 2188 • PHOENIX, ARIZONA 85001

November 3, 1982

ANPP-22188 - WFQ/TFQ

Mr. H. R. Denton, Director  
Nuclear Reactor Regulation  
U. S. Nuclear Regulatory Commission  
Washington D.C. 20555

Subject: Palo Verde Nuclear Generating Station (PVNGS)  
Units 1, 2 and 3  
Docket Nos. STN-50-528/529/530  
File: 82-056-026, G.1.01.10

References: See Attached List

Dear Mr. Denton:

On July 29, 1982 I discussed our position concerning the backfitting of power operated relief valves (PORVs) into the PVNGS design with F. Miraglia and E. Licitra of your staff. At the end of that conversation, I promised to formally submit an explanation of our activities and our technical conclusion concerning the need for this piece of equipment.

In recent months a great amount of attention and concern has been directed toward the lack of PORVs on the primary system of newer vintage Combustion Engineering (CE) NSSS designs (System 80 and the 3410s; e.g. San Onofre and Waterford). In our opinion the major reasons for this concern are that: (1) the vast majority of operating PWRs have PORVs on the primary system; (2) without PORVs it has been assumed that these new CE NSSS designs do not include rapid depressurization capability; and (3) without PORVs it has been assumed that these designs cannot remove decay heat in the event that all feedwater is lost. The following is a brief discussion of the events and meetings contributing to our evaluation of this issue.

As part of our continuing safety evaluation of the PVNGS plant design, the question of whether a PORV would enhance the operation or safety of PVNGS has been considered by APS for several years. Such consideration was initiated in recognition that PORVs might offer the following benefits: reducing challenges to the primary system safety valves, minimizing high pressure transients, providing high system pressure protection, venting of non-condensable gases, providing back-up to pressurizer sprays, providing mitigation of start-up and shutdown transients and providing an alternate means of decay heat removal. The on-going evaluation of these issues by both CE and APS indicated to us that the benefits were not sufficient to outweigh the negative aspects.

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The rapid depressurization and decay heat ("feed and bleed") removal issues have been raised and addressed frequently during the last several years and each time the conclusion has been that PORVs are not required. The accident at Three Mile Island, Unit 2, (TMI-2) illustrated an important shortfall in the use of PORVs, that is, the fail-open mode of PORVs is a potential breach of the reactor coolant pressure boundary, which subsequently could lead to a small break loss of coolant accident. TMI-2 is only one of several examples of PORV failures where PORVs have stuck open. These failures are of great concern to APS.

The NRC staff, in the SERs (References A and B) for PVNGS, concluded that PORVs were not required for the safe operation of PVNGS. Reference (A), Section C.4, discussed unresolved safety issue A-45, "Shutdown Decay Heat Removal Requirements", in which the staff concluded that PVNGS can be operated prior to the ultimate resolution of the issue, relying on the primary method of decay heat removal, which is the use of the steam generators and the secondary system. This method depends on the operation of the auxiliary feedwater system, which was reviewed by the NRC staff and discussed in reference (A), Section 20.4.9 and 22.2, item II.E.1.1. Reference (B) did not conclude that PORVs or a rapid depressurization system needed to be included in the System 80 design prior to the granting of a Final Design Approval (FDA).

As reflected in references (C) and (D), the Advisory Committee on Reactor Safeguards (ACRS) was concerned that the System 80 design does not have the capability to rapidly depressurize the primary system in a direct manner and does not have a method to remove decay heat without the use of the steam generators. The ACRS expressed their concern that the safety of the plant was highly dependent on the integrity of the steam generators and the reliability of the auxiliary feedwater system. The ACRS requested that APS, CE and the NRC staff further evaluate the present design in light of their concerns. CE has presented their reevaluation before the ACRS subcommittee on Decay Heat Removal Systems on March 16, 1982, and before the ACRS full committee on April 1, 1982. (These meetings will be discussed in more detail later in this letter.)

Early this year, an incident at the Ginna Nuclear Facility placed further attention on the use of PORVs for rapid depressurization of the primary system, and ironically the failure of the PORV to close properly. This incident was a steam generator tube rupture which resulted in a radiological release through the main steam safety valves. Reference (E) reported that the release was controlled by using the PORV to rapidly depressurize the primary system, thus reducing the primary-to-secondary leakage. This event precipitated another review of the PVNGS design by APS.

In response to an NRC staff request, CE provided their evaluation of rapid depressurization and decay heat removal capability, reference (F).



This letter was reviewed by the NRC staff and a request for additional information was made in reference (G). The CE evaluation and the NRC request for additional information were discussed before ACRS on April 1, 1982. The ACRS agreed with the NRC staff approach to resolving this issue in an expeditious manner. The ACRS again requested that the NRC staff and CE reconsider the issue, but concluded that the resolution should not be a condition for licensing of plants at full power and that the need for future hardware or procedural changes should be contingent upon the results of the evaluation.

Based on a preliminary reassessment it appeared to us that it may be beneficial to provide the control room operator an additional means of direct primary system pressure control, and we decided in May of this year to proceed with the preliminary design of a direct rapid depressurization system, which included remote manually-operated PORVs. In conjunction with the decision to design the plant modification, we decided to determine if it was possible to install the modification prior to fuel load to minimize several key factors; radiological dose to construction workers, impact on future outage schedules, impact on present construction and start-up schedule and increased costs. To further enhance our ability to achieve these objectives, we also proceeded with a portion of the related procurement activities. All of these activities were based on our perception, based on preliminary analysis, that the following enhancements to the operation of PVNGS would be achieved:

- Operator flexibility to control primary system pressure
- Operator flexibility to mitigate to a SGTR accident
- Address possible future NRC requirements for Decay Heat Removal Systems
- Provide for a future alternate Low Temperature Over Pressure Protection System should the operators desire a more flexible system

This commitment was reflected in the telephone conversation I had with F. Miraglia and E. Licitra on July 29, 1982. During that conversation, I stated that we were pursuing the installation of PORVs on the basis that we were enhancing operator flexibility. We indicated that we did not consider this modification a safety enhancement, but we were evaluating the design to assure the PORVs did not degrade plant safety.

Development of our design criteria resulted in a preliminary design. This design included two remotely operated PORVs in parallel, which could only be manually operated from the control room (no automatic setpoint). The inlet piping to one of the primary safety valves would be modified to include a "TEE" for the inlet piping for the PORVs. Normally closed, remotely-operated block valves upstream of the PORVs would also be part of the system, and the PORVs would discharge into the existing reactor



drain tank. The piping and valves would be ASME Section III, Class 1, and IE power would be provided to the valve actuators and instrumentation. Design criteria for equipment which is part of the RCPB would also be met. This arrangement provided a depressurization capability of 20 psi/sec for one PORV and 40 psi/sec for two PORVs once the operator opened the valves. These depressurization rates could be reduced by throttling the block (globe) valves, to a rate of 4 psi/sec.

However, further investigation and evaluation indicated that this rapid depressurization capability posed operational concerns not previously identified in our preliminary analysis. These operational concerns were associated with the use of PORVs to rapidly reduce primary system pressure and resulted in voiding of the reactor vessel upper head, degradation of pressurizer level control and liquid discharge to the containment. These concerns then led to a more detailed evaluation of situations where this system would be used and how the present design would cope with them. For PVNGS the depressurization capability of the primary system is provided by the pressurizer sprays, when the reactor coolant pumps are running, and by the safety-grade auxiliary spray system when the RCPs are not running. The use of the auxiliary sprays, instead of PORVs to depressurize when the RCPs are not operational will result in a depressurization rate of 6 psi/sec, with better control of pressurizer level and partial reactor vessel upper head voiding. This evaluation concluded, contrary to our initial preliminary evaluation, that PORVs did not enhance operator flexibility.

#### Current APS Technical Position

The evaluation of adding remote-manual operated PORVs to PVNGS design resulted in the following benefits and drawbacks of this modification. The benefits are as summarized below:

- ° Direct manual method of depressurization, which will backup the existing safety-grade auxiliary spray system.
- ° Provides capability for decay heat removal, "feed and bleed", if neither steam generator and the safety-grade auxiliary feedwater system are not operable.
- ° May provide a more flexible low temperature over pressure protection method (if an automatic setpoint is utilized for actuation).

The drawbacks are summarized below:

- ° The PORVs add a potential path of RCS leakage.
- ° Inadvertent opening may violate the reactor coolant pressure boundary (RCPB).

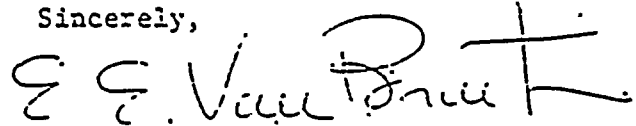
- ° Probability of PORVs sticking open increases probability of plant transients (similar to small break loss of coolant accidents) LOCAs.
- ° If used when RCPs are not operable, the reactor vessel upper head voids, and the pressurizer becomes solid (degrading pressurizer level control very quickly).
- ° Any extended use will result in a discharge to the containment.
- ° Adverse impact on construction, without balancing enhancement start-up and preoperational test schedules, and their related costs.

When considering these benefits and drawbacks, we conclude that this modification does not significantly improve the operational flexibility. Therefore, PORVs will not, at this time, be backfitted into the PVNGS design.

APS is continuing to participate in the CE Owner's Group effort to provide the additional information requested in reference (F), so that the NRC staff can complete their reevaluation of the CESSAR design with respect to this issue. As we have in the past, as additional information concerning this subject becomes available, we will reevaluate the PVNGS design which may or may not require installation of PORVs.

We will be available to discuss this letter or any additional concerns on this matter with the NRC at your request.

Sincerely,



E. E. Van Brunt, Jr.  
APS Vice President  
Nuclear Projects  
ANPP Project Director

EEVB/TFQ/wp

cc: D. G. Eisenhower  
T. H. Novak  
G. W. Knighton  
E. A. Licitra  
L. Bernabei  
A. C. Gehr





H. R. Denton, Director  
Page 6

bcc: G. C. Andognini  
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W. H. Wilson  
W. G. Bingham  
D. Keith  
G. F. Kopchinski  
J. Schuh  
C. Ferguson  
M. F. Barnoski  
G. Davis (CE)



ATTACHMENT

REFERENCES

- (A) NUREG-0857, "Safety Evaluation Report related to the operation of the Palo Verde Nuclear Generating Station, Units 1, 2 and 3" dated November, 1981.
- (B) NUREG-0852, "Safety Evaluation Report related to the final design approval of the Combustion Engineering Standard Nuclear Steam Supply System (CESSAR) System 80", dated November, 1981.
- (C) NRC letter from J. Carson Mark, Chairman of Advisory Committee on Reactor Safeguards, to Nunzio J. Palladino, Chairman, U.S. Nuclear Regulatory Commission, dated December 15, 1981. "ACRS Report on Final Design Approval for Combustion Engineering, Inc. Standard Nuclear Steam Supply System."
- (D) NRC letter from J. Carson Mark, Chairman of Advisory Committee on Reactor Safeguards, to Nunzio J. Palladino, Chairman, U.S. Nuclear Regulatory Commission, dated December 15, 1981. "ACRS report on the Palo Verde Nuclear Generating Station, Units 1, 2 and 3."
- (E) NUREG-BR-005, Volume 4, No. 2 USNRC Power Reactor Events Jan-Feb, 1982
- (F) Letter from A. E. Scherer, CE, Director of Nuclear Licensing, USNRC, LD-62-029, dated March 4, 1982.
- (G) NRC letter from R. L. Tedesco, Assistant Director for Licensing, Division of Licensing, USNRC, to P. E. Scherer, Director of Nuclear Licensing, Combustion Engineering, Inc. "Depressurization and Decay Heat Removal Capability of the CESSAR Design", dated March 26, 1982.
- (H) NRC letter from P. Shewman, Chairman Advisory Committee on Reactor Safeguards, to William J. Dircks, Executive Director for Operations, USNRC, dated April 5, 1982, "Reliability of the Shutdown Heat Removal System on the System 80 Design."



BOARD NOTIFICATION 83-31  
Palo Verde, Units 1, 2 & 3  
San Onofre, Units 2 & 3  
Waterford, Unit 3

Document Control (50-528/50-529/50-530  
50-361/50-362 & 50-382)\*

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cc: Board Service List



FEB 06 1984

DOCKET NO(S). 50-528  
The Honorable Richard Ottinger, Chairman  
Subcommittee on Energy Conservation and Power  
United States House of Representatives  
Washington, D. C. 20515

SUBJECT: ARIZONA PUBLIC SERVICE COMPANY, ET AL. PALO VERDE NUCLEAR GENERATING  
STATION, UNIT 1

The following documents concerning our review of the subject facility are transmitted for your information.

- ☐ Notice of Receipt of Application.
- ☐ Draft/Final Environmental Statement, dated \_\_\_\_\_.
- ☐ Notice of Availability of Draft/Final Environmental Statement, dated \_\_\_\_\_.
- ☐ Safety Evaluation Report, or Supplement No. \_\_\_\_\_, dated \_\_\_\_\_.
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- ☒ Order Extending Construction Completion Date, dated December 29, 1983.
- ☐ Other (Specify) \_\_\_\_\_

Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Representative Carlos Moorhead  
bcc: OCA

OFFICE	LB#3: DL						
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DATE	2/6/84						





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DOCKET NO(S). 50-528  
The Honorable Alan Simpson, Chairman  
Subcommittee on Nuclear Regulation  
Committee on Environment and Public Works  
United States Senate  
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United States House of Representatives  
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DATE	12/27/83						



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Committee on Interior and Insular Affairs  
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November 18, 1982

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The Honorable Toby Moffett, Chairman  
 Subcommittee on Environment, Energy and  
 Natural Resources

Committee on Government Operations  
 United States House of Representatives  
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cc: Representative Joel Deckard

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DATE	11/18/82						

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A large, abstract, black and white photograph of a dense crowd of people, mostly seen from the back, filling a large hall or arena. The image is grainy and high-contrast, with many dark silhouettes against a lighter background.

1. *Chlorophyll a* and *Chlorophyll b* were determined by the method of Arar and Collins (1971) using a Shimadzu 1601 UV-Visible Spectrophotometer.

November 18, 1982

DOCKET NO(S). STN 50-528

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As stated

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OFFICE	DLAIB#3						
SURNAME	J. Lee						
DATE	11/18/82						



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The Honorable Alan Simpson, Chairman  
Subcommittee on Nuclear Regulation  
Committee on Environment and Public Works  
United States Senate  
Washington, D.C. 20510

SUBJECT: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
PALO VERDE NUCLEAR GENERATING STATION, UNIT 1

The following documents concerning our review of the subject facility are transmitted for your information.

- ☐ Notice of Receipt of Application.
- ☐ Draft/Final Environmental Statement, dated \_\_\_\_\_.
- ☐ Notice of Availability of Draft/Final Environmental Statement, dated \_\_\_\_\_.
- ☐ Safety Evaluation Report, or Supplement No. \_\_\_\_\_, dated \_\_\_\_\_.
- ☐ Notice of Hearing on Application for Construction Permit.
- ☐ Notice of Consideration of Issuance of Facility Operating License.
- ☐ Application and Safety Analysis Report, Volume \_\_\_\_\_.
- ☐ Amendment No. \_\_\_\_\_ to Application/SAR dated \_\_\_\_\_.
- ☐ Construction Permit No. CPPR- \_\_\_\_\_, Amendment No. \_\_\_\_\_, dated \_\_\_\_\_.
- ☐ Facility Operating License No. \_\_\_\_\_, Amendment No. \_\_\_\_\_, dated \_\_\_\_\_.
- ☒ Order Extending Construction Completion Date, dated November 4, 1982.
- ☐ Other (Specify) \_\_\_\_\_

Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Senator Gary Hart

bcc: OCA

OFFICE	DL:LB#3						
SURNAME	JL:ec						
DATE	11/18/82						



October 7, 1982

DOCKET NO(S). STN 50-528/529/530  
The Honorable Toby Moffett, Chairman  
Subcommittee on Environment, Energy  
and Natural Resources  
Committee on Government Operations  
United States House of Representatives  
Washington, D.C. 20515

SUBJECT: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2 & 3

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- ☐ Other (Specify) \_\_\_\_\_

Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Representative Joel Deckard

bcc: CCA

OFFICE	DA:IB#3						
SURNAME	J. Lee						
DATE	10/7/82						



October 7, 1982

DOCKET NO(S). STN 50-528/529/530

The Honorable Morris Udall, Chairman  
Subcommittee on Energy and the Environment  
Committee on Interior and Insular Affairs  
United States House of Representatives  
Washington, D.C. 20515

SUBJECT: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2 & 3

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- ☐ Other (Specify) \_\_\_\_\_

Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Representative Manuel Lujan

bcc: OCA

OFFICE	DE:1B/3						
SURNAME	J. Lee						
DATE	10/7/82						

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October 7, 1982

DOCKET NO(S). STN 50-528/529/530

The Honorable Richard Ottinger, Chairman  
Subcommittee on Energy Conservation and Power  
Committee on Energy and Commerce  
United States House of Representatives  
Washington, D. C. 20515

SUBJECT: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2 & 3

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Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Representative Carlos Moorhead

bcc: OCA

/

OFFICE	DI:IE#3						
SURNAME	10/7/82						
DATE	10/7/82						





October 7, 1982

DOCKET NO(S). STN 50-528/529/530

The Honorable Alan Simpson, Chairman  
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Committee on Environment and Public Works  
United States Senate  
Washington, D.C. 20510

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Office of Nuclear Reactor Regulation

Enclosures:  
As stated

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OFFICE	DP:10/7/82						
SURNAME	DP:10/7/82						
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May 26, 1982

DOCKET NO(S). STN 50-528/529/530

The Honorable Morris Udall, Chairman  
Subcommittee on Energy and the Environment  
Committee on Interior and Insular Affairs  
United States House of Representatives  
Washington, D.C. 20515

SUBJECT: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2 & 3

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Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Representative Manuel Lujan

bcc: OCA

OFFICE	DL-IB#3						
SURNAME	J Lee						
DATE	5/26/82						



May 26, 1982

DOCKET NO(S). STN 50-528/529/530

The Honorable Richard Ottinger, Chairman  
Subcommittee on Energy Conservation and Power  
Committee on Energy and Commerce  
United States House of Representatives  
Washington, D.C. 20515

SUBJECT: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2 & 3

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Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Representative Carlos Moorhead

bcc: OCA

OFFICE	DL: LB#3						
SURNAME	DL: LB#3						
DATE	5/26/82						



May 26, 1982

DOCKET NO(S). STN 50-528/529/530  
The Honorable Toby Moffett, Chairman  
Subcommittee on Environment, Energy  
and Natural Resources  
Committee on Government Operations  
United States House of Representatives  
Washington, D.C. 20515  
SUBJECT: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
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Office of Nuclear Reactor Regulation

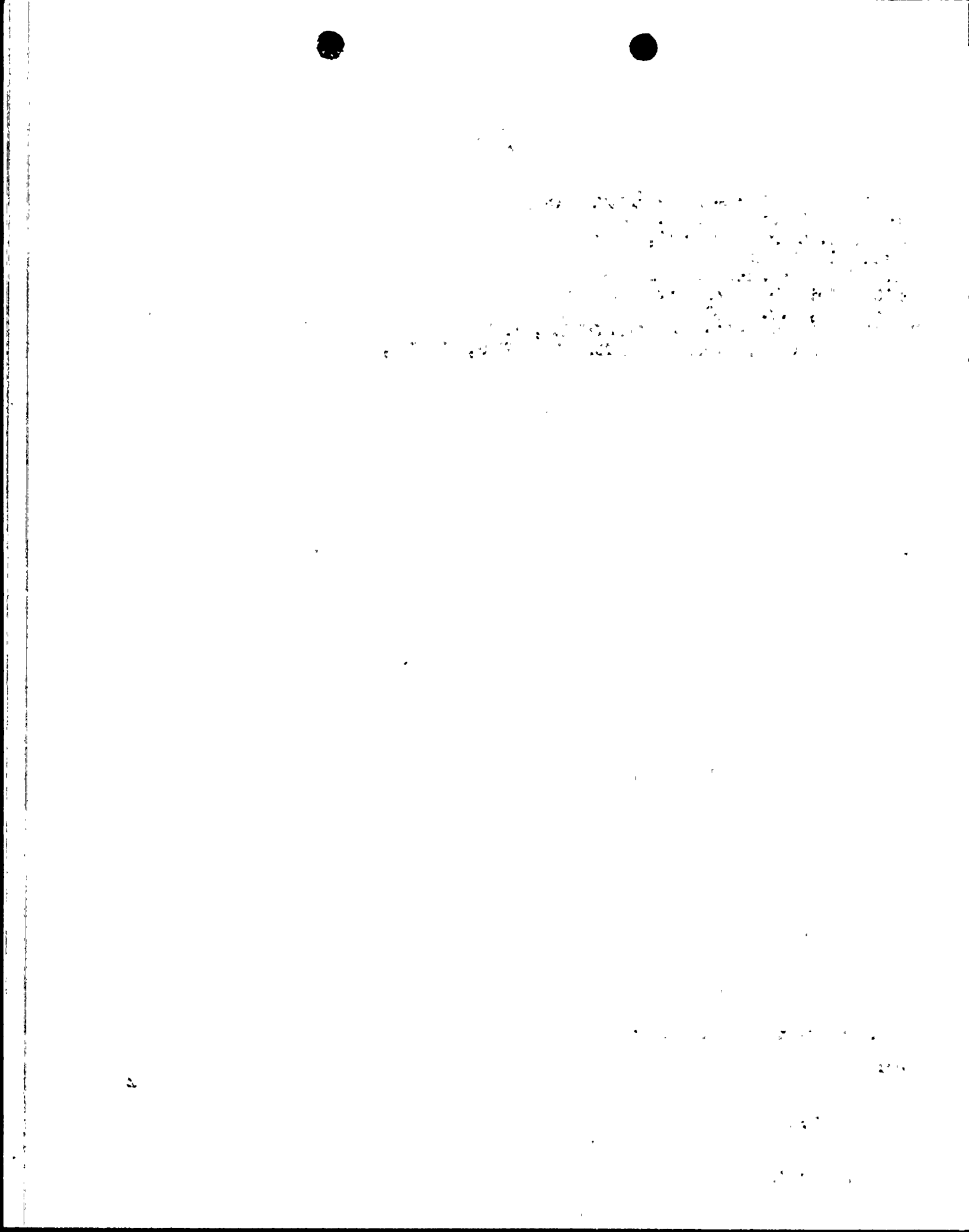
Enclosures:  
As stated

cc: Representative Joel Deckard

bcc: OCA

OFFICE	DL: IB#3						
SURNAME	J Lee						
DATE	5/26/82						





May 26, 1982

DOCKET NO(S). STN 50-528/529/530

The Honorable Alan Simpson, Chairman  
Subcommittee on Nuclear Regulation  
Committee on Environment and Public Works  
United States Senate  
Washington, D.C. 20510

SUBJECT: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
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Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Senator Gary Hart

bcc: OCA

OFFICE	DL:LB#3						
SURNAME	SL:SP						
DATE	5/26/82						



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May 7, 1982

The Honorable Toby Moffett, Chairman  
Subcommittee on Environment, Energy and  
Natural Resources  
Committee on Government Operations  
United States House of Representatives

NRC-21 (6-76)

DEC:	COA						
OFFICE	DL:IB#3						
SURNAME	JLse						
DATE	5/7/82						



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON D.C. 20555

May 7, 1982

Docket No. STN 50-528/529/530

The Honorable Richard Ottinger, Chairman  
Subcommittee on Energy Conservation and Power  
Committee on Energy and Commerce  
United States House of Representatives  
Washington, D.C. 20515

Subject: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2 & 3

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- ☐ Facility Operating License No. DPR- \_\_\_\_\_, NPF- \_\_\_\_\_, dated \_\_\_\_\_.
- ☒ Amendment No. 4 to CPPR- 1417 or DRR- CPFR-142 & CPFR-143, dated 4/28/82.
- ☐ Other: \_\_\_\_\_
- ☐ \_\_\_\_\_

Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Representative Carlos Moorhead

bcc: OCA

OFFICE ▶

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SURNAME ▶

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5/9/82

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON D.C. 20555

May 7, 1982

Docket No. STN 50-528/529/530

The Honorable Alan Simpson  
Subcommittee on Nuclear Regulation  
Committee on Environment and Public Works  
United States Senate  
Washington, D.C. 20510

Subject: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
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- ☐ Other: \_\_\_\_\_
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Office of Nuclear Reactor Regulation

Enclosures:  
As stated

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OFFICE	DL:LB#3				
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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON D.C. 20555

May 7, 1982

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- ☐ Other: \_\_\_\_\_
- ☐ \_\_\_\_\_

Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Representative Manuel Lujan

bcc: OCA

OFFICE

DL:IB#3

SURNAME

JLce

DATE

5/7/82

THE  
FEDERAL  
BUREAU OF INVESTIGATION  
WASHINGTON, D. C.

TO : DIRECTOR, FBI  
FROM : SAC, NEW YORK  
SUBJECT: [Illegible]

RE: [Illegible]  
[Illegible]

DATE: [Illegible]  
[Illegible]

BY: [Illegible]  
[Illegible]

BY: [Illegible]  
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[Illegible]

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON D.C. 20555

April 7, 1982

Docket No. STN 50-528/529/530

The Honorable Morris Udall, Chairman  
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Committee on Interior and Insular Affairs  
United States House of Representatives  
Washington, D.C. 20515

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- ☐ Other: \_\_\_\_\_
- ☐ \_\_\_\_\_

Office of Nuclear Reactor Regulation

Enclosures:  
As stated

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bcc: OCA

OFFICE	DL:IB#3				
SURNAME	J Lee				
DATE	4/7/82				

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1. The first part of the report is a general  
description of the project and its objectives.  
2. The second part is a detailed description of the  
methodology used in the study.  
3. The third part is a description of the results  
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4. The fourth part is a discussion of the results  
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5. The fifth part is a conclusion and a list of  
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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON D.C. 20555

April 7, 1982

Docket No. STN 50-528/529/530

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- ☐ Other: \_\_\_\_\_
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Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Representative Carlos Moorhead

bcc: OCA

OFFICE

DL:LB#3

SURNAME

J Lee

DATE

4/7/82



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON D.C. 20555

April 7, 1982

Docket No. STN 50-528/529/530

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- ☐ Other: \_\_\_\_\_
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Office of Nuclear Reactor Regulation

Enclosures:  
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bcc: OCA

OFFICE

DL:JB#3

SURNAME

J Lee

DATE

3/26/82



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UNITED STATES  
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Washington, D.C. 20515

Subject: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2 AND 3

The following documents concerning our review of the subject facility  
are transmitted for your information:

- ☐ Notice of Receipt of Application.
- ☐ Draft/Final Environmental Statement, dated \_\_\_\_\_.
- ☐ Safety Evaluation, or Supplement No. \_\_\_\_\_, dated \_\_\_\_\_.
- ☐ Notice of Hearing on Application for Construction Permit.
- ☐ Notice of Consideration of Issuance of Facility Operating License.
- ☐ Application and Safety Analysis Report, Vol. \_\_\_\_\_.
- ☐ Amendment No. \_\_\_\_\_ to Application/SAR, dated \_\_\_\_\_.
- ☐ Construction Permit No. CPPR- \_\_\_\_\_, dated \_\_\_\_\_.
- ☐ Facility Operating License No. DPR- \_\_\_\_\_, NPF- \_\_\_\_\_, dated \_\_\_\_\_.
- ☒ Amendment No. 3 to CPPR- 142 & CPPR-143 141/or DRR- \_\_\_\_\_, dated 3/26/82.
- ☐ Other: \_\_\_\_\_
- ☐ \_\_\_\_\_

Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Representative Joel Deckard

bcc: OCA

OFFICE	DL: 1B#3					
SURNAME	J Lee					
DATE	4/7/82					

$\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

the 1990s, the number of people in the world who are undernourished has declined from 1.1 billion to 800 million. The number of people who are malnourished has declined from 1.5 billion to 1 billion. The number of people who are obese has increased from 100 million to 300 million. The number of people who are overweight has increased from 100 million to 300 million. The number of people who are obese and overweight has increased from 100 million to 300 million. The number of people who are obese and overweight has increased from 100 million to 300 million.

12

[illegible]

$\frac{1}{2} \left( \frac{1}{2} \right) = \frac{1}{4}$

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Figure 1. Schematic representation of the experimental design. The subjects were divided into two groups: the control group (A) and the experimental group (B). The control group (A) was divided into two subgroups: the control group (A1) and the control group (A2). The experimental group (B) was divided into two subgroups: the experimental group (B1) and the experimental group (B2). The control group (A1) and the experimental group (B1) were subjected to the same treatment. The control group (A2) and the experimental group (B2) were subjected to the same treatment. The control group (A1) and the experimental group (B1) were subjected to the same treatment. The control group (A2) and the experimental group (B2) were subjected to the same treatment.

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON D.C. 20555

March 24, 1982

Docket No. STN 50-528/529/530

The Honorable Toby Moffett, Chairman  
Subcommittee on Environment, Energy and  
Natural Resources  
Committee on Government Operations  
United States House of Representatives

Subject: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2 & 3

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- ☐ Amendment No. \_\_\_\_\_ to CPPR- \_\_\_\_\_ or DRR- \_\_\_\_\_, dated \_\_\_\_\_.
- ☒ Other: Notice of Availability of Final Environmental Statement
- ☐ \_\_\_\_\_

Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Representative Joel Deckard

bcc: OCA

OFFICE ▶

DL:LB#3

SURNAME ▶

JLee

DATE ▶

3/24/82

state

1943

1. The first part of the report  
deals with the general situation  
of the country and the  
position of the various  
groups.

2. The second part of the report  
deals with the economic situation  
and the financial resources of the  
country.

3. The third part of the report  
deals with the social situation  
and the cultural life of the  
country.

4. The fourth part of the report  
deals with the political situation  
and the government of the country.

5. The fifth part of the report  
deals with the military situation  
and the armed forces of the country.

6. The sixth part of the report  
deals with the international situation  
and the relations of the country  
with the other countries of the world.

7. The seventh part of the report  
deals with the future of the country  
and the prospects for the future.

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON D.C. 20555

March 24, 1982

Docket No. STN 50-528/529/530

The Honorable Alan Simpson, Chairman  
Subcommittee on Nuclear Regulation  
Committee on Environment and Public Works  
United States Senate  
Washington, D.C. 20510

Subject: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2 & 3

The following documents concerning our review of the subject facility  
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- ☒ Other: Notice of Availability of Final Environmental Statement
- ☐ \_\_\_\_\_

Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Senator Gary Hart

bcc: OCA

OFFICE

DL:LB#3

SURNAME

J Lee

DATE

3/24/82

state



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON D.C. 20555

March 24, 1982

Docket No. STN 50-528/529/530

The Honorable Morris Udall, Chairman  
Subcommittee on Energy and the Environment  
Committee on Interior and Insular Affairs  
United States House of Representatives  
Washington, D.C. 20515

Subject: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2 & 3

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- ☐ Amendment No. \_\_\_\_\_ to CPPR- \_\_\_\_\_ or DRR- \_\_\_\_\_, dated \_\_\_\_\_.
- ☒ Other: Notice of Availability of Final Environmental Statement
- ☐ \_\_\_\_\_

Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Representative Manuel Iujan

bcc: OCA

OFFICE

DL:LB#3

SURNAME

Jlee

DATE

3/24/82

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON D.C. 20555

March 24, 1982

Docket No. STN 50-528/529/530

The Honorable Richard Ottinger, Chairman  
Subcommittee on Energy Conservation and Power  
Committee on Energy and Commerce  
United States House of Representatives  
Washington, D.C. 20515

Subject: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2 & 3

The following documents concerning our review of the subject facility  
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- ☐ Amendment No. \_\_\_\_\_ to CPPR- \_\_\_\_\_ or DRR- \_\_\_\_\_, dated \_\_\_\_\_.
- ☒ Other: ~~Notice of Availability of Final Environmental Statement~~
- ☐ \_\_\_\_\_

Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Representative Carlos Moorhead

bcc: OCA

OFFICE	DL:IB#3					
SURNAME	J Lee					
DATE	3/24/82					

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON D.C. 20555

March 1, 1982

Docket No. STN 50-528/529/530

The Honorable Morris Udall, Chairman  
Subcommittee on Energy and the Environment  
Committee on Interior and Insular Affairs  
United States House of Representatives  
Washington, D.C. 20515

Subject: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2 AND 3

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- ☐ Other: \_\_\_\_\_
- ☐ \_\_\_\_\_

Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Representative Manuel Iujan  
bcc: OCA

OFFICE

DL:LB#3

SURNAME

J Lee

DATE

3/1/82

State

1944

1. The first part of the report deals with the general situation of the country and the progress of the war. It is a very interesting and informative account of the events of the year.

2. The second part of the report deals with the economic situation of the country. It is a very detailed and accurate account of the economic conditions of the year.

3. The third part of the report deals with the social situation of the country. It is a very thorough and complete account of the social conditions of the year.

4. The fourth part of the report deals with the political situation of the country. It is a very clear and concise account of the political conditions of the year.

5. The fifth part of the report deals with the military situation of the country. It is a very comprehensive and detailed account of the military conditions of the year.

6. The sixth part of the report deals with the cultural situation of the country. It is a very interesting and informative account of the cultural conditions of the year.

7. The seventh part of the report deals with the scientific situation of the country. It is a very thorough and complete account of the scientific conditions of the year.

8. The eighth part of the report deals with the legal situation of the country. It is a very clear and concise account of the legal conditions of the year.

9. The ninth part of the report deals with the administrative situation of the country. It is a very detailed and accurate account of the administrative conditions of the year.

10. The tenth part of the report deals with the financial situation of the country. It is a very thorough and complete account of the financial conditions of the year.

1945

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON D.C. 20555

March 1, 1982

Docket No. STN 50-528/529/530

The Honorable Richard Ottinger, Chairman  
Subcommittee on Energy Conservation and Power  
Committee on Energy and Commerce  
United States House of Representatives  
Washington, D.C. 20515

Subject: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2 AND 3

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- ☐ Other: \_\_\_\_\_
- ☐ \_\_\_\_\_

Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Representative Carlos Moorhead

bcc: OCA

OFFICE	DL:LB#3					
SURNAME	Lee					
DATE	3/1/82					



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON D.C. 20555

March 1, 1982

Docket No. STN 50-528/529/530

The Honorable Alan Simpson, Chairman  
Subcommittee on Nuclear Regulation  
Committee on Environment and Public Works  
United States Senate  
Washington, D.C. 20510

Subject: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
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- ☐ Other: \_\_\_\_\_
- ☐ \_\_\_\_\_

Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Senator Gary Hart

bcc: CCA

OFFICE

DL:IB#3

SURNAME

JLee

DATE

3/1/82





UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON D.C. 20555

March 1, 1982

Docket No. STN 50-528/529/530

The Honorable Toby Moffett, Chairman  
Subcommittee on Environment, Energy and  
Natural Resources

Committee on Government Operations  
United States House of Representatives  
Washington, D.C. 20515

Subject: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
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- ☐ Other: \_\_\_\_\_
- ☐ \_\_\_\_\_

Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Representative Joel Deckard

bcc: OCA

OFFICE	DL:LB#3					
SURNAME	Hee					
DATE	3/1/82					



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON D.C. 20555

December 9, 1981

Docket No. STN 50-528/529/530

The Honorable Morris Udall, Chairman  
Subcommittee on Energy and the Environment  
Committee on Interior and Insular Affairs  
United States House of Representatives  
Washington, D.C. 20515

Subject: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
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- ☐ Other: \_\_\_\_\_
- ☐ \_\_\_\_\_

Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Representative Manuel Lujan

bcc: OCA

*State*

OFFICE

DL:IB#3

SURNAME

Jlee

DATE

12/9/81

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON D.C. 20555

December 9, 1981

Docket No. STN 50-528/529/530

The Honorable Alan Simpson, Chairman  
Subcommittee on Nuclear Regulation  
Committee on Environment and Public Works  
United States Senate  
Washington, D.C. 20510

Subject: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
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- ☐ Other: \_\_\_\_\_
- ☐ \_\_\_\_\_

Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Senator Gary Hart

*State*  
bcc: OCA

OFFICE ▶

DL: LB#3

SURNAME ▶

J/lee

DATE ▶

12/9/81

2000

1. The first group of people who are not in the labor force are those who are not in the labor force because they are not in the labor force.

the 1990s, the number of people in the United States who are 65 years of age and older has increased by 50 percent, and the number of people 75 years of age and older has increased by 100 percent. The number of people 85 years of age and older has increased by 200 percent. The number of people 95 years of age and older has increased by 400 percent. The number of people 100 years of age and older has increased by 1,000 percent. The number of people 105 years of age and older has increased by 2,000 percent. The number of people 110 years of age and older has increased by 4,000 percent. The number of people 115 years of age and older has increased by 8,000 percent. The number of people 120 years of age and older has increased by 16,000 percent. The number of people 125 years of age and older has increased by 32,000 percent. The number of people 130 years of age and older has increased by 64,000 percent. The number of people 135 years of age and older has increased by 128,000 percent. The number of people 140 years of age and older has increased by 256,000 percent. The number of people 145 years of age and older has increased by 512,000 percent. The number of people 150 years of age and older has increased by 1,024,000 percent. The number of people 155 years of age and older has increased by 2,048,000 percent. The number of people 160 years of age and older has increased by 4,096,000 percent. The number of people 165 years of age and older has increased by 8,192,000 percent. The number of people 170 years of age and older has increased by 16,384,000 percent. The number of people 175 years of age and older has increased by 32,768,000 percent. The number of people 180 years of age and older has increased by 65,536,000 percent. The number of people 185 years of age and older has increased by 131,072,000 percent. The number of people 190 years of age and older has increased by 262,144,000 percent. The number of people 195 years of age and older has increased by 524,288,000 percent. The number of people 200 years of age and older has increased by 1,048,576,000 percent. The number of people 205 years of age and older has increased by 2,097,152,000 percent. The number of people 210 years of age and older has increased by 4,194,304,000 percent. The number of people 215 years of age and older has increased by 8,388,608,000 percent. The number of people 220 years of age and older has increased by 16,777,216,000 percent. The number of people 225 years of age and older has increased by 33,554,432,000 percent. The number of people 230 years of age and older has increased by 67,108,864,000 percent. The number of people 235 years of age and older has increased by 134,217,728,000 percent. The number of people 240 years of age and older has increased by 268,435,456,000 percent. The number of people 245 years of age and older has increased by 536,870,912,000 percent. The number of people 250 years of age and older has increased by 1,073,741,824,000 percent. The number of people 255 years of age and older has increased by 2,147,483,648,000 percent. The number of people 260 years of age and older has increased by 4,294,967,296,000 percent. The number of people 265 years of age and older has increased by 8,589,934,592,000 percent. The number of people 270 years of age and older has increased by 17,179,869,184,000 percent. The number of people 275 years of age and older has increased by 34,359,738,368,000 percent. The number of people 280 years of age and older has increased by 68,719,476,736,000 percent. The number of people 285 years of age and older has increased by 137,438,953,472,000 percent. The number of people 290 years of age and older has increased by 274,877,906,944,000 percent. The number of people 295 years of age and older has increased by 549,755,813,888,000 percent. The number of people 300 years of age and older has increased by 1,099,511,627,776,000 percent. The number of people 305 years of age and older has increased by 2,199,023,255,552,000 percent. The number of people 310 years of age and older has increased by 4,398,046,511,104,000 percent. The number of people 315 years of age and older has increased by 8,796,093,022,208,000 percent. The number of people 320 years of age and older has increased by 17,592,186,044,416,000 percent. The number of people 325 years of age and older has increased by 35,184,372,088,832,000 percent. The number of people 330 years of age and older has increased by 70,368,744,177,664,000 percent. The number of people 335 years of age and older has increased by 140,737,488,355,328,000 percent. The number of people 340 years of age and older has increased by 281,474,976,710,656,000 percent. The number of people 345 years of age and older has increased by 562,949,953,421,312,000 percent. The number of people 350 years of age and older has increased by 1,125,899,906,842,624,000 percent. The number of people 355 years of age and older has increased by 2,251,799,813,685,248,000 percent. The number of people 360 years of age and older has increased by 4,503,599,627,370,496,000 percent. The number of people 365 years of age and older has increased by 9,007,199,254,740,992,000 percent. The number of people 370 years of age and older has increased by 18,014,398,509,481,984,000 percent. The number of people 375 years of age and older has increased by 36,028,797,018,963,968,000 percent. The number of people 380 years of age and older has increased by 72,057,594,037,927,936,000 percent. The number of people 385 years of age and older has increased by 144,115,188,075,855,872,000 percent. The number of people 390 years of age and older has increased by 288,230,376,151,711,744,000 percent. The number of people 395 years of age and older has increased by 576,460,752,303,423,488,000 percent. The number of people 400 years of age and older has increased by 1,152,921,504,606,846,976,000 percent. The number of people 405 years of age and older has increased by 2,305,843,009,213,693,952,000 percent. The number of people 410 years of age and older has increased by 4,611,686,018,427,387,904,000 percent. The number of people 415 years of age and older has increased by 9,223,372,036,854,775,808,000 percent. The number of people 420 years of age and older has increased by 18,446,744,073,709,551,616,000 percent. The number of people 425 years of age and older has increased by 36,893,488,147,419,103,232,000 percent. The number of people 430 years of age and older has increased by 73,786,976,294,838,206,464,000 percent. The number of people 435 years of age and older has increased by 147,573,952,589,676,412,928,000 percent. The number of people 440 years of age and older has increased by 295,147,905,179,352,825,856,000 percent. The number of people 445 years of age and older has increased by 590,295,810,358,705,651,712,000 percent. The number of people 450 years of age and older has increased by 1,180,591,620,717,411,303,424,000 percent. The number of people 455 years of age and older has increased by 2,361,183,241,434,822,606,848,000 percent. The number of people 460 years of age and older has increased by 4,722,366,482,869,645,213,696,000 percent. The number of people 465 years of age and older has increased by 9,444,732,965,739,290,427,392,000 percent. The number of people 470 years of age and older has increased by 18,889,465,931,478,580,854,784,000 percent. The number of people 475 years of age and older has increased by 37,778,931,862,957,161,709,568,000 percent. The number of people 480 years of age and older has increased by 75,557,863,725,914,323,419,136,000 percent. The number of people 485 years of age and older has increased by 151,115,727,451,828,646,838,272,000 percent. The number of people 490 years of age and older has increased by 302,231,454,903,657,293,676,544,000 percent. The number of people 495 years of age and older has increased by 604,462,909,807,314,587,353,088,000 percent. The number of people 500 years of age and older has increased by 1,208,925,819,614,629,174,706,176,000 percent. The number of people 505 years of age and older has increased by 2,417,851,639,229,258,349,412,352,000 percent. The number of people 510 years of age and older has increased by 4,835,703,278,458,516,698,824,704,000 percent. The number of people 515 years of age and older has increased by 9,671,406,556,917,033,397,649,408,000 percent. The number of people 520 years of age and older has increased by 19,342,813,113,834,066,795,298,816,000 percent. The number of people 525 years of age and older has increased by 38,685,626,227,668,133,590,597,632,000 percent. The number of people 530 years of age and older has increased by 77,371,252,455,336,267,181,195,264,000 percent. The number of people 535 years of age and older has increased by 154,742,504,910,672,534,362,390,528,000 percent. The number of people 540 years of age and older has increased by 309,485,009,821,345,068,724,781,056,000 percent. The number of people 545 years of age and older has increased by 618,970,019,642,690,137,449,562,112,000 percent. The number of people 550 years of age and older has increased by 1,237,940,039,285,380,274,899,124,224,000 percent. The number of people 555 years of age and older has increased by 2,475,880,078,570,760,549,798,248,448,000 percent. The number of people 560 years of age and older has increased by 4,951,760,157,141,521,099,596,496,896,000 percent. The number of people 565 years of age and older has increased by 9,903,520,314,283,042,199,193,993,792,000 percent. The number of people 570 years of age and older has increased by 19,807,040,628,566,084,398,387,987,584,000 percent. The number of people 575 years of age and older has

1. *Chlorophyll a* (Chl *a*) is the primary photosynthetic pigment in most plants and algae. It is a green pigment that absorbs light energy in the blue and red regions of the visible spectrum.

[illegible]

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$\frac{1}{2} \times \frac{1}{2}$

[illegible][illegible]

1. *Chlorophyll a* (Chl *a*) and *Chlorophyll b* (Chl *b*) were determined by the method of Lichtenthal and Whistler (1973). The total chlorophyll content was determined by the method of Arar and Cook (1980). The carotenoid content was determined by the method of Lichtenthal and Whistler (1973).

$$x \quad y \quad z \quad w \quad v \quad u \quad t \quad s \quad r \quad q \quad p \quad o \quad n \quad m \quad l \quad k \quad j \quad i \quad h \quad g \quad f \quad e \quad d \quad c \quad b \quad a$$

$\frac{1}{\sqrt{\pi}} \int_{-\infty}^{\infty} f(x) e^{-x^2} dx = \frac{1}{\sqrt{\pi}} \int_{-\infty}^{\infty} f(x) e^{-x^2} dx$

1. *Chlorophyll a* and *Chlorophyll b* were determined by the method of Arar and Collins (1987) using a spectrophotometer (Shimadzu 1601) with a 10 mm quartz cuvette. The absorbance of the sample was measured at 663 nm and 646 nm. The concentration of chlorophyll *a* and chlorophyll *b* was calculated using the following equations:

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 84

*Journal of Management Education* 30(6)p. 789-804

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*Journal of Management Education* 36(7) 809-827

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON D.C. 20555

December 9, 1981

Docket No. STN 50-528/529/530

The Honorable Richard Ottinger, Chairman  
Subcommittee on Energy Conservation & Power  
Committee on Energy and Commerce  
United States House of Representatives  
Washington, D.C. 20515

Subject: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2, AND 3

The following documents concerning our review of the subject facility  
are transmitted for your information:

- ☐ Notice of Receipt of Application.
- ☐ Draft/Final Environmental Statement, dated \_\_\_\_\_.
- ☒ Safety Evaluation, or Supplement No. \_\_\_\_\_, dated November 1981.
- ☐ Notice of Hearing on Application for Construction Permit.
- ☐ Notice of Consideration of Issuance of Facility Operating License.
- ☐ Application and Safety Analysis Report, Vol. \_\_\_\_\_.
- ☐ Amendment No. \_\_\_\_\_ to Application/SAR, dated \_\_\_\_\_.
- ☐ Construction Permit No. CPPR- \_\_\_\_\_, dated \_\_\_\_\_.
- ☐ Facility Operating License No. DPR- \_\_\_\_\_, NPF- \_\_\_\_\_, dated \_\_\_\_\_.
- ☐ Amendment No. \_\_\_\_\_ to CPPR- \_\_\_\_\_ or DRR- \_\_\_\_\_, dated \_\_\_\_\_.
- ☐ Other: \_\_\_\_\_
- ☐ \_\_\_\_\_

Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Representative Carlos Moorhead  
bcc: OCA

state

OFFICE

DL:IB#3

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON D.C. 20555

December 9, 1981

Docket No. STN 50-528/529/530

The Honorable Toby Moffett, Chairman  
Subcommittee on Environment, Energy and  
Natural Resources

Committee on Government Operations  
United States House of Representatives  
Washington, D.C. 20515

Subject: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2 AND 3

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- ☐ Facility Operating License No. DPR- \_\_\_\_\_, NPF- \_\_\_\_\_, dated \_\_\_\_\_.
- ☐ Amendment No. \_\_\_\_\_ to CPPR- \_\_\_\_\_ or DRR- \_\_\_\_\_, dated \_\_\_\_\_.
- ☐ Other: \_\_\_\_\_
- ☐ \_\_\_\_\_

Office of Nuclear Reactor Regulation

Enclosures:  
As stated

*State* cc: Representative Joel Deckard

bcc: OCA

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| OFFICE  | DL:IB#3 |  |  |  |  |
| SURNAME | DL      |  |  |  |  |
| DATE    | 12/9/81 |  |  |  |  |

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1. *Phragmites* (Common Reed)

1. *Chlorophyll a* and *Chlorophyll b* were determined by the method of Arar and Collins (1971). The *Chlorophyll a* and *Chlorophyll b* contents were expressed as  $\mu\text{g g}^{-1}$  of dry weight.

1. The first group of people who are interested in the study of the history of the United States are the people who are interested in the history of the United States.

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*Journal of Management Studies*, 19(1), 67-80.

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$$B = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}, \quad M = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}, \quad \text{and} \quad \text{the other matrices are the same as in the previous case.}$$

1. *Chlorophyll a* (Chl *a*)

$$-\frac{1}{h} \int_{\mathbb{R}^d} \nabla \cdot (A(x) \nabla u) dx = \int_{\mathbb{R}^d} f(x) u dx, \quad \forall u \in H^1_0(\Omega).$$

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON D.C. 20555

October 30, 1981

Docket No. STN 50-528/529/530

The Honorable Morris Udall, Chairman  
Subcommittee on Energy and the Environment  
Committee on Interior and Insular Affairs  
United States House of Representatives  
Washington, D.C. 20515

Subject: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2 AND 3

The following documents concerning our review of the subject facility  
are transmitted for your information:

- ☐ Notice of Receipt of Application.
- ☒ Notice of Availability of  
Draft/~~DDP~~ Environmental Statement, dated 10/30/81
- ☐ Safety Evaluation, or Supplement No. \_\_\_\_\_, dated \_\_\_\_\_.
- ☐ Notice of Hearing on Application for Construction Permit.
- ☐ Notice of Consideration of Issuance of Facility Operating License.
- ☐ Application and Safety Analysis Report, Vol. \_\_\_\_\_.
- ☐ Amendment No. \_\_\_\_\_ to Application/SAR, dated \_\_\_\_\_.
- ☐ Construction Permit No. CPPR- \_\_\_\_\_, dated \_\_\_\_\_.
- ☐ Facility Operating License No. DPR- \_\_\_\_\_, NPF- \_\_\_\_\_, dated \_\_\_\_\_.
- ☐ Amendment No. \_\_\_\_\_ to CPPR- \_\_\_\_\_ or DRR- \_\_\_\_\_, dated \_\_\_\_\_.
- ☐ Other: \_\_\_\_\_
- ☐ \_\_\_\_\_

Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Representative Manuel Lujan

bcc: OCA

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| OFFICE  | DL:IB#3  |  |  |  |  |  |
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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON D.C. 20555

October 30, 1981

Docket No. STN 50-528/529/530

The Honorable Richard Ottinger, Chairman  
Subcommittee on Energy Conservation and Power  
Committee on Energy and Commerce  
United States House of Representatives  
Washington, D.C. 20515

Subject: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2 AND 3

The following documents concerning our review of the subject facility  
are transmitted for your information:

- ☐ Notice of Receipt of Application.
- ☒ Notice of Availability of  
Draft/Final Environmental Statement, dated 10/30/81.
- ☐ Safety Evaluation, or Supplement No. \_\_\_\_\_, dated \_\_\_\_\_.
- ☐ Notice of Hearing on Application for Construction Permit.
- ☐ Notice of Consideration of Issuance of Facility Operating License.
- ☐ Application and Safety Analysis Report, Vol. \_\_\_\_\_.
- ☐ Amendment No. \_\_\_\_\_ to Application/SAR, dated \_\_\_\_\_.
- ☐ Construction Permit No. CPPR- \_\_\_\_\_, dated \_\_\_\_\_.
- ☐ Facility Operating License No. DPR- \_\_\_\_\_, NPF- \_\_\_\_\_, dated \_\_\_\_\_.
- ☐ Amendment No. \_\_\_\_\_ to CPPR- \_\_\_\_\_ or DRR- \_\_\_\_\_, dated \_\_\_\_\_.
- ☐ Other: \_\_\_\_\_
- ☐ \_\_\_\_\_

Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: Representative Carlos Moorhead

bcc: OCA

OFFICE

DL:IB#3

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DATE

10/30/81



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON D.C. 20555

October 30, 1981

Docket No. STN 50-528/529/530

The Honorable Alan Simpson, Chairman  
Subcommittee on Nuclear Regulation  
Committee on Environment and Public Works  
United States Senate  
Washington, D.C. 20510

Subject: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2 AND 3

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- ☐ Amendment No. \_\_\_\_\_ to CPPR- \_\_\_\_\_ or DRR- \_\_\_\_\_, dated \_\_\_\_\_.
- ☐ Other: \_\_\_\_\_
- ☐ \_\_\_\_\_

Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: The Honorable Gary Hart

bcc: OCA

|         |          |  |  |  |  |  |
|---------|----------|--|--|--|--|--|
| OFFICE  | DL:JB#3  |  |  |  |  |  |
| SURNAME | J Lee    |  |  |  |  |  |
| DATE    | 10/30/81 |  |  |  |  |  |





THE  
UNITED STATES  
DEPARTMENT OF  
THE ARMY  
WASHINGTON, D. C.  
OFFICE OF THE  
CHIEF OF STAFF  
MEMORANDUM FOR THE  
CHIEF OF STAFF  
SUBJECT: [Illegible]

1. [Illegible]  
2. [Illegible]  
3. [Illegible]  
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18. [Illegible]  
19. [Illegible]  
20. [Illegible]

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON D.C. 20555

October 30, 1981

Docket No. STN 50-528/529/530

The Honorable Toby Moffett, Chairman  
Subcommittee on Environment, Energy and  
Natural Resources

Committee on Government Operations  
U.S. House of Representatives  
Washington, D.C. 20515

Subject: ARIZONA PUBLIC SERVICE COMPANY, ET AL  
PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2 AND 3

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- ☐ Other: \_\_\_\_\_
- ☐ \_\_\_\_\_

Office of Nuclear Reactor Regulation

Enclosures:  
As stated

cc: The Honorable Joel Deckard  
bcc: OCA

OFFICE

DL:IB#3

SURNAME

JLee

DATE

10/30/81



1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that this is crucial for ensuring the integrity of the financial system and for providing a clear audit trail. The text also mentions the need for regular reviews and updates to the records to reflect any changes in the data.

2. The second part of the document focuses on the role of technology in improving the efficiency of record-keeping. It highlights how digital tools can help in organizing and analyzing large volumes of data more effectively than traditional methods.

3. The third part of the document addresses the challenges associated with data security and privacy. It discusses the various risks involved in storing sensitive information and provides recommendations for implementing robust security measures to protect the data from unauthorized access.

4. The fourth part of the document concludes by summarizing the key points discussed and reiterates the importance of a proactive approach to managing financial records.

5. The fifth part of the document provides a brief overview of the future trends in financial record-keeping, including the potential impact of artificial intelligence and blockchain technology.

6. The final part of the document offers some practical advice for individuals and organizations looking to optimize their record-keeping processes.