U.S. NUCLEAR REGULATORY COMMISSION
REGION V

Docket Numbers: 50-528, 50-529, 50-530

Inspection Report Number: 50-528/90-35, 50-529/90-35, 50-530/90-35
EA 90-121

License Numbers: NPF-41, NPF-51, NPF-74

Licensee: Arizona Nuclear Power Project
P. O. Box 52034
Phoenix, Arizona 85072-2034

Facility Name: Palo Verde Nuclear Generating Station Units 1, 2, and 3

Enforcement Conference: July 10, 1990

Inspection at: Palo Verde Site, Wintersburg, Arizona

Inspection Conducted: August 28-31, 1990

Inspectors: R. Huey, Chief, Engineering Section
A. Johnson, Enforcement Officer

Submitted by: _____ 9/20/90
F. R. Huey, Chief, Engineering Section Date Signed

Approved by: _____ 9/21/90
D. F. Kirsch, Chief, Reactor Safety Branch Date Signed

Summary:

Enforcement Conference on July 10, 1990, and Inspection at Palo Verde on August 28-31, 1990 (Report Nos. 50-528, 50-529, 50-530/90-35).

Areas Discussed at Enforcement Conference:

The purpose of the Enforcement Conference was to discuss the apparent violations that were summarized in NRC Inspection Report Nos. 50-528/90-25, dated July 5, 1990, regarding the reliability, design, and testing of emergency lighting units installed at Palo Verde.

Areas Inspected at Palo Verde:

The purpose of the inspection at the Palo Verde site was to review the findings of licensee submittals dated July 20, August 1 and August 15, 1990, which provided the results of further licensee review of the information discussed at the Enforcement Conference.

Results of Inspection:

General Conclusion and Specific Findings:

1. During the last three years (1987-1990), Appendix R 8-hour emergency lighting units have experienced significant availability problems, without appropriate corrective actions being implemented. This has resulted in numerous instances of the lights not being available to operate for 8 hours in the event of a fire.

2. The licensee does not appear to have properly involved cognizant engineering and technical support personnel in the routine evaluation and trending of maintenance activities at the Palo Verde plant.

Significant Safety Matters:

Failure of the Appendix R emergency lights to fulfill their design function is a significant safety concern.

Summary of Violations Identified:

Two apparent violations were identified, which will be the subject of separate correspondence:

° Apparent failure to implement the quality assurance (QA) program for fire protection required by APS operating licenses, and

° Apparent failure to comply with the requirement for 8-hour emergency lights in all areas needed for operation of safe shutdown equipment and in access and egress routes thereto.

ENFORCEMENT CONFERENCE DETAILS

1. Meeting Attendees

a. NRC

W. P. Ang, Reactor Inspector
M. Blume, Regional Attorney
T. L. Chan, Senior Project Manager, NRR
D. H. Coe, Senior Resident Inspector
B. H. Faulkenberry, Deputy Regional Administrator
B. B. Hayes, Director, Office of Investigations
R. Hoefling, Office of General Counsel
F. R. Huey, Chief, Engineering Section
A. D. Johnson, Enforcement Officer
D. F. Kirsch, Chief, Reactor Safety Branch
J. T. Larkins, Director, PD5, NRR
R. G. Marsh, Director, Field Office Investigations, RV
J. B. Martin, Regional Administrator
M. H. Miller, Reactor Inspector
D. P. Notley, Fire Protection Engineer, NRR
S. R. Peterson, Project Manager, NRR
C. B. Ramsey, Reactor Inspector
H. J. Wong, Chief, Reactor Projects Section 2
R. P. Zimmerman, Director, Division of Reactor Safety and Projects

b. Arizona Public Service

J. N. Bailey, Vice President, Nuclear Safety and Licensing
B. E. Ballard, Sr., Director, Quality Assurance
R. A. Bernier, Licensing Supervisor
W. F. Conway, Executive Vice President, Nuclear
E. G. Firth, Training Manager
F. Garrett, Fire Protection Engineer
A. Gutterman, Attorney
J. Levine, Vice President, Nuclear Production
G. R. Overbeck, Director, Site Technical Support
W. F. Quinn, Director, Licensing
E. C. Simpson, Vice President, Nuclear Engineering & Construction
G. W. Sowers, Site Technical Support
E. C. Sterling, Manager, Nuclear Engineering

2. Palo Verde Enforcement Conference Details

Mr. Martin opened the meeting by stating that this was an enforcement conference regarding emergency lighting discrepancies at Palo Verde.

Mr. Huey reviewed the specific NRC concerns associated with the emergency lighting system at Palo Verde. In particular, the following apparent violations were discussed:

° Apparent failure to implement the quality assurance (QA)

program for fire protection required by APS operating licenses, with the result that corrective actions and testing appeared to be significantly deficient in this area;

- Apparent failure to comply with the requirement for 8-hour emergency lights in all areas needed for operation of safe shutdown equipment and in access and egress routes thereto, as evidenced by the significant proportion of these lights that failed during the past three years and would not have been capable of operating for eight hours in the event of a postulated fire;

- Apparent failure to install lighting units in outdoor areas in accord with the requirements of the National Fire Protection Code or with those of the NRC for components to be tested and accepted by an independent, nationally recognized testing laboratory;

- Apparent failure to properly scope the periodic review of the Pre-Fire Strategies Manual to determine whether changes were necessary, with the result that it contained errors that would have precluded certain operator actions; and

- Apparent failure to report the above potential violations as required by APS operating licenses and technical specifications.

Subsequent to the discussion of the apparent violations, Mr. Conway stated that he was not yet prepared to agree with the NRC conclusions and requested additional time to address the specific NRC concerns in a more detailed manner. Mr. Martin agreed to this request, noting that the licensee had committed to:

1. Submit by July 13, 1990, a Justification for Continued Operation which addresses the apparent inadequate quality assurance oversight of the Fire Protection Program in general and emergency lighting in particular; and,

2. Submit by July 27, 1990, any additional information which the licensee concluded should be considered in assessing the apparent violations identified above.

This concluded the Enforcement Conference.

INSPECTION DETAILS

1. Persons Contacted

Arizona Public Service

#W. Conway, Executive Vice President, Nuclear
*E. Simpson, Vice President, Nuclear Engineering & Construction
#J. Bailey, Vice President, Nuclear Safety & Licensing
*J. Allen, Director, Nuclear Engineering & Construction
W. Quinn, Director, APS Licensing
T. Cogburn, Technical Assistant
R. Bernier, Licensing Supervisor
*G. Clyde, Senior Licensing Engineer
*C. Stevens, Supervisor, Nuclear Engineering Analysis
S. Rodgers, Senior Engineer
Y. Lokic, APS Consultant
L. Mitchell, System Engineer
C. Cooper, System Engineer
J. Wadella, Engineer

* Denotes those personnel in attendance at the exit meeting on August 31, 1990.

\# Denotes those personnel linked by telephone for the August 31, 1990 exit meeting.

2. Follow-up on Previous Inspection Findings

(Open) Violation 528/90-25-01: "Failure of Appendix R Emergency Lights"

The inspectors reviewed the following submittals, which were provided by APS following the July 10 Enforcement Conference:

-- Proposed Justification for Continued Operation, dated July 20, 1990

-- Detailed response to the findings of NRC Inspection Report 50/528-90-25, dated August 1, 1990

-- Listing of emergency lighting discharge tests conducted at the Palo Verde site since 1987, dated August 15, 1990

NRC review of the above submittals concluded that two of the apparent violations discussed during the July 10 Enforcement Conference continued to warrant NRC enforcement action. In particular:

° Apparent failure to implement the quality assurance (QA) program for fire protection required by APS operating licenses, and

° Apparent failure to comply with the requirement for 8-hour emergency lights in all areas needed for operation of safe shutdown equipment and in access and egress routes thereto.

Furthermore, the inspectors determined the following concerning the availability of 8-hour emergency lights since 1987 (in this regard,

"availability" refers to the ability of the lights to operate for eight hours in the event they were called upon to operate during a fire):

Unit 1:

* Control Room emergency lighting unit 1EQDNN01 was not available for approximately 12 weeks, due to low specific gravity following a discharge test on February 3, 1987. Following the discharge test, it appears that the unit did not receive an equalizing charge and was not demonstrated to be satisfactorily recharged until April 5, 1987.

* Control Room emergency lighting unit 1EQDNN01 was also not available for approximately 29 weeks, due to low specific gravity problems following a discharge test on January 29, 1988. The unit required several equalizing charges and was not demonstrated to be satisfactorily recharged until August 19, 1988.

* Control Room emergency lighting unit 1EQDNN02 was also not available for approximately 21 weeks, due to low specific gravity following a discharge test on February 5, 1987. The unit required several equalizing charges and was not demonstrated to be satisfactorily recharged until July 6, 1987. During the 12 week period from February 5 until April 5, 1987, both Control Room emergency lighting units were not available due to battery recharging problems.

* Control Room emergency lighting unit 1EQDNN02 was also not available for approximately 34 weeks, due to low specific gravity problems following a discharge test on January 29, 1988. Although the battery received several recharges during the periodic preventive maintenance activities, low specific gravity problems continued until the battery bank was replaced on September 29, 1988. The unit was not satisfactorily tested until February 27, 1990.

* During the 29 week period from January 28 until August 19, 1988, both of the above Control Room emergency lighting units were not available due to battery recharging problems.

* Control Building emergency lighting unit 1EQBN001 was not available for approximately 11 weeks, following failure of a discharge test on January 28, 1988. During the test, the inverter failed and the unit breakers remained open until the unit was restored on April 13, 1988.

Unit 2:

* Control Building emergency lighting unit 2EQBN002 was not available for approximately 61 weeks, following identification of a defective inverter transfer relay on March 8, 1987. The unit failed two consecutive discharge tests (September 9, 1987 and May 5, 1988) due to a defective inverter transfer relay. No

discharge time was achieved during the first test and only 4 hours of discharge were achieved during the second test. The unit was not repaired until May 12, 1988. The unit was not satisfactorily tested until July 3, 1989.

* Control Building emergency lighting unit 2EQBN001 was not available for approximately 4 weeks, following the discovery of maintenance inflicted damage to battery posts on January 31, 1989. The unit was not repaired and tested until March 1, 1989.

* Control Room emergency lighting unit 2EQDNN02 was not available for approximately 7 weeks, due to low specific gravity following a discharge test on December 4, 1989. Battery bank recharging was not satisfactorily completed until January 27, 1990.

* Control Room emergency lighting unit 2EQDNN01 was not available for approximately 15 weeks, following failure of a discharge test on January 3, 1990. The unit failed two consecutive discharge tests (January 3, 1990 and April 5, 1990) due to an apparently defective inverter cutout relay, which resulted in the unit operating about 7-1/2 hours. The unit was not restored to operable condition until April 20, 1990.

Unit 3:

* Auxiliary Building emergency lighting unit 3EQBN003 was not available for approximately 52 weeks, following failure of the lights to operate during a discharge test on April 17, 1987. This unit also failed two successive preventive maintenance tasks on February 8, 1988 (six of eight cells were found missing from the battery bank) and March 4, 1988 (all eight cells were found missing from the battery bank). Although a work order had been initiated to replace the battery bank, the batteries were not replaced and satisfactorily tested until April 19, 1988.

* Control Building emergency lighting unit 3EQBN002 was not available for approximately 31 weeks, following the discovery of low battery bank voltage and damaged battery cells on September 12, 1987. This unit also failed two successive preventive maintenance tests on February 5, 1988 and March 7, 1988, due to continuing low battery bank voltages. Furthermore, during the March 1988 maintenance activity, two of the eight cells in the battery bank were found to be missing. Although a work order had been initiated to replace the battery bank, the batteries were not replaced and satisfactorily tested until April 18, 1988.

* Control Room emergency lighting unit 3EQDNN01 was not available for approximately 4 weeks, due to low specific gravity following a discharge test on June 12, 1989. Following the discharge test, the unit did not receive an equalizing charge and was not demonstrated to be satisfactorily recharged until July 19, 1989.

* Control Room emergency lighting unit 3EQDNN01 was not available for approximately 15 weeks, following failure of a discharge test on May 11, 1989. The unit failed three consecutive discharge tests (May 1989, June 1989 and July 1989) due to a defective inverter

cutout relay. The unit was not satisfactorily tested and restored to operable condition until August 28, 1989.

* Auxiliary Building emergency lighting unit 3EQBN003 was not available for approximately 6 weeks, following failure of a discharge test on May 3, 1990, during which the lights operated 6 1/2 hours. The battery and inverter unit were not replaced and satisfactorily tested until June 18, 1990.

During the review of maintenance records associated with the emergency lighting system, the inspectors noted that APS does not appear to have properly involved cognizant engineering and technical support personnel in the routine evaluation and trending of maintenance activities at the Palo Verde plant. In this regard, the inspectors observed that cognizant emergency lighting system engineers continue to be involved in plant maintenance activities affecting emergency lighting only when requested.

3. Exit Meeting

An exit meeting was held with the licensee on August 31, 1990. The above findings were discussed during that meeting. The licensee acknowledged the scope and content of the inspection findings.