

UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON, D.C. 20555

November 13, 1992

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

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LICENSEE: Arizona Public Service Company

FACILITY: Palo Verde Nuclear Generating Station

SUBJECT: SUMMARY OF MEETING HELD ON NOVEMBER 10, 1992 TO DISCUSS FIRE PROTECTION PROGRAMS AT PALO VERDE

On November 10, 1992, the NRC staff met with representatives of Arizona Public Service Company to discuss recent fire protection program improvements and efforts. Persons attending the meeting are identified in Enclosure (1). A copy of viewgraphs used at the meeting is shown in Enclosure (2). The meeting was held pursuant to notice issued on October 27, 1992. Highlights of the meeting are summarized below.

The licensee, Arizona Public Service Company (APS), has underway a 10 CFR 50, Appendix R, Reconstitution Program to "enhance criteria, methodology, and assumptions in Appendix R support analysis such that it is written and organized to facilitate review by a person not involved in the evaluation." The other objective of the reconstitution effort is to validate existing analyses given current regulatory issues. The reconstitution program identified the need for some plant modifications, revisions to operator actions, revisions to three previously approved deviations, and three new Appendix R deviation requests. The details of these items are contained in Enclosure (2).

The second subject concerned APS' efforts towards resolution of the Fire Protection Justification for Continued Operation which was initiated July 20, 1990, when it was found that some of APS' commitments regarding quality assurance for fire protection had not been fully implemented. All efforts associated with this progrm will be completed by December 31, 1992.

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Enclosures:

The balance of the meeting was devoted to a description of the Penetration Seal Project and a status report on Thermo-Lag fire barriers at Palo Verde.

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Original Signed By:

Charles M. Trammell, Senior Project Manager Project Directorate V Division of Reactor Projects III/IV/V

Office of Nuclear Reactor Regulation

1. List of Attendees 2. Viewgraphs cc w/enclosures: See next page ч. DISTRIBUTION: [Docket_File_7 NRC & Local PDRs PDV Reading File TMurley/FMiraglia, 12G18 (w/o enclosure 2) JPartlow, 12G18 (w/o enclosure 2) JRoe (w/o enclosure 2) MVirgilio (w/o enclosure 2) TQuay (w/o enclosure 2) CTrammell (w/o enclosure 2) DFoster (w/o enclosure 2) OGC, 15B18 (w/o enclosure 2) EJordan, MNBB 3701 PMadden, 8D1 (w/o enclosure 2) ACRS (10), P315 JMitchell, 17G21 (w/o enclosure 2) KPerkins, RV (w/o enclosure 2)

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Charles M. Traumel

Charles M. Trammell, Senior Project Manager Project Directorate V Division of Reactor Projects III/IV/V Office of Nuclear Reactor Regulation

Enclosures:

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List of Attendees
Viewgraphs

cc w/enclosures: See next page

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Mr. William F. Conway Executive Vice President, Nuclear Arizona Public Service Company Post Office Box 53999 Phoenix, Arizona 85072-3999

ENCLOSURE 1

NOVEMBER 10, 1992

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FIRE PROTECTION MEETING

BETWEEN

NRC STAFF AND ARIZONA PUBLIC SERVICE COMPANY

LIST OF ATTENDEES

NAME Charles Trammell Patrick Madden Mohammad Karbassian Frank Garrett Scot Koski Elizabeth Kleinsorg Nancy Turley Michael E. Powell

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ORGANIZATION NRC/NRR/PDV NRC/NRR/SPLB APS APS APS APS APS APS APS



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Objectives

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Appendix R Reconstitution Tasks

- A. Reconstitute Safe Shutdown Equipment List
- **B. Create SSD Logics**
- **C. Reconstitute SSD Cables**
- **D. Reconstitute Operational Considerations**
- E. Verify III.G/III.L Compliance
- F. Document Manual Action Feasibility
- G. Reconstitute Common PWR Supply/Common Enclosure

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- H. Revise Operator Actions
 - I. Update Configuration Management Documents
- J. Update UFSAR

Appendix R Reconstitution Task "A"

Task A. Reconstitute Safe Shutdown Equipment List:

Create one list which contains all safe shutdown components and pertinent information

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Results: 13-MC-FP-315, 10CFR50 Appendix R Safe Shutdown Equipment List

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Appendix R Reconstitution Task "B"

Task B. Create Safe Shutdown Logics:

- Create success path logics which depict all safe shutdown components
- Create a tool which will aid in the consistent application of systems interaction and reproducibility of results

Results: 13-M-FPR-001 through 021, Safe Shutdown Logic and Safety Functional Diagrams

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Appendix R Reconstitution Task "C"

Task C. Reconstitute Safe Shutdown Cables:

- Document the circuit analysis of all safe shutdown circuits
- Update the Cable and Raceway Tracking System

Task.4

Results: 13-EC-FP-004, 10CFR50 Appendix R Safe Shutdown Cable Identification Analysis

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Appendix R Reconstitution Task "D"

Task D. Reconstitute Operational Considerations:

Consolidate APS calculations or analysis which estimate time frames in which operator actions should occur to prevent the plant from being placed in an unrecoverable condition

Results: 13-EC-FP-004, 10CFR50 Appendix R Safe Shutdown Cable Identification Analysis

Appendix R Reconstitution Task "E"

Task E. Verify III.G/III.L Compliance:

Provide one document that assesses the ability to achieve and maintain safe shutdown given a fire in any analysis area

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Results: 13-MC-FP-318, 10CFR50 Appendix R III.G/III.L Compliance Assessment

Appendix R Reconstitution Task "F"

Task F. Document Manual Action Feasibility:

Provide a document which assesses the feasibility of completing the manual actions identified in each analysis area

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Results: 13-MC-FP-316, 10CFR50 Appendix R Manual Action Feasibility

Appendix R Reconstitution Task "G"

Task G. <u>Reconstitute Common Power Supply/Common</u> Enclosure:

> Currently being addressed under Electrical Engineering's Calculation Reconstitution effort

Results, as necessary, will be included in the Appendix R Documentation

Task-G

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Appendix R Reconstitution Task "H"

Task H. Revise Operator Actions:

Updating Pre-Fire Strategies Manual to provide revised actions

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Revising Control Room fire procedure to reprioritize actions

Results: Revision to 4XAO-XZZ44 Revision to Pre-Fire Strategies Manual . .

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Appendix R Reconstitution Task "I"

Task I. Update Configuration Management Documents:

Currently revising Configuration Management Program Documents to reflect FP Engineering Organization and new calculations and drawings



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Appendix R Reconstitution Reconstitution Results

- The reconstitution concluded that the original analysis was generally correct for "Active" safe shutdown components
- The Reconstitution identified the need for:
 - Plant Modifications

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- Revisions to Operator Actions
- Revisions to Approved Deviations
- Request for New Deviations

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Appendix R Reconstitution Plant Modifications					
Subject	Interim Actions	Final Resolution			
Loss of RCP Seal Injection: Potential for loss of RCP Seal Cooling causing seal damage which could result in RCS leakage > available charging due to design basis fire (both inside or outside C.R.)	Revised Pre-Fire Strategies Manual Revised ZZ44	PCR to install a transfer switch to operate NC Containment isolation valve			
Loss of Essential HVAC: Potential loss of Essential HVAC to B Train DC equipment rooms during Control Room Fire scenario	Revised ZZ44	PCR to install remote/local switch			
Loss of RCS Sampling: Potential for a loss of power to a sampling valve required to obtain hourly RCS sample during a Control Room fire scenario	Calculation performed to demonstrate the ability to achieve and maintain safe shutdown per ZZ44 without sampling capability	PCR to provide dedicated power to sampling valve to ensure RCS sampling capability			

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Appendix R Reconstitution Plant Modifications

Subject	Interim Actions	Final Resolution
DG A&B Train Cables in Same Fire Area:		
A&B Train safe shutdown cables lo- cated in the DG stairway. Physical separation 30' horizontal and 30' vertical and by non-rated concrete barriers (floor and wall)	Hourly fire watch established in DG stairway	PCR to upgrade a fire door and rate existing non-rated barriers (wall and floor)
Loss of EW System Inventory:	~	
Potential for loss of EW system inven- tory due to spurious opening of EW MOVs (when in X-tied to NC system) during a Control Room Fire	Revised ZZ44 to include operator actions to ensure closure of EW MOVs prior to establishing the EW/NC X-tie	PCR to provide Emergency Lighting for EW valves
Fire Panel Control Circuit/Damper Closure in Opposite Train:		
Control Circuits for the Control Bldg. elev. 100' fire panels pass thru both trains. A fire in one train could result in loss of Essential HVAC to the opposite train due to spurious damper closure	Established hourly roving fire watches. Inactivated the automatic function of the A-Train CO2 system (Control Bldg. 100'). Revised Pre- fire Strategies Manual to provide instructions to restore HVAC (mater	PCR to reconfigure Fire Panel control circuits to provide train separation ial staged)

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Appendix R Reconstitution Plant Modifications

Subject	Interim Actions	Final Resolution
Associated Circuits/Lack of Fuses: The potential exists that non-safe shut- down (NSSD) "associated" cables that share a common power source with safe shutdown equipment, could cause a loss of power to the safe shutdown equipment if a ground fault were to occur in an "un-fused" leg of the NSSD circuit	Hourly fire watches were established for all potentially affected fire zones containing cables of both trains. Revising Pre-fire Strategies & ZZ44 to incorporate operator actions.	PCR to install fuses in the "unfused" leg of the existing SSD and associated circuits, as necessary
Loss of Essential HVAC to A-Train AF Pump: A design basis fire in MSSS Bldg. could cause a loss of both the B-Train AF pump and loss of Essential HVAC to the A-Train AF pump room, thus disabling the pump which would be required to achieve safe shutdown	Hourly fire watch established in fire zone 74B (location of unprotected circuit)	DCP to reconfigure the control circuitry for the Essential ACU to install the required additional fuse

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Appendix R Reconstitution Plant Modifications		
Subject	Interim Actions	Final Resolution
Diesel Generator Transfer Switch: Depends on the existing set of fuses in the affected circuit. Potential for loss of DG breaker control power due to fuse opening in the event of a fire	Hourly fire watch established. ZZ44 is being revised	PCR to reconfigure DG breaker control circuit
Manual Actions, New Deviations and Revision to Previous Deviations:	Pending	Pending
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Appendix R Reconstitution Reconstitution Results Revision to Operator Actions

Corrective Action documents generated for additional operator actions for alternative shutdown areas

Operator actions which changed for non-alternative shutdown areas were feasible

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Appendix R Reconstitution Reconstitution Results Revision to Approved Deviations

- Reconstitution credited all existing approved deviations
- Existing deviations were validated in the field
- Results indicate that original A/B separation justifications were correct. However, the addition of spurious components affected the following deviations:
 - Fire Area I Deviation 5
 - Fire Area II Deviation 2
 - Fire Area XV Deviation 8

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Appendix R Reconstitution Reconstitution Results Revision to Approved Deviations

Control Building Fire Area I Deviation 5:

Description:

The central wall of the dead space compartment between the Auxiliary Building and the Control Building and is a Fire Area boundary common to Fire Area I (Zone 86A) and Fire Area II (Zone 86B) at elev. 74' thru 140'. The central wall is reinforced concrete construction with a nominal 6" seismic gap. A Deviation is requested from Section III G.2 of 10CFR50 Appendix R to the extent that it requries 3 hour rated barriers to separate redundant circuits.

Justification:

- The central wall of the deadspace (86A & 86B) is reinforced concrete construction and has two 6" nominal seismic gaps covered by 1/4" solid steel plates bolted to each side of a concrete wall
- Zonal detection covers the predominant in situ combustibles on elev. 100' and 120'
- Automatic deluge water spray covers the in situ combustibles on elev. 100' and 120'
- The A/B train safe shutdown cable trays in zones 86A and 86B are each approximately 10 feet from the center wall with no intervening combustibles
- The combustible loading for zones 86A and 86B is 140 and 350
- The Fire Team response is expected within 10 minutes

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Appendix R Reconstitution Reconstitution Results Revision to Approved Deviations

Control Building Fire Area II Deviation 2:

Description:

The east wall of Fire Zone 86B is a Fire Area boundary between Fire Area II and the Corridor Bldg. The barrier contains a 6" nominal seismic gap which is covered with non-rated solid 18 gauge sheet metal flashing on either side of a reinforced concrete wall. A Deviation is requested from Section III G.2 of 10CFR50 Appendix R to the extent that it requires installation of a 1 hour barrier and an area wide suppression system. Control Fire Area II

Justification:

• The east wall of 86B is reinforced concrete construction stub with a 6 inch nominal seismic gap covered with 18 gauge sheet metal on each side

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- There is no safe shutdown equipment or cables located in the corridor building
- Zonal detection covers the in situ combustibles in zone 86B at elev. 100' and 120'
- Automatic deluge water spray covers the in situ combustibles on elev. 100' and 120'
- The combustible loading for zone 86B is less than 350 minutes
- Fire Team response is expected in less than 10 minutes



Appendix R Reconstitution Reconstitution Results Revision to Approved Deviations

Fire Area XV Deviation 8:

- Credits spatial separation between Train A and B safe shutdown equipment
- Addition of "N" Train and spurious components require clarification of approved deviation

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Appendix R Reconstitution Reconstitution Results New Deviations

Additional action in the Control Room

Parameters outside those expected for a normal loss of AC power

Improper application of Generic Letter 86-10, Questions 5.3.10 and 5.3.1

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Appendix R Reconstitution Reconstitution Results New Deviations

Additional action in the Control Room

- The conservative bounding analysis done for the Control Room fire indicates the SGs may overfill in 1.5 minutes - assuming:
 - MFVs remain @ 50% flow after trip
 - No "automatic control" via ESFAS
- Justification:
 - Action in Control Room is on same panel as trip button
 - Action is followed-up outside the Control Room immediately

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Appendix R Reconstitution Reconstitution Results New Deviations

Parameters outside those expected for a normal loss of AC power

- Plant is not placed in an unrecoverable condition
- Parameters are restored

Appendix R Reconstitution Reconstitution Results New Deviations

Improper application of Generic Letter 86-10, Questions 5.3.1 and 5.3.10

 Power and control cables for redundant high/low pressure interface valves

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Appendix R Reconstitution Long Term Compliance Organizational effectiveness Configuration control Training

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FP JCO Project Overview

FP/QAG Program Implementation



Program

JCO Project Overview

Items Requiring Closure Prior to Lifting of the JCO

- I. Installation Verification of the RCP Lube Oil Collection System
- II. Inspection of the Radiant Energy Shield
- III. Verification of the PM on Powerblock Lightning Protection System
- **IV. Resolution of Fire Damper Closure Under Air Flow (IN-89-52)**
- V. Enhancement of the Design Review Process per the QA Assessment Report
- VI. Enhancement of the FT Program per the QA Assessment Report

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Penetration Seal Project I. Verification and Consolidation of Design Basis Internal Conduit Sealing Requirements

- Developed criteria to determine the internal sealing requirements for:
 - 1) Fire and Smoke & Hot Gas
 - 2) Flooding
 - 3) Differential Pressure

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Penetration Seal Project I. Verification and Consolidation of Design Basis Internal Conduit Sealing Requirements

Fire and Smoke & Hot Gas Criteria:

Conduit Diameter	Continuous Thru Room	Terminates <1' From Barrier	Terminates 1'≤ x < 3' From Barrier	Terminates 3'≤ x 5' From Barrier	Terminates 5'≤ x <10' From Barrier	Terminates ≥ 10' From Barrier
<u><</u> 1 - 1/2"	NS	F	SHG	SHG	NS	NS
2"	NS	F	F	SHG	SHG	NS
2" < Ø ≤ 4"	NS	F	F	F	SHG	NS
> 4"	NS	F	F	F	F	SHG

Flooding:

Conduits which penetrate flood barriers below the postulated height of the flood, are open in the flooded room, and are not routed up and out of the flood prior to exiting the room are paths for the escape of flood waters.

Differential Pressure:

Conduits which penetrate a barrier separating an are maintained at a pressure differential than an adjoining area are potential paths for the egress (or ingress) of airborne radiation

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Penetration Seal Project I. Verification and Consolidation of Design Basis Typical Penetration Seal Details

- Developed unique set of typical penetration details
- Performed calculation that evaluated each typical penetration detail
- Evaluation included regulatory and industry guidance criteria

Penetration Seal Project

II. Verification of As-Built

Performed Walkdown

Evaluation performed on Walkdown data

Generated Corrective Action Documents

WMN029 N29 SIMS - CIV	IL/ARCH EQUIPMENT SUMMARY	10/28/92 14:37:04
EQ ID 1AZANB102-E OPS DESC CONCRETE BARRIER B PRI SOURCE DOC AD 13-A-ZA	B15-W BARRIE REC T TWN A-102 AND A-B15 D-201 COORD	TYPE ECM STATUS UNIT 1 SYS ZA
IOCATION SPEC MFR VEN	SERIAL # TECH MANUAL MODEL MFR/MODEL DA MODEL	REV NO ATA NOT FOUND
ENG A CONSTRUCTION TYPE ENG B THICKNESS ENG C FIRE RATING ENG D RADIATION REQMNTS ENG E ~P ACROSS BARRIER ENG F SECURITY BARRIER ENG G FLOOD HEIGHT (FT) ENG H HELB REQMNT'S (PSIG) ENG J DESIGN PRESS DESIGN TEMP WEIGHT ASSOC BARRIER EQID ASSOC FIRE ZONE 42D/NONE	REINFORCED CONCRETE >= 24" BUT < 36" APPENDIX A - 2 HRS NONE HA YES 0.00 FT 0.00 PSIG ENV INT ENV EXT OPERATING PRESS OPERATING TEMP ASSOC PIPE TAG	QUALITY CLASS Q SEISMIC CAT 1 ASME CODE N Q FUNCTIONAL MODE P Q FUNCTION 08 08 EQ CATEGORY MP EQ ZONE 3

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WMN029 N29 SIMS -	CIVIL/ARCH EQUI	IPMENT SUMMARY	10/28/92 1	.4:27			
EQ ID 1AZYD323 OPS DESC PENETR	001	SEALXX REC TYP	PE ECM STATUS	5 r			
PRI SOURCE DOC AD 01-A-ZYI	COORD	NR					
LOCATION SPEC MFR VEN Z100 ISI-ICMS (FOR FP SY	SERIAL # TECH MANUAL MODEL (STEM Q MODEL	NA MFR/MODEL DATA GFS-1 / NA	REV NO A NOT FOUND	7			
ENG A PENETRÀTION TYPE	CORE DRILLED		QUALITY CLASS	QAG			
ENG B FIRE RATING	APPENDIX $\Lambda - 3$	HRS	SEISMIC CAT	3			
ENG C CONDUIT SEAL BARRIER	NA		ASME CODE	N			
ENG D CONDUIT SEAL SUFFIX	NA		Q FUNCTIONAL MODE	Р			
ENG E RADIATION	NOT APPLICABLE		Q FUNCTION 18				
ENG F ~P AND SECURITY	NA		EQ CATEGORY	N			
ENG G FLOOD (FT)	00000 FT		EQ ZONE	4			
ENG H HELB (PSIG)	0.0 PSIG 1	ENV INT X					
ENG J PEN SIZE (DIA OR HXW	2 IN 1	ENV EXT F	с. —				
DESIGN PRESS NA NA	OPERATING PRESS	S NA NA					
DESIGN TEMP NA NA	OPERATING TEMP	NA DEGF					
WEIGHT NA	ASSOC PIPE TAG	SEE NAMEPLATI	E / WMN011				
ASSOC BARRIER EQID 1AZJNB:	L09-E	1.14-W BA	ARRIE				
ASSOC FIRE ZONE 6B/5B							

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Penetration Seal Project

ill. Development of User Friendly Design Documents

- Station Information Management System (SIMS):
 1) Originated EQIDs for each penetration
 2) Originated EQIDs for Barrier designation
- Design and Configuration Documents:
 - 1) Engineering Procedure
 - [•] 2) Revision of Penetration Location Drawings
 - 3) Revision of Engineering Specification
 - 4) Revision of Maintenance Procedure
 - 5) Revision of Surveillance Procedures

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Typical Scoring and Grooving Layout



D = Depth of penetration

This is for illustration purposes only.

6 83 3 6 5 6 6 83 7





- L = Unsupported barrier span
- S = Spacing requirements 12 in. maximum PVNGS 8 in. maximum typical
- t = Barrier panel thickness

This is for illustration purposes only.

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