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SUBJECT: Suppls WF Conway 900713 ltr to JB Martin re evaluation of fire protection sys equipment.

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WILLIAM F. CONWAY
EXECUTIVE VICE PRESIDENT
NUCLEAR

161-03349-WFC/RAB
July 20, 1990

Docket Nos. STN 50-528/529/530

Mr. John B. Martin
Regional Administrator, Region V
U. S. Nuclear Regulatory Commission
1450 Maria Lane, Suite 210
Walnut Creek, CA 94596-5368

References: 1) Letter from R. P. Zimmerman, NRC, to W. F. Conway, APS, dated July 5, 1990; Subject: NRC Inspection of Palo Verde Units 1, 2 and 3. Inspection Report Nos. 50-528/90-25, 50-529/90-25 and 50-530/90-25.

2) Letter to J. B. Martin, NRC, from W. F. Conway, APS, dated July 13, 1990; Subject: Evaluation of the Fire Protection System Equipment (161-03338).

Dear Mr. Martin:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2 and 3
Evaluation of the Fire Protection System Equipment
File: 90-019-026; 90-056-026

This letter supplements Reference 2) and completes the APS response to your request for a justification for continued operation, based on your questions regarding the application of the Quality Assurance Program to fire protection equipment.

If you have any questions concerning this information, contact Mr. R. A. Bernier, at (602) 340-4295.

Sincerely,

J M Levine for WFC

WFC/RAB
Enclosure

A006
1/1

161-03349-WFC/RAB
July 20, 1990

cc: Document Control Desk
C. M. Trammell
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ENCLOSURE

EXECUTIVE SUMMARY

The purpose of this evaluation is to determine which areas of the Fire Protection System can be readily shown to be covered by the appropriate criteria of the PVNGS QA Program, and for those areas that cannot be shown to have adequate coverage, to provide the appropriate assurance that the fire protection systems will function as required. The determination of system functionality was approached through several individual evaluations as follows:

Initially, the following actions were taken:

a) The PVNGS Operations Quality Assurance Criteria Manual was compared with the NRC's BTP 9.5-1, Appendix A on QA Criteria for Fire Protection (BTP APCSB 9.5-1, Appendix A) to evaluate compliance.

b) The PVNGS Administrative Controls procedures were evaluated to assure that programmatic controls are in effect to assure conformance with the applicable QA criteria.

c) The fire protection equipment quality classification system used by PVNGS was reviewed to determine affected components/equipment quality class.

Upon completion of these reviews:

a) Areas of incomplete application of the PVNGS QA program to the Fire Protection Program were determined and identified as discrepancies, then

b) To assure that the systems potentially affected by the discrepancies will function as required, a technical evaluation was performed and justifications for continued operation (JCO) have been documented.

The evaluation of the ability of the fire protection equipment to function as required took into account partial application of QA program controls in combination with other activities such as those performed during PVNGS operations. Based on the results of this evaluation, APS has concluded that the fire protection systems and equipment are adequate to support the continued safe operation of PVNGS.

I INTRODUCTION

The purpose of this evaluation is to determine which areas of the Fire Protection System are currently covered by the appropriate criteria of the QA Program and for those areas that do not have adequate coverage, to provide the assurance that the fire protection systems will function as required.

Section II of this evaluation describes the current requirements for Quality Assurance to be applied to fire protection equipment. These QA requirements, as documented in the PVNGS Operations Quality Assurance Criteria Manual (OQACM), are compared to the guidelines of BTP 9.5-1, Appendix A, to demonstrate that the PVNGS requirements implement the BTP 9.5-1, Appendix A, guidelines. The implementation of the QA requirements in the administrative control program is also summarized in Section II.

Section III provides a history of the quality classification systems of PVNGS and the application of the quality classification system to the fire protection equipment.

Section IV summarizes the evaluation performed to determine the application of the QA program requirements described in the OQACM to the affected fire protection equipment. This evaluation identifies certain QA program application deficiencies.

Section V evaluates the impact of the identified application deficiencies on the functionality of the equipment and provides Justifications for Continued Operation (JCOs) for fire protection systems equipment where necessary.

Section VI discusses corrective actions that will be taken as a result of the deficiencies identified in Section IV.

II DESCRIPTION OF QA CRITERIA MANUAL AS APPLIED TO FIRE PROTECTION SYSTEM

A. Implementation of Appendix A to BTP 9.5-1 through the Operations Quality Assurance Criteria Manual

In order to demonstrate that the APS Quality Program, which is governed by the Operational Quality Assurance Criteria Manual, includes the elements of the Quality Requirements of BTP 9.5-1, Appendix A, the following table was developed. The table itemizes the BTP 9.5-1, Appendix A, Quality Requirements, and the Operational Quality Assurance Criteria Manual implementing requirements. This table demonstrates that the PVNGS QA Program, which is based upon the application of the pertinent Quality Assurance criteria of 10CFR50, Appendix B, to Fire Protection Systems and Activities, satisfies the detailed requirements of BTP 9.5-1, Appendix A.

COMPARISON OF BTP APCSB 9.5-1
QUALITY ASSURANCE GUIDELINES WITH OQACM CRITERIA

Appendix A to BTP 9.5-1, Appendix A APCSB 9.5-1	Demonstration that OQACM implements BTP 9.5-1
1. Design Control and Procurement Document Control Measures should be established to assure that all design-related guidelines of BTP 9.5-1, Appendix A are included in design and procurement documents and that deviations therefrom are controlled.	1. Design Control and Procurement Document Control Criterion 3 of the Operations Quality Assurance Criteria Manual addresses Design Control. Design documents are addressed by Section 3.2.2.1. Design deviations are addressed by Section 3.2.2.1.c, and 3.2.2.1.d, and 3.2.2.1.h. Criterion 4 of the Operations Quality Assurance Manual addresses procurement document control. Design Requirements for procurement documents are specified in Section 4.2.2.2. Deviations from the design requirements of the procurement documents are addressed by Section 4.2.2.3.4.
Instructions, Procedures, and Drawings Instructions, tests, administrative controls, fire drills, and training that govern the fire protection program should be prescribed by documented instructions, procedures, or drawings and should be accomplished in accordance with these documents.	2. Instructions, Procedures, and Drawings Instructions, procedures, and drawings for quality-related activities are specified in Operations Quality Assurance Criteria Manual Criterion 5. Instructions. Sections 5.2.2 and 5.2.3 address instructions and the need for procedures and drawings. Tests are Quality Related activities as defined in Section 2.2.7 of the OQACM. Section 5.2.3 specifies that Quality Related activities be accomplished in accordance with instructions, procedures, or drawings. Administrative Controls that govern the fire protection program are to be specified in procedures pursuant to Section 5.2.2. Fire drills and training are a fire Protection Program requirement specified in UFSAR Section 13.2.10. License Conditions 2.C.6, 2.C.7, and 2.F (Units 1, 2, and 3 respectively) require a Fire Protection Program as described in the FSAR. OQACM Criterion 2.2.3.1 specify that License Condition activities are Quality Related and subject to the OQACM. Criterion 5, Section 5.2.3 specifies that Quality Related Activities be accomplished by instructions, procedures or drawings. Therefore the fire drills and training are governed by Criterion 5.

COMPARISON OF BTP APCSB 9.5-1
QUALITY ASSURANCE GUIDELINES WITH OQACM CRITERIA
(CONTINUED)

Appendix A to BTP 9.5-1, Appendix A APCSB 9.5-1	Demonstration that OQACM implements BTP9.5-1
3. Control of Purchased Material, Equipment, and Services Measures should be established to assure that purchased material, equipment, and services conform to the procurement documents.	3. Control of Purchased Material, Equipment, and Services Criterion 7 of the OQACM ensures that items or services purchased comply with the requirements of the procurement documents. Criterion 4 of the OQACM specifies the information to be included in the procurement documents.
4. Inspection A program for independent inspection of activities affecting fire protection should be established and executed by, or for, the organization performing the activity to verify conformance with documented installation drawings and test procedures for accomplishing the activities.	4. Inspection Criterion 10 of the OQACM satisfies this requirement. USFAR Table 9B.3-1 states PVNGS complies by utilizing the American Nuclear Insurers (ANI) as the independent inspection organization.
5. Test and Test Control A test program should be established and implemented to assure that testing is performed and verified by inspection and audit to demonstrate conformance with design and system readiness requirements. The tests should be performed in accordance with written test procedures; test results should be properly evaluated and acted upon.	5. Test and Test Control Test Program to assure testing is performed and verified by inspection and audit to demonstrate conformance with design and system readiness requirements. Criterion 11 of the OQACM satisfies this requirement. Tests are performed in accordance with written test procedures. Section 11.2.3 of Criterion 11 satisfies this requirement. Test results should be properly evaluated and acted upon. Section 11.2.1.5, 11.2.1.6, and 11.2.1.9 of Criterion 11 satisfies this requirement. Audits are performed in accordance with Criterion 18.

COMPARISON OF BTP APCSB 9.5-1
QUALITY ASSURANCE GUIDELINES WITH OQACM CRITERIA
(CONTINUED)

Appendix A to BTP 9.5-1, Appendix A APCSB 9.5-1	Demonstration that OQACM implements BTP9.5-1
6. Inspection, Test, and Operation Status Measures should be established to provide for the identification of items that have satisfactorily passed required tests and inspections.	6. Inspection, Test, and Operating Status Criterion 14, Section 14.2, of this OQACM satisfies this requirement.
7. Nonconforming Items Measures should be established to control items that do not conform to specified requirements to prevent inadvertent use or installation.	7. Nonconforming Items Criterion 15 satisfies this requirement.
8. Corrective Action Measures should be established to assure that conditions adverse to fire protection, such as failures, malfunctions, deficiencies, deviations, defective components, uncontrolled combustible material and non-conformances are promptly identified, reported, and corrected.	8. Corrective Action Criteria 15 and 16 of the OQACM satisfies this requirement for failures, malfunctions, deficiencies, deviations, defective components, uncontrolled combustible material and non-conformances.
9. Records Records should be prepared and maintained to furnish evidence that the criteria enumerated above are being met for activities affecting the fire protection program.	9. Records Criterion 17 of the OQACM satisfies this requirement. Section 17.2.5 identifies, among other things, the criteria enumerated above as requiring QA records.
10. Audits Audits should be conducted and documented to verify compliance with the fire protection program including design and procurement documents, instructions, procedures and drawings, and inspection and test activities.	10. Audits Criterion 18, Section 18.2.1.5 of the OQACM satisfies this requirement.

B. Implementation of Fire Protection Systems Quality Assurance Program

The Quality Assurance Program requirements outlined in the Operations Quality Assurance Criteria Manual (OQACM) are implemented at PVNGS through various procedures. These procedures are generally categorized as Program procedures or Administrative Control procedures. This section outlines, for each of BTP 9.5-1, Appendix A criteria, which Program and Administrative Control procedures implement the requirements of the OQACM.

These procedures effectively implement the OQACM requirements for equipment classified Q (safety-related) and for equipment classified QAG (quality-augmented). For equipment recently reclassified QAG, those procedures are generally effective at implementing the OQACM requirements, though some implementation problems have been identified. For equipment classified NQR (non quality-related), these procedures implement some, but not all, of the OQACM requirements, as described in the paragraphs that follow.

CRITERION 1: DESIGN and PROCUREMENT DOCUMENT CONTROL

"Measures should be established to assure that all design related guidelines of BTP 9.5-1, Appendix A are included in design and procurement documents and that deviations therefrom are controlled."

OQACM CRITERIA	IMPLEMENTING PROCEDURES	
Design Control and Procurement Document Control (Design Control Criterion 3)	81PR-0DC02	Plant Design Change Program
	81AC-0CC06	Quality Classification for structures, systems, components, spare parts and activities.
	81AC-0DC01	Procedure for Design Modifications
	14PR-0FP01	PVNGS Fire Protection Program
(Procurement Document Control Criterion 4)	84PR-0RM01	Nuclear Records Management and Document Control
	12AC-0MC01	Control of Purchased Material, Equipment, and Services
	81AC-0CC08	Control of Vendor Documents

IMPLEMENTATION SUMMARY

The design and procurement document control program applied to important-to-safety (which is referred to in PVNGS procedures as quality augmented) structures and components complies with Criteria 3 and 4 of 10CFR50, Appendix B, which exceeds the requirements imposed by BTP 9.5-1, Appendix A. Design controls applicable to non-quality related (NQR) items are equivalent to those applied to quality augmented items except that NQR design change documents do not require review by the QA organization. The Plant Design Change Program (81PR-0DC02) allows NQR design changes to be implemented without the design verification required for quality augmented design changes. However, in practice this option is typically not exercised and in the sample reviewed it was not observed.

Procurement document controls and review requirements for NQR procurement documents are less stringent than as those applied to quality augmented documents. Although the same procedures govern procurement for both NQR and quality augmented items, the organizations responsible for the technical adequacy of the procurement documents differ. Quality augmented procurement documents are reviewed by the Procurement Engineering Department and the QA organization to assure that design and technical requirements have been adequately translated. Other organizations are responsible for the technical adequacy of NQR procurement documents. BTP 9.5-1, Appendix A, does not require QA or engineering review of procurement documents. Yet, due to the lack of specificity in the governing procedures regarding the organization(s) responsible for the technical content of NQR

procurement documents and the qualifications of NQR procurement document preparers and reviewers, the NQR procurement document review program may not be adequate to meet the requirements of BTP 9.5-1, Appendix A.

CRITERION 2: INSTRUCTIONS, PROCEDURES and DRAWINGS

"Instructions, tests, administrative controls, fire drills, and training that govern the fire protection program should be prescribed by documented instructions, procedures, or drawings, and should be accomplished in accordance with these documents."

OQACM CRITERIA	IMPLEMENTING PROCEDURES	
Instructions, Procedures and Drawings		
(Instructions, Procedures and Drawings Criterion 5)	14PR-0FP01	PVNGS Fire Protection Program
	01PR-0AP01	Administrative Controls Program
	01AC-0AP01	Format and Content of Nuclear Administrative and Technical Procedures
	01AC-0AP02	Review and Approval of Nuclear Administrative and Technical Procedures
	14AC-0FP01	Fire System Impairment
	14AC-0FP02	Emergency Notification and Response
	14AC-0FP03	Control of Combustibles/ Transient
	14AC-0FP04	Fire Watch Duties
	14AC-0FP06	Hot Work Authorization Permit
	14AC-0FP09	Fire Protection Test Program
	14AC-0FP10	PVNGS Fire Department Incident Command System
	14AC-9FP02	Fire Barrier Seal and Structural Steel Fire Proofing Removal and Reinstallation
	30AC-9ZZ01	Work Control
	40AC-9OP17	Control and Issuance of Door Permits
	14TR-0FP01	Fire Team Training
	14DP-0TR02	Fire Protection Inspection and Testing Qualification and Certification

IMPLEMENTATION SUMMARY

Procedures and instructions are written pursuant to the requirements of 01AC-0AP02, "Review and Approval of Nuclear Administrative and Technical Procedures" and 30AC-9ZZ01, "Work Control". The requirements of the OQACM are met for procedures written in compliance with the PVNGS Administrative Controls Program. Work Instructions written pursuant to the requirements of 30AC-9ZZ01 comply with the requirement of OQACM for those instructions classified as quality augmented. Those Work Instructions not classified as quality augmented do not meet the requirements of the OQACM, but they do meet the requirements of BTP 9.5-1, Appendix A.

CRITERION 3: CONTROL OF PURCHASED MATERIAL

"Measures should be established to assure that purchased material, equipment and services conform to the procurement document."

OQACM CRITERIA	IMPLEMENTING PROCEDURES	
Control of Purchased Material, Equipment, and Services (Control of Purchased Material, Equipment, and Services, Criterion 7)	12PR-0PR01 . 12AC-0MC01	Material Control Program Control of Purchased Material, Equipment and Services

IMPLEMENTATION SUMMARY

The procurement program applicable to important-to-safety (referred to in PVNGS procedures as quality augmented or QAG) allows for source inspection and requires objective evidence for quality from the contractor when appropriate. These provisions are normally not exercised, however, since QC receipt inspection is required for QAG procurement and is typically the basis for acceptance of QAG hardware. Provisions for source evaluation exist but normally do not involve the QA Department's input since many QAG procurements utilize original equipment manufacturers. The procurement program applied to QAG items and services complies with the requirements of BTP 9.5-1, Appendix A.

The NQR procurement process provides for vendor evaluation and selection. This process normally does not involve input from the QA Department. Source inspection and requiring objective evidence of quality from the contractor are allowed by the programs and procedures but these options are typically not utilized. Receipt inspection is the basis for acceptance of NQR items. These inspections are normally performed by Material Control personnel rather than QC personnel and are accomplished in accordance with 12DP-0MC25 "Material Receiving". The inspection required by this procedure provides assurance that the item matches the procurement document and, therefore, satisfies the requirements of BTP 9.5-1, Appendix A.

CRITERION 4: INSPECTION

"A program for independent inspection of activities affecting fire protection should be established and executed by, or for, the organization performing the activity to verify conformance with documented installation drawings and test procedures for accomplishing the activities."

OQACM CRITERIA	IMPLEMENTING PROCEDURES	
Inspection	14AC-9FP02	Fire Barriers and Structural Steel Fireproofing Removal and Installation
(Inspection, Criterion 10)	14DP-0FP04	Unit Walkdown Procedure
	63AC-0QQ01	Quality Control Inspections

IMPLEMENTATION SUMMARY

The program for independent inspection of quality augmented activities complies with OQACM Criterion 10 which exceeds the requirements imposed by BTP 9.5-1, Appendix A.

Independent inspection of NQR activities is not comprehensive. Independent inspections of some installation, maintenance and modification activities are performed but these primarily address activities in which there is a high potential for human error and may not be sufficient to assure compliance with design and installation requirements for other activities. Independent inspection of the installation of penetration seals and fire retardant coating installations is accomplished in accordance with established procedures. Inspection procedures, instructions or checklists have been developed for periodic inspections of fire protection systems, emergency breathing and auxiliary equipment, and emergency lighting as well as inspection of materials subject to degradation such as fire stops, seals and fire retardant coatings.

Table 9B.3-1 of the UFSAR states only that the American Nuclear Insurers will be used as the independent inspection organization. APS complies with this commitment through the implementation of 01PR-0RS01 "Risk Management Program" and ANI inspections and reviews to date have included NQR and QAG equipment and activities.

CRITERION 5: TEST and TEST CONTROL

"A test program should be established and implemented to assure that testing is performed and verified by inspection and audit to demonstrate conformance with design and system readiness requirements. The tests should be performed in accordance with written test procedures; test results should be properly evaluated and acted upon."

OQACM CRITERIA	IMPLEMENTING PROCEDURES	
Test and Test Control	14AC-0FP09	Fire Protection Test Program
	30AC-9MP02	Preventive Maintenance
(Test Control, Criterion 11)	30AC-9ZZ01	Work Control
	75RP-9EE02	Respiratory Equipment Maintenance, Inspection and Repair
	73AC-9ZZ04	Surveillance Testing

IMPLEMENTATION SUMMARY

The test program for QAG and NQR fire protection equipment is governed by the above listed procedures. Audits and inspections are performed to verify implementation of the test program as described in Criteria 4 and 10 of this section. Testing of fire protection equipment is defined by documented procedures for that equipment identified in Section V of this report. Test procedures have not been identified for floor drains, RCP lube oil collection, lightning protection, and portions of the in-plant communications equipment. Further, there is a lack of QA/QC involvement in testing of selected equipment.

CRITERION 6: INSPECTION, TEST AND OPERATING STATUS

"Measures should be established to provide for the identification of items that have satisfactorily passed required tests and inspections."

OQACM CRITERIA	IMPLEMENTING PROCEDURES	
Inspection, Test, and Operation Status	30AC-9ZZ01	Work Control
	14AC-0FP09	Fire Protection Test Program
	14AC-0FP01	Fire System Impairment
(Inspection, Test and Operating Status, Criterion 14)	40AC-0ZZ06	Locked Valve and Breaker Control
	40AC-90P15	Station Tagging and Clearance
	40AC-9MP02	Preventive Maintenance

IMPLEMENTATION SUMMARY

The programs for controlling QAG and NQR equipment, tests and identification of such tests is established in 14AC-0FP09, "Fire Protection Test Program" and 30AC-9MP02, "Preventive Maintenance". The tests required by these documents are tracked and maintained as a QA record. These records are maintained to track the frequency of the test and the PASS or FAIL status. This is tracked under the Plant Surveillance Test Work Order System (STWO) or the Preventive Maintenance Work Order System.

System status is maintained by the Fire Department for selected fire protection systems/equipment. System status is controlled by 14AC-0FP01, "Fire System Impairment", 14DP-0FP02, "Fire System Impairments and Notifications", 40AC-0ZZ 06, "Locked Valve and Breaker Control" and 14DP-0FP13 "System Status Control".

This system status is controlled by 14DP-0FP13, "System Status Control". This status control identifies the in-plant condition/position of selected fire protection equipment, which includes the attached list:

- Fire Detection Systems
  (Panels, detectors, Battery backup)
- CRT Screen and Assoc. Hardware
  (Concentrators, software etc.)
- Wet Pipe Sprinkler Systems
  (Valves, piping, heads etc.)
- Pre-action Sprinkler Systems
  (Valves, piping, heads etc.)
- Deluxe Sprinkler Systems
  (Valves, piping, heads etc.)
- Carbon Dioxide Suppression Systems
- Halon Suppression Systems
- Fire Hoses
- Hose Stations
- Fire Pumps
- Water Tanks
- Fire Loop and Isolation Valves
- Dampers (Appendix R)
- Seals (Appendix A & R)
- Fire Walls and Barriers (Appendix R)
- Seismic Seals (Appendix R)
- Doors (Appendix A & R)
- Floors (Appendix R)
- Thermo-lag (Appendix R)
- Extinguishers - (All)

CRITERION 7: NONCONFORMING ITEMS

"Measures should be established to control items that do not conform to specified requirements to prevent inadvertent use or installation."

OQACM CRITERIA	IMPLEMENTING PROCEDURES	
Nonconforming Items	60AC-0QQ01	Control of Nonconforming Items Material Non-conformances
(Nonconforming Items, Criterion 15)	12DP-0MC29	Warehouse Discrepancy Notices
	62DP-0QQ08	Vendor Deficiency Notice
	30AC-9ZZ01	Work Control
	81DP-0DC09	Supplier Deviation Disposition Request

IMPLEMENTATION SUMMARY

The program for control of nonconforming QAG items complies with Criterion 15 of OQACM, which exceeds the requirements of BTP 9.5-1, Appendix A. Although use of the same procedures and documents is allowed for NQR items, the non-conformance control measure most commonly applied to installed NQR equipment is the generation of a Work Request in accordance with the requirements of 30AC-9ZZ01, "Work Control". This system of non-conformance control does not require that nonconforming, inoperative, or malfunctioning items be tagged or labelled, and does not adequately address notification of affected organizations, and therefore may not satisfy the requirements of BTP 9.5-1, Appendix A. The non-conformance control measures applied to NQR materials at receipt and while in storage are equivalent to those applied to quality related items.

CRITERION 8: CORRECTIVE ACTION

"Measures should be established to assure that conditions adverse to fire protection, such as failures, malfunctions, deficiencies, deviations, defective components, uncontrolled combustible material and non-conformances are promptly identified, reported, and corrected."

OQACM CRITERIA	IMPLEMENTING PROCEDURES	
Corrective Action	60AC-0QQ02	Corrective Action
	60AC-0QQ03	Quality Deficiency Report
(Corrective Action, Criterion 16)	60AC-0QQ05	Stop Work Notice
	60AC-0QQ04	Management Escalation Program for Quality/Nuclear Safety Issues and Deficiencies
	30AC-9ZZ01	Work Control
	81DP-0DC09	Supplier Deviation Disposition Request
	14AC-0FF03	Contol of Transient Combustibles

IMPLEMENTATION SUMMARY

The PVNGS administrative control programs for the control of programmatic deviations and deficiencies comply with BTP 9.5-1, Appendix A, for QAG and NQR activities. 60AC-0QQ03, "Quality Deficiency Report" requires all individuals involved with PVNGS to report conditions adverse to quality when they are identified. Quality Deficiency Reports (QDR) are reviewed by designated QA personnel who determine if the identified deficiency should be classified as quality related, quality augmented, significant non-quality related, or not significant non-quality related. If the identified deficiency meets the criteria for a Corrective Action Report, the QDR is elevated to a CAR. The administrative controls for both of these corrective action documents provide for timely identification, reporting and correction of conditions adverse to quality.

The administrative control programs applicable to the identification and reporting of hardware or equipment failures, malfunctions and non-conformances are identified under Criterion 7, discussed on the previous page.

CRITERION 9: RECORDS

"Records should be prepared and maintained to furnish evidence that the criteria enumerated above are being met for activities affecting the fire protection program."

OQACM CRITERIA	IMPLEMENTING PROCEDURES	
Records	84PR-0RM01	Nuclear Records Management and Document Control Program
	84AC-0RM05	Document/Record Control
(Records, Criterion 17)		

IMPLEMENTATION SUMMARY

The records that are generated as a result of periodic tests, preventive maintenance and corrective maintenance for QAG and NQR equipment are maintained. These records are identified in the Technical Specification sections 6.10.1(b) and 6.10.2(a,i,&j). Procedures 14AC-0FP09, "Fire Protection Test Program", and 14DP-0FP09, "Conduct of Fire Shift Operations" require that completed fire protection procedures/tests are to be turned over to DDC, in accordance with turnover instructions. Records including those identifying NQR equipment are turned over to NRM-DDC in accordance with 84AC-0RM05, "Document/Record Turnover Control". Additionally, the records for NQR equipment that are generated by departments other than Fire Protection, follow this same procedure. This procedure satisfies the requirements of BTP 9.5-1, Appendix A.

CRITERION 10: AUDITS

"Audits should be conducted and documented to verify compliance with the fire protection program."

OQACM CRITERIA	IMPLEMENTING PROCEDURES	
Audits	62DP-0QQ01	Quality Auditing
	62DP-0QQ05	Vendor Audits
(Audits, Criterion 18)	60DP-0QQ05	Monitoring Program

IMPLEMENTATION SUMMARY

The Audit Program requirements are specified by Technical Specification 6.5.3.5.(f&g). The fire protection audits conducted since 1985 have covered aspects of QAG and NQR equipment and activities. Other aspects of the Fire Protection Program are covered in various audits throughout the year. The Audit Program is further enhanced by periodic monitoring of fire protection activities. The audit program satisfies the requirements of BTP 9.5-1, Appendix A.

III DESCRIPTION OF EQUIPMENT CLASSIFICATION PROGRAM

A. History of Quality Classifications at PVNGS

The Palo Verde Nuclear Generating Station was designed and constructed using a classification system of "Q", "R", and "S", to establish the categories of structures, systems, and components for application of Quality Assurance Program requirements. Items classified as Class "Q" were considered safety related and required the full implementation of the 10CFR50 Appendix B Quality Assurance Program. Class "S" was used to identify those items which would be designed, procured, and installed in accordance with industry practice. Class "R" items were those considered important to reliability, and certain quality assurance controls were applicable.

When PVNGS transitioned from Construction to Operations, the APS Operations Quality Assurance Program was implemented. The classification system for structures, systems, components, spare parts, and activities was updated to enable proper application of the Quality Assurance Program to operations phase activities. Items previously classified as "Q" became "SR" and were treated under the full Appendix B QA Program. Some Items previously classified as "R" or "S" were reclassified Important to Safety ("ITS") if a specific commitment was identified in FSAR Table 3.2-1 requiring selective application of the Operations QA Operations Program. The remainder of the "R" and "S" items were classified "NQR".

Beginning in 1988, a new classification procedure and system was put in place based on a Component Classification Evaluation (CCE) which provided a detailed evaluation of each component at PVNGS. The component contribution to safety was defined, whether it was an active or passive item, and the basis for classifying the item as safety-related ("Q"), quality augmented ("QAG") or non-quality related ("NQR"). This data was then input to the Station Information Management System (SIMS) Equipment Database in 1989 and provided a significant upgrade in design output information.

B. Classification of Fire Protection Equipment

The classification review performed in 1988 and 1989 utilized criteria listed below for classification of fire protection equipment.

> "Non-component" fire protection items such as hoses, self-contained breathing apparatus (SCBA), fire extinguishers, cabling, fireproofing, radiant energy shields, and thermolag were not classified as part of this effort.
>
> Quality class "QAG" was applied to systems and components which perform a fire protection function and are used or installed in the quality-related areas of the "Power Block". Buildings which are included in this definition are the Containment Building, Control Building, Auxiliary Building, Fuel Building, Radwaste Building, Main Steam Support Structure, Diesel Generator Building, Corridor Building, Condensate Storage Tank Pump Building, Essential Spray Pond Pump House, and tunnels connecting these locations. Systems and equipment included in this definition are:

a) Fire suppression (water, carbon dioxide and Halon) and detection systems protecting or installed in the buildings defined above.

Fire suppression systems include automatic suppression systems and manual hose stations. The water suppression systems also include portions of the fire water supply system including water storage, fire pumps, and piping supplying these systems.

b) Features of the fire area and fire zone barriers defined in the Fire Protection Evaluation Report, PVNGS UFSAR Appendix 9B. These features include:

- Fire walls
- Fire dampers
- Fire rated penetration seals
- Fire rated seismic gap seals
- Fireproofing installed to insure the integrity of fire barriers (e.g., structural steel fireproofing, cable tray support fireproofing and HVAC support fireproofing)

c) Barriers (both fire rated and non-fire rated) installed for 10CFR50 Appendix R redundant safe shutdown circuit as identified in the Fire Protection Evaluation Report, PVNGS UFSAR Appendix 9B.

d) The lube oil collection system for the reactor coolant pumps.

e) Emergency lighting and components required to meet 10 CFR50 Appendix R safe shutdown requirements.

C. Resulting Three Categories of Classifications for Fire Protection Equipment

The application of these classification criteria resulted in some items previously treated as NQR being classified as QAG. Other items were classified as NQR or not classified at all as discussed above. As a result, the Fire Protection Equipment addressed in this evaluation may be grouped into one of three categories:

a) The equipment is classified QAG now and was treated as QAG prior to the recent project to review the classification of all components. (QAG)

b) The equipment is classified QAG now but was NQR prior to completion of the classification review project. (QAG*)

c) The equipment is classified NQR now (NQR).

D. Current Fire Protection Equipment Classification

The following table provides the current quality classification for PVNGS fire protection systems/equipment:

Equipment	Quality Class
Fire Protection Suppression and Actuation System	QAG[1]
Fire Detection and Alarm System Equipment	QAG*[2]
Fire Barriers	QAG*
Lube Oil Collection System	QAG*
Emergency Lighting System	QAG*
In-Plant Communications System	NQR
Lightning Protection	NQR
Ventilation	NQR
Manual Firefighting Equipment	NQR

- Hoses & Nozzles
- Self-contained Breathing Apparatus (SCBA)
- Fire Extinguishers
- Portable Fire Protection Equipment

(1) With the exception of floor drains, storage tank, trips and alarms, fire hydrants, some remote/manual controls and indication circuits and water storage tanks which are NQR.

(2) With the exception of security system portions of the alarm system.

IV EVALUATION OF STATUS OF FIRE PROTECTION SYSTEMS/EQUIPMENT

A. Review Methodology

The APS Operations Quality Assurance Criteria for the Fire Protection Program have been evaluated to determine the status of the implementation of applicable QA criteria. The methodology utilized is described below:

a) Define the systems and equipment utilized for the fire protection program.

The UFSAR Section 9.5-1 (and cross-referenced sections) were reviewed to determine the systems which fulfill APS commitments for fire protection. These systems were listed earlier in Section III.

b) Summarize the specific activities of the applicable QA criteria to be verified.

The following criteria from the Operations Quality Assurance Criteria Manual were reviewed to determine the specific activities which were to be verified. Activities to be verified are those activities described in each of the following OQACM Criterion.

Criterion 3	Design Control
Criterion 4	Procurement Document Control
Criterion 5	Instructions, Procedures and Drawings
Criterion 7	Control of Purchased Material, Equipment and Service
Criterion 10	Inspection
Criterion 11	Test Control
Criterion 14	Inspection, Test and Operating Status
Criterion 15	Nonconforming Items
Criterion 16	Corrective Action
Criterion 17	Records
Criterion 18	Audits

c) Review PVNGS administrative programmatic controls to verify that the Criteria have been applied to the Fire Protection Program.

PVNGS procedures were reviewed to determine if the activities identified in the OQACM were being applied to each Fire Protection System equipment group.

If deficiencies from the requirements of the Operation's Quality Assurance Criteria Manual were found, they were noted and further review was conducted to determine if the fire protection quality assurance program (as modified by APS commitments) met the requirements of BTP 9.5-1 Appendix A, Section C "Quality Assurance".

d) Sample completed work documents to determine that the Programmatic Controls are being implemented.

Documents such as design documents, work orders, purchase orders, test documents, CARs, QDRs, MNCRs, work requests, audit reports, procedures, etc. were sampled to ensure that activities were being performed in accordance with the applicable procedures. Deficiencies were noted and are included in subsequent portions of this section of this report.

B. Evaluation Summary

Due, in part, to the fact that Fire Protection Technical Specifications were at one time in place for Palo Verde with corresponding surveillance testing requirements, the implementation of controls for fire systems quality assurance were made comprehensive for the affected systems/equipment. These systems and equipment are primarily those whose function it is to detect, contain and extinguish fires (e.g., fire detection and actuation, fire barriers and fire suppression). Thus, the most direct acting equipment features for fire control are more rigorously treated than those systems/equipment that are less directly related to fire control (e.g., communications, lighting, ventilation exhaust, lube oil collection, etc.).

Systems and equipment identified as QAG

Those systems and fire protection equipment historically identified as QAG are generally in compliance with the pertinent fire protection elements of the Operations Quality Assurance Criteria Manual at PVNGS, and the implementation of administrative controls to ensure adherence to the QA criteria are well established.

Systems and equipment identified as QAG*

Those systems and fire protection equipment identified as QAG* have been recently upgraded to QAG. Although this equipment is governed by the Operations Quality Assurance Criteria Manual and associated quality programs, the status of implementation of administrative controls to ensure adherence to the QA criteria needs to be established since the classification has been recently upgraded through an equipment quality classification project.

Systems and equipment identified as NQR

The systems and fire protection equipment identified as NQR have not been upgraded to QAG. The following discussion presents a description of the difference between the QAG program and NQR controls.

PVNGS Treatment of NQR Equipment

As documented in the previous section, the controls provided for NQR fire protection equipment are similar in many instances to those for QAG equipment, thus increasing APS's confidence that NQR equipment will remain functional and be capable of providing adequate fire protection.

The APS Quality Assurance organization has performed periodic audits and monitorings of NQR portions of the Palo Verde fire protection program. The results of these audits have generally confirmed that administrative controls are effective for NQR equipment and are properly executed. This provides additional confidence that the quality of the equipment is adequate to assure the proper functioning of Palo Verde fire protection system equipment.

C. Compensatory Measures

The PVNGS fire protection system impairment program provides for compensatory measures as appropriate in the event that fire protection equipment is found to be non-functional. APS reviewed this program to ensure its scope is adequate and found that additional guidance was needed to ensure impairments are identified and compensatory measures are established when needed. This information has been communicated to PVNGS personnel via memorandum.

During the course of the further validation efforts, should fire system impairments be identified, compensatory measures will be promptly implemented. Where compensatory measures are credited in justifications for continued operation (JCO), these measures are identified in the JCO and will remain in effect until the cause for the compensatory measures have been corrected.

D. Detailed Evaluation of Compliance with BTP 9.5-1 QA Criteria

As described in IV.A., Review Methodology, a four step process was employed which evaluated the status of the application of quality assurance to fire protection system equipment for compliance to the QA criteria of BTP 9.5-1, Appendix A. As previously described in Section II, this evaluation considers the current state of PVNGS procedures, controls in identifying areas of compliance as well as potential deficiencies.

Based upon the sample review conducted as part of this evaluation, some deficiencies in implementation of the PVNGS programs were identified. These deficiencies will be addressed via existing PVNGS deficiency procedures. These deficiencies are not discussed below. The discussion provided below demonstrates how PVNGS quality classifications (see Section III.D above), compares to the quality assurance guidelines of BTP 9.5-1 Appendix A.

During the technical review of each fire protection system/equipment group that was conducted to evaluate compliance with BTP 9.5-1, Appendix A, several technical questions were raised. These questions are identified in the paragraphs that follow and in the justifications for continued operation in Section V.

A) Fire Protection Suppression and Actuation Systems Equipment

. Program complies with the following BTP 9.5-1 QA Criteria:

- Design Control
- Procurement Document Control
  (except for NQR portions*)
- Procedures, Instructions and Drawings
- Control of Purchased Material
- Inspections (except for NQR portions*)
- Non-conformances (except for NQR portions*)
- Records
- Audits

(*e.g., floor drains, fire hydrants, water storage tanks)

. Program compliance deficiencies as applied to the equipment:

- Test/Test Control
  lack of QC involvement in testing
- Inspection Test and Operating Status
  limited testing of floor drains, hydrants, charcoal filters
- Corrective Action
  timeliness of implementation

. Technical Questions Identified:

- diesel fire pump fuel freeze protection
- preventive maintenance on charcoal filter temperature sensors

B) Fire Detection and Alarm System Equipment

. Program as applied to the equipment complies with the following BTP 9.5-1 QA Criteria:

- Design Control
- Procurement Document Control
  (except for NQR portions*)
- Procedures, Instructions and Drawings
- Control of Purchased Material
- Inspections (except for NQR portions*)
- Test/Inspection Status
- Non-conformances (except for NQR portions*)
- Records
- Audits

(* e.g. Security Computer sections of the alarm system)

. Program compliance deficiencies as applied to the equipment:

- Inspection Test and Operating Status
  lack of QC involvement in testing

- Corrective Action
  timeliness of implementation

. Technical Questions Identified:

- None

C) Fire Barriers

. Program as applied to the equipment complies with the following BTP 9.5-1 QA Criteria:

- Design Control
- Procurement Document Control
  (except for NQR portions*)
- Procedures, Instructions and Drawings
- Control of Purchased Material
- Inspections (except for NQR portions*)
- Non-conformances (except for NQR portions*)
- Records
- Audits

(* e.g. Appendix A fire walls/barriers, radiant energy shields)

. Program compliance deficiencies as applied to the equipment:

- Test/Test Control
  lack of QC involvement in testing

- Inspection Test and Operating Status
  limited inspection/testing of Appendix A fire walls, dampers, penetrations and Radiant Energy Shields

- Corrective Action
  timeliness of implementation

. Technical Questions Identified:

- Dampers
  issues related to resolution of IE Notice 89-52

- Penetration Seals
  CAR 90-007 corrective action plan addresses penetration seal deficiencies

D) Lube Oil Collection System

. Program as applied to the equipment complies with the following BTP 9.5-1 QA Criteria:

- Design Control
- Procedures, Instructions and Drawings
- Control of Purchased Material
- Non-conformances (except for NQR portions)
- Records

. Program compliance deficiencies as applied to the equipment:

- Test/Test Control
  (no identified retest)

- Procurement Document Control
  (some NQR parts)

- Inspection Test and Operating Status
  lack of impairment notifications in work procedures

- Audits (no apparent QA/QC involvement)

- Corrective Action
  timeliness of implementation

- Inspections (no apparent QA/QC involvement)

. Technical Questions Identified:

- None

E) Emergency Lighting System

. Program as applied to the equipment complies with the following BTP 9.5-1 QA Criteria:

- Design Control
- Procurement Document Control
- Procedures, Instructions and Drawings
- Control of Purchased Material
- Inspections
- Test/Test Control
- Non-conformances
- Records
- Audits

. Program compliance deficiencies as applied to the equipment:

- Inspection, Test and Operating Status
  lack of impairment notification in work procedures

- Corrective Actions
  timeliness of implementation

. Identified Technical Questions:

- None

JUSTIFICATION FOR CONTINUED OPERATION
FIRE PROTECTION SUPPRESSION AND ACTUATION SYSTEMS

I PROBLEM STATEMENT

Differences between the quality assurance quidelines of BTP 9.5-1, Appendix A, and the quality assurance applied to the PVNGS fire protection suppression and actuation systems have raised a concern over the system's ability to provide the fire suppression capability stipulated in the detailed fire hazards analysis.

II EQUIPMENT DESCRIPTION

Fire protection suppression systems are provided in various areas of the PVNGS power block as identified in PVNGS UFSAR, Appendix 9B. These suppression systems generally consist of one or more of the following subsystems:

- An automatically actuated water suppression system along with its associated actuation system.
- An automatically actuated gas suppression system (i.e. C02 or Halon) along with its associated actuation system.
- A standpipe system.

In addition, the water suppression system includes the fire water supply piping, hydrants, fire water storage tanks, fire pumps and associated support equipment (e.g. diesel fire pump freeze protection). Floor drains are provided inside the various structures for the purpose of preventing accumulation of fire protection water in the event of actuation.

III SAFETY FUNCTION

The fire suppression system provides for control/extinguishment of fires in their early stages for safety related areas to prevent the spread of fire from its point of origin, to minimize the damages, protect safety related equipment, and protect plant personnel. In some cases credit is taken for the suppression system to comply with the requirements of 10CFR50 Appendix R Section IIIG.

IV CONSEQUENCES OF A FAILURE TO PERFORM

A complete failure of a fire suppression system results in reliance on the other backup fire protection capability.

V ENGINEERING EVALUATION

PVNGS is designed so that a single failure in the fire suppression system will not impair all fire suppression capabilities. This is further described in UFSAR Table 9B.3-1 Section A.4. The fire suppression water storage tanks were supplied and erected under quality class "S" specification 13-MM-119A, by Hogan Tanks, during original construction. These tanks, including their instrumentation and controls are presently NQR. The materials for the plant fire protection underground piping loop, pumps, hydrants, standpipe system, and underground valves including the support equipment for the diesel driven pump were purchased as quality class "S" under various specifications. The installation of this equipment was accomplished as quality class "R" as part of the original construction by Bechtel. This equipment is currently classified as QAG for equipment protecting safety related areas with the exception of diesel fire pump fuel line freeze protection and fire hydrants, which are classified as "NQR". The fire protection sprinkler and spray equipment in the individual power block units was supplied and installed under specification 13-MM-650, by the subcontractor Viking Corporation. This specification was classified as quality class "R". The equipment protecting safety-related areas/equipment is currently classified as "QAG". The carbon dioxide suppression system was purchased from Chemtron under Specification 13-MM-652 as quality class "S" and installed as quality class "R" by Bechtel as part of the original construction. The equipment protecting safety-related areas is currently classified as "QAG". The Halon suppression equipment in the power block were purchased under Specifications 13-MM-658 and 13-MM-999 as quality class "S" and installed as quality class "R/ITS" by Bechtel as part of original construction. The equipment protecting safety-related areas is currently classified as "QAG". The Initial Test Program (Start-Up) verified the proper design and installation of the Fire Suppression Systems.

These Fire Suppression Systems including their detection, alarm and control functions are currently maintained and tested in accordance with the following Procedures:

- 14FT-0FP01 Fire Water Suppression System Valve Position Verification
- 14FT-0FP02 Well Water/Fire Water Reserve Tanks Operational Check
- 14FT-1FP01 Diesel Driven Fire Pumps Start and Run
- 14FT-1FP02 Motor Driven Fire Pump Start and Run
- 14FT-1FP03 Fire Water Valve Verifications
- 14FT-1FP04 Tamper Switch Test and Fire Water Valve Cycling
- 14FT-2FP03 Fire Water Valve Verifications
- 14FT-2FP04 Tamper Switch Test and Fire Water Valve Cycling
- 14FT-3FP03 Fire Water Valve Verifications
- 14FT-3FP04 Tamper Switch Test and Fire Water Valve Cycling
- 14FT-9FP01 Fire Protection Equipment Testing for the Power Block
- 14FT-7FP01 Fire Protection Equipment Testing For the Ancillary Buildings

JUSTIFICATION FOR CONTINUED OPERATION
FIRE PROTECTION SUPPRESSION AND ACTUATION SYSTEMS

14FT-9FP04	Fire Suppression Water System Functional Test
14FT-9FP05	Fire Sprinkler System Air Flow Test
14FT-9FP07	CO2 Suppression System Storage Tank Level
14FT-9FP08	CO2 Fire Suppression System Functional Test
14FT-9FP09	Halon Tank Weight and Pressure
14FT-9FP10	Halon Fire Suppression System Functional Test
14FT-9FP11	Fire Hose Station Visual Inspection
14FT-9FP12	Fire Hose Station Inspection
14FT-9FP13	Fire Hose Station Operational and Hydrostatic Test
14FT-9FP22	Halon System Inspection
14FT-9FP23	Fire Suppression Water System Flow Test
14FT-9FP28	Spray And/Or Sprinkler System Functional Test
14FT-9FP29	CO2 Fire Suppression System Valve Position Verification
14FT-9FP32	Fire Suppression Water System Flush
14AC-0FP01	Fire System Impairment (Includes reqmt for MNCR's, PRS, etc.)
14FT-9FP15	Yard Fire Hydrant Inspection
140P-0FP05	Isolation of the Fire Water Suppression System
140P-9FP02	CO2 Fire Protection (Cardox)
140P-9FP03	Fire Protection System (Halon)
140P-9FP04	Automatic Fire Protection Valves (FP)
14PR-0FP01	PVNGS Fire Protection Program
30PR-9MP01	Maintenance Program
36MT-1QK05	Fire Detection/Protection System Functional Test - Diesel Generator Building
36MT-1QK06	Fire Detection/Protection System Supervised Circuits Test -Diesel Generator Bldg.
36MT-1QK07	Fire Detection/Protection System Functional Test - MSSS Building
36MT-XQK08	Fire Detection/Protection Supervised Circuits Test - MSSS Building
36MT-1QK13	Fire Detection/Protection System Functional Test Carbon Dioxide Panels
36MT-1QK14	Fire Detection/Protection System Supervised Circuits Test - Carbon Dioxide System
36MT-1QK15	Fire Detection/Protection System Functional Test - Halon Panels
36MT-1QK16	Fire Detection/Protection System Supervised Circuits Test - Halon Panels
36MT-1QK17	Fire Detection/Protection System Functional Test - Protectowire Model ACR 1603
36MT-1QK18	Fire Detection/Protection System Supervised Circuits Test - Protectowire Model ACR 1603
36MT-1QK19	Fire Detection/Protection System Functional Test - Protectowire Models ACR 1615 and 1618
36MT-1QK20	Fire Detection/Protection System Supervised Circuits Test - Protectowire Models ACR 1615 and 1618
36MT-1QK21	Fire Detection/Protection System Functional Test - Alison Model A888-M134A

- 36MT-1QK22 Fire Detection/Protection System Supervised Circuits Test -Alison Model A888-M14A
- 36MT-1QK23 Fire Detection/Protection System Functional Test - Alison Model A888-M135
- 36MT-1QK24 Fire Detection/Protection System Supervised Circuits Test -Alison Model A888-M135
- 36MT-1QK25 Fire Detection/Protection System Functional Test - Alison Model A888-M136
- 36MT-1QK26 Fire Detection/Protection System Supervised Circuits Test -Alison Model A888-M136
- 74MT-1FP01 Diesel Fire Pump Fuel Oil Tank "A" Maintenance Test
- 74MT-1FP02 Diesel Fire Pump Fuel Oil Tank "B" Maintenance Test
- 14FT-0FP03 Fuel Pump Test for Insurance Company
- 14FT-0FP04 Annual Fire Water Loop Test
- 14FT-0FP05 Weekly Diesel Fire Pump Run

Fire Hydrants

The fire hydrants were originally designed as "S" quality classification and installed as "R" quality classification. These hydrants are currently classified as quality classification "NQR". Fire Protection supply lines, up to and including the fire hydrant isolation valves, are currently classified as quality classification "QAG" per the PVNGS Component Classification Evaluation. The PVNGS fire hydrants are currently inspected for evidence of damage to threads and existence of gaskets in caps on a monthly basis per PVNGS procedure 14FT-9FP01. The 2 1/2 inch gate valves are fully opened and closed to ensure functionality on a monthly basis per the same procedure. In addition, all fire hydrants are flow tested through the 2 1/2 inch gate valves per the same procedure on an annual basis. Performance, documentation and monitoring of these tests are controlled per the Fire Protection Test Program outlined in 14AC-0FP09. A walkdown of all power block (24) fire hydrants was completed on July 14, 1990 to provide assurance that fire hydrants were bought and received to Factory Manual standards. All power block (24) hydrants reflected markings that indicated compliance to this standard.

Freeze Protection

Freeze protection (insulation) which is installed on the fire pump diesel engine fuel oil lines is NQR. This insulation has been installed to maintain the temperature of the small volume of fuel oil in the line above the fuel cloud point in this small above ground line. This insulation material performs a passive function. The fuel oil line is carbon steel and therefore is not susceptible to intergranular stress corrosion which would require control of chlorides in the insulation. PVNGS design basis requires that fuel oil be maintained a minimum of 10 degrees F above the cloud point. The design basis for PVNGS is a minimum mean 24 hour outdoor temperature of 25 degrees F. The diesel oil fuel tank freeze protection does not presently meet this requirement without using winterized fuel. An EER has been initiated to evaluate this issue.

The Suppression Water Tanks and Alarms

The fire suppression water tanks and associated alarm and level control system are quality class NQR. There are two redundant 500,000 gallon capacity tanks supplied by two well pumps for a normal operating capacity of 1,000,000 gallons. The lower 300,000 gallons of each tank is reserved for fire protection. The maintenance of this volume is done passively. The domestic water supply system takes its suction from pipes located at the 300,000 gallon reserve level so that the tanks physically cannot be drawn down below that level by the domestic water system. In addition, a low domestic water alarm switch is located just above this low domestic water level. If the domestic water supply were to be depleted it would still have no effect on the 300,000 gallon fire protection reserve supply.

A backup water supply to the fire protection system is available from the cooling tower basins, which can be supplied to the power block through a backup fire pump.

Floor Drains

Floor drains have been installed in accordance with the requirements of Appendix A to BTP 9.5-1, Appendix A, and compliance is described UFSAR Appendix 9B, Table 9B.3-1 to remove fire suppression water. The equipment and floor drainage subsystems are described in more detail in UFSAR Section 9.3.3. Material for these drains was generally purchased as "S" quality class. Various portions of the drains were installed as either "S" or "R" quality class. Certain portions of the radioactive drain system which drain safety-related equipment rooms are classified as "Q" quality class and this classification continues to be maintained. The remaining drains are "NQR". Normal drains are not tested on a regular basis. Radioactive drains are also not tested in order to minimize the generation of radwaste. Steps are taken during fire suppression systems tests to ensure the test water does not run into radioactive drains in an effort to minimize radwaste production. Start-up flush tests ensured these drains were open and not plugged. Drains are passive equipment and no active components are utilized in the gravity drain piping portions of the systems. General housekeeping and control of combustible and transient materials procedures will also help ensure that drains are not plugged. Procedure 14AC-OFP03, Control of Transient Combustibles was revised in June, 1990 to include a Control Program requiring time limited permits for "transient combustibles" taken into safety-related areas as broadly defined in the procedures.

Charcoal Filters, Spray Nozzles and High Temperature Sensors

Six air filtration systems at PVNGS Units 1,2 and 3 are designed with charcoal absorption beds. The filtration systems are required for accident mitigation shutdown and were designed and fabricated by the manufacturer (CTI-Nuclear) in accordance with quality classification "Q" in specification 13-MM-721B. Included were manually activated fire control systems installed in the charcoal absorbers as identified in section

4-8.5.1.1.4 of the specification. The Air filtration units that are used during normal operation of the PVNGS units are designed and fabricated in accordance with quality classification "S" as identified in section 4-8.3.4 and 4-8.5.1.1.4 of specification 13-MM-721B. The safety related air filtration units are currently designated as quality classification "Q". The normal air filtration units designed and fabricated "S" are currently designated a quality classification of "NQR".

The spray nozzles installed in the charcoal bed housing are similar to a sprayer nozzle with holes drilled in a straight piece of pipe. There are no sprinkler heads associated with this nozzle. The straight piece of pipe in the charcoal bed is always empty. Testing of these nozzles will damage and degrade the quality of the charcoal in the filtration units which has a significant impact in the ability of the filter to absorb properly. These nozzles are capped on the outside of the filtration unit to prevent foreign material entry into the nozzle and a coupling is provided for fire hose connection. PVNGS verified on a sample basis that the couplings and caps are installed.

The charcoal filters potentially have three internal sources of ignition, decay heat from absorbed radioisotopes, in-duct electric resistance heaters, or sparks generated from upstream in-duct equipment. The total combined equivalent primary system iodine 131 from normal operation would not produce enough decay heat to ignite one charcoal filter bed. The electric resistance heaters would not produce enough heat to ignite a charcoal bed before failing. All fans are located downstream of the charcoal filters; therefore, any sparks produced from fan rotors striking from housings would flow away from the charcoal and not be an ignition source. The charcoal filters all have other lowl-combustible equipment between them and the upstream inlet dampers. Sparks generated by faulty or mis-aligned dampers cannot pass through the intervening equipment to ignite the charcoal. Sparks generated by downstream faulty dampers will flow away from the charcoal.

VI CORRECTIVE ACTION PLAN

Differences between the quality assurance guidelines of BTP 9.5-1, Appendix A, and the quality assurance applied to the PVNGS fire protection suppression and actuation systems have not resulted in causing the system/equipment to be non-functional based on the information evaluated as part of the justification for continued operation. Corrective measures to address QA program deficiencies will be resolved through the normal PVNGS corrective action program.

Freeze Protection

An EER has been initiated to evaluate a design change or procedural controls to ensure that the fuel for the diesel driven fire pumps meets the requirements necessary for reliable starting and operation during low ambient temperature periods. An ICR will be implemented to verify installation of the insulation as part of the periodic inspections.

Charcoal Filters

PVNGS does not perform any preventive maintenance on the temperature sensors. The lack of preventive maintenance on the sensors will be evaluated in an EER.

VII JUSTIFICATION FOR CONTINUED OPERATION

Fire Hydrants

Adequate specifications and program requirements were in place to provide reasonable assurance that the fire hydrants were properly purchased and installed. The fire protection program requirements, inspections and tests are in place to ensure the hydrants are functional. Therefore, adequate measures have been and are currently in place to justify continued operation.

Fire Suppression Tanks and Alarms

Adequate tank inventory is verified by operation of the domestic water supply at the WRF water treatment facility which is continuously manned. The manual level gage is surveyed periodically by plant personnel. Fire System Impairment procedure 14AC-OFP01 requires compensatory measures be taken if one tank is inoperable. It must be restored to operable status within 7 days or a backup supply will be provided. Therefore, adequate compensatory measures currently exist for continued operation.

Floor Drains

Adequate specifications have been used to install the floor drains and startup flushing tests ensured these drains were open. Procedural controls on housekeeping (30AC-9ZZ04) and control of combustible and transient materials (14AC-OFP03) help ensure these drains do not become plugged.

Freeze Protection

Local ambient temperatures are presently at their annual highs and temperature reductions of the fuel below the cloud point is not expected. There will not be a low temperature problem with the fuel at the present time nor have there been problems with starting and operation of the diesels due to cold fuel. The implementation of the previously outlined corrective action will be completed prior to the advent of cold weather.

Charcoal Filters

The spray nozzles do not have any component other than a short run of pipe and a cap at the end. Roving fire watches have been established in areas allowing access. There are no potential internal sources of ignition within the ductwork of the charcoal filters. Therefore, continued operation is justified.

All Other QAG Equipment

Adequate specifications, quality programs are in effect to provide reasonable assurance that fire suppression systems are properly maintained. The fire protection testing program as defined in procedure 14AC-OFP09 is executed at PVNGS. Compensatory actions are established in accordance with the fire impairment procedure as required. These impairments and compensatory actions are identified and tracked by the PVNGS Fire Department in accordance with procedure 14AC-OFP01.

ATTACHMENT B

JUSTIFICATION FOR CONTINUED OPERATION

FIRE DETECTION AND ALARM SYSTEM

JUSTIFICATION FOR CONTINUED OPERATION
FIRE DETECTION AND ALARM SYSTEM

I PROBLEM STATEMENT

The fire detection and alarm system (QK) previously had a quality classification of "S" ("NQR") which has been upgraded to "QAG". It has been questioned whether there is adequate assurance that the fire detection and alarm system will perform its intended function due to weaknesses in the proper implementation of QA program requirements as a result of the upgraded quality class.

II EQUIPMENT DESCRIPTION

The fire detection and alarm system is comprised of diversified detection and monitoring facilities particularly selected to produce an early warning in case of fire or smoke. The detection system typically does not activate any fire suppression systems, but exceptions exist.

This system consists of fire and smoke detectors of the ionization, photoelectric, thermal, and ultraviolet types, line type heat detectors, and control panels.

. Ionization Detector	Used to detect combustion product particles
. Photoelectric Detector	Used to detect visible smoke concentrations
. Thermal Detectors	Fixed temperature detectors contain fusible elements that melt at a fixed temperature. For rate of rise detectors, a rapid temperature rise will cause differential expansion of a gas filled tube.
. Line-Type Heat Detectors	Used in cable trays.
. Ultraviolet (UV) Fire Detectors	Respond to UV radiation emanating from a flame.
. Fire Alarm Control Panels	Consist of modules which are combined in the panel according to system requirements.

Several protected areas, or fire detection zones, are grouped together at a control cabinet to form an integrated detection system. There are eighteen (18) integrated detection systems throughout each power block and one (1) integrated detection system for the water treatment building. Each fire detection zone is monitored by a control panel. Each control panel monitors one or more detection zones. In the event of fire, an audible and visual alarm is activated at the local control panel. The visual alarm at the local panel will indicate in which fire detection zone the fire is detected. Supervisory circuits monitor the various panel modules and detectors. Signals are also sent through a portion of the communications "QF" system to annunciate and display an alarm for the specific troubled fire detection zone on the Control Room annunciators and Control Room Communications Console (CRCC), respectively. This portion of the "QF" system is quality classification of NQR.

On the outside of each local fire alarm control panel, a power 'ON' light is provided to locally monitor the power supply. An individual trouble light is also provided for each fire detection zone. This loss of power and general trouble indications are also alarmed at the CRCC.

Local alarm panels in the Diesel Generator and MSSS buildings provide a contact output to activate certain fire protection suppression system equipment.

III SAFETY FUNCTION

A functional fire detection system provides a dependable and accurate means of early detection.

UFSAR sections relating to the fire detection system are:

. 9.5.1.1.1.C	Safety Design Basis Three
. 9.5.1.1.1.O	Safety Design Basis Fifteen
. 9.5.1.2.1.M	Fire and Smoke Monitoring, Detection, and Alarm System
. 9.5.1.2.2.M	Fire and Smoke Monitoring, Detection, and Alarm Devices

. 9.5.1.4.B	Post-Operational Testing
. 9A.71	FPER Question 9
. 9A.82	FPER Question 16e
. 9A.87	FPER Question 18
. 9A.90	FPER Question 19c
. 9A.9	FPER Question 19f
. 9A.94	FPER Question 19g
. 9A.104	FPER Question 22b
. 9A.116	FPER Audit Open Item No. 11
. 9A.123	FPER Audit Open Item No. 18
. 9A.128	Question to clarify circuit classes
. 9B.2	Fire Hazard Analysis
. Table 9B-3.1	Comparison of PVNGS to Appendix A of NRC BTP 9.5-1

IV CONSEQUENCES OF FAILURE TO PERFORM

Failure of a single fire detection device is annunciated by the local fire alarm panel's trouble alarm. This indication prompts inspection by plant personnel (per 14AC-0FP02, "Emergency Notification and Response"). During the period when the failed fire or smoke detector is out of service, detection capability continues to exist because more than one detector is installed in each area. Procedure 14AC-0FP01, Fire System Impairment, requires an evaluation for compensatory actions for fire detection zones with inoperable fire detection devices.

The failure of a fire alarm control panel will provide a trouble alarm on the Control Room Communications Console (CRCC).

System failure may allow an undetected fire or may not activate fire protection system equipment and a safety-related system or component could be damaged by the fire, possibly preventing the safe shutdown of the plant.

JUSTIFICATION FOR CONTINUED OPERATION
FIRE DETECTION AND ALARM SYSTEM

V ENGINEERING EVALUATION

The fire detection system was purchased as class "S" ("NQR") by specification 13-MM-651. The system was later re-classified "QAG". The technical requirements of this specification are sufficient to ensure the UFSAR commitments are met or exceeded. The system is designed using the guidance of NFPA 72D-1975 and NFPA 72E-1974.

The fire detection system has experienced problems with false and nuisance alarms to the control room. Design modifications have been completed to rework the plant ground system to reduce noise and eliminate spurious alarms. This has enhanced system reliability. Additional efforts on the verification and update of the database for fire protection input points are ongoing.

APS performs its maintenance and testing in accordance with NFPA 72E-1974 to ensure each detector is continually maintained in a reliable operating condition. Current maintenance and testing programs for PVNGS fire and smoke detectors in the power block, associated alarm response from detectors to local alarm panels are performed to quality related procedures. Subsequent Control Room annunciators via portions of the "QF" Systems are maintained and tested regularly to NQR procedures.

Listed below are applicable "QK" maintenance procedures:

36MT-1,2,3QK03	36MT-1,2,3QK10
36MT-1,2,3QK04	36MT-1,2,3QK11
36MT-1,2,3QK05	36MT-1,2,3QK12
36MT-1,2,3QK06	36MT-1,2,3QK27
36MT-1,2,3QK07	36MT-1,2,3QK28
36MT-1,2,3QK08	36MT-1,2,3QK29
36MT-1,2,3QK09	36MT-1,2,3QK30

Note: All QK tasks above are in support of UFSAR/ANI commitments. All tasks with the exception of 36MT-1,2,3QK11 and 36 MT-1,2,3QK12 are quality-related. Procedure 36MT-1,2,3QK11 tests detector function, alarm annunciation and alarm display at the CRCC in the Sub-synchronous Relay (SSR) and WRF Buildings. Procedure 36MT-1,2,3QK12 tests for proper alarm response at the local alarm panel and CRCC for SSR and WRF Buildings.

Preventative maintenance on the portions of "QF" System, aforementioned, are performed under Preventive Maintenance (Procedure 30AC-9MP02). Reference Tasks: 068299, 057953, 066176, 012766, 065171, 012695, 006448.

VI CORRECTIVE ACTION PLAN

Discrepancies in the implementation of the requirements of the PVNGS Operations Quality Assurance Criteria Manual have been identified. These discrepancies have not resulted in causing the system/equipment to be not functional based on the information evaluated as part of the justification for continued operation. Corrective measures to address QA program deficiencies will be resolved through the normal PVNGS corrective action programs.

VII JUSTIFICATION FOR CONTINUED OPERATION

When the "QK" system was purchased as "S" ("NQR") it was specified that it be maintained and tested in accordance with NFPA commitments. The code requirements did not change with the change to quality class QAG for the fire detection system. The "QK" system will continue to be tested and maintained to the same code requirements per quality related procedures for power block related system components and functions.

Periodic maintenance for the affected portions of the "QF" system is performed regularly under the PVNGS Preventive Maintenance Program to preserve functionality.

ATTACHMENT C

JUSTIFICATION FOR CONTINUED OPERATION

FIRE BARRIERS

JUSTIFICATION FOR CONTINUED OPERATION
FIRE BARRIERS

I PROBLEM STATEMENT

Differences between quality assurance guidelines of BTP 9.5-1 Appendix A and the quality assurance applied to PVNGS fire barriers raised a concern over the barriers' ability to provide the fire rating stipulated in the detailed fire hazards analysis.

II EQUIPMENT DESCRIPTION

A fire barrier is defined as any wall, slab or shield used to isolate safety related systems from unacceptable fire hazards or separate redundant safety-related systems from each other so that both are not subject to damage from a single fire hazard. The structural fire barriers are identified in the detailed fire hazards analysis found in UFSAR section 9B.2. UFSAR figures 9B-1 through 9B-35 and fire barrier delineation 'S' class drawings 13-A-ZYD-021 through 13-A-ZYD-030 illustrate these barriers on the plant layout. Each fire barrier is given a fire rating commensurate with the analysis. Individual components making up the overall barrier must have an equivalent fire rating or an evaluation for equivalency. Specific descriptions for these components are contained in the following paragraphs. Note that interior finishes and acoustical ceilings are not considered as fire barrier components due to their being non-combustible and providing minimal contribution to the associated barrier fire rating. Reference USFAR Table 9B.3-1 sections D.1d, D.1j, D.3.d, D.3.e and D.4.f.

Structural Material

Fire barriers separating fire areas and fire zones inside the fire areas are reinforced concrete, concrete masonry, gypsum wallboard on metal studs and plaster on metal lath, all of which are non-combustible. The fire barrier physical characteristics and installation details are called out on the structural and architectural drawings.

Doors

Consistent with standard industry practice, three hour barriers generally use a 3-hour Class A door; 2-hour barriers use a 1 1/2-hour Class B door; 1-hour barriers use a 3/4-hour Class C door. The physical characteristics and installation details are called out on the architectural drawings and vendor shop drawings.

Penetration Seals

The penetration fire seals use either grout, high density elastomer, low density silicone foam or flexible boot seals with ceramic fiber to seal the space between the penetrant and the barrier. Internal conduit seals use low density silicone foam to seal the open space around the cables inside the conduit. The seal locations, physical characteristics and installation details are called out on the structural drawings, architectural drawings and in the specifications.

Fire Breaks

Fire breaks or stops are low density silicone foam or gypsum located inside cable trays every 20 feet on covered horizontal trays and vertical trays crossing through non-rated slabs as well as at each penetrated barrier for uncovered horizontal trays and vertical trays passing through rated slabs. The penetration seal at the fire barrier is considered the fire break.

Seismic Gap Seals

The seismic gap seals use sheet metal, flexible silicone boot material and ceramic fiber, or low density silicone foam to seal the seismic gaps between buildings. The physical characteristics and installation details are called out on the structural and architectural drawings.

Fireproofing

Fireproofing is applied to steel necessary to ensure the structural integrity of the fire barrier or a penetrant through a fire barrier. Building beams, building columns, cable tray supports and HVAC duct supports are fireproofed with cementitious material (Monokote) using sprayed or troweled on application. The location of fireproofing on building beams and columns is called out on the architectural drawings. The location of fireproofing on cable tray and HVAC duct supports are called out on the electrical and mechanical drawings.

Conduits and cable trays received insulation (Thermolag) in prefabricated panels or trowelable form. The raceways requiring Thermolag are identified in the EE580 database, fire protection system impairment procedure and design drawings.

Radiant Energy Shields

Radiant energy shields are stand alone, metallic reflectorized insulation fire barriers for protection of the pressurizer auxiliary spray valves located in the Containment building.

Dampers

The fire dampers are curtain type dampers which are pulled to the closed position by a set of 'negator' springs after the fusible link is melted due to the heat of the fire. The fusible link on the fire dampers separating the fire zones that are protected by a halon or CO_2 suppression system control panel are melted electrically by a signal from the suppression system control panel. The fire damper locations and physical characteristics are indicated on the mechanical drawings.

III SAFETY FUNCTION

A fire barrier isolates safety related systems from unacceptable fire hazards, separates redundant safety-related systems from each other so that both are not subject to damage from a single fire hazard, or separates individual designated fire areas. Each fire barrier is given a fire rating based on the detailed fire hazards analysis described in UFSAR section 9B.2. The following paragraphs describe the way in which each individual barrier component contributes to the overall barrier safety function.

Structural Material

The structural materials specified for the fire barriers need to be non-combustible and of sufficient thickness, quality and/or meet UL designs to meet the barriers' required fire rating.

Doors

The fire doors specified need to provide a fire rating equivalent to the barrier in which they are installed.

F) In-Plant Communications System

. Program as applied to the equipment complies with the following BTP 9.5-1 QA Criteria:

- Audits

During fire protection audits, each QA criteria is evaluated. Audit samples did not always include communication systems for all QA criteria audited.

Fire Protection audits did include sample fire zone inspections for inclusion of the correct type of communication equipment.

. Program compliance deficiencies* as applied to the equipment:

- Design Control
- Procedures, Instructions and Drawings
- Control of Purchased Material
- Inspections
- Test/Test Control
- Inspection, Test and Operating Status
- Non-conformances (NQR)
- Corrective Action (timeliness of implementation)
- Records
- Procurement Document Control

* some parts of the communication system are not designed, procured, constructed or maintained per PVNGS QA programs. These are the plant phones and the hand-held radios.

. Technical Questions Identified:

- None

G) Lightning Protection

. Program as applied to the equipment complies with the following BTP 9.5-1 QA Criteria:

- Design Control
- Procedures, Instructions and Drawings
- Control of Purchased Material
- Non-conformances (NQR)
- Records

. Program compliance deficiencies as applied to the equipment:

- Procurement Document Control
  purchase specifications provide no quality requirements for NQR

- Inspections
  lack of QA/QC involvement

- Test/Test Control
  informal Test Controls

- Inspection, Test and Operating Status
  lack of formal impairment notification in work procedures

- Corrective Action
  timeliness of implementation

- Audits
  none identified

. Technical Questions identified:

- Adequacy of periodic testing to ensure long-term reliability

H) Ventilation

. Program as applied to the equipment complies with the following BTP 9.5-1 QA Criteria:

- Design Control
- Procedures, Instructions and Drawings
- Control of Purchased Material
- Records

. Program compliance deficiencies as applied to the equipment:

- Procurement Document Control*
- Inspections*
- Test/Test Control*
- Inspection, Test and Operating Status*
- Non-conformances*
- Audits (no apparent involvement)
- Corrective Action (timeliness of implementation)

* Parts of these systems are designated NQR with a resulting lack of QA/QC involvement.

. Technical Questions Identified:

- None

I) Manual Firefighting Equipment

. Program as applied to the equipment complies with the following BTP 9.5-1 QA Criteria:

- Control of Purchased Material
- Corrective Action
- Test/Test Control (lack of QA/QC involvement)
- Inspection, Test and Operating Status
- Records
- Audits

. Program compliance deficiencies* as applied to the equipment:

- Design Control
- Procurement Document Control
- Procedures, Instructions, Drawings
- Inspections
- Non-conformances (NQR)

* Non-permanent plant equipment is not covered under the design control program and certain programs are less formal than BTP 9.5-1 requirements.

. Technical Questions Identified:

- None

V EVALUATION OF IDENTIFIED DEFICIENCIES IN FIRE PROTECTION EQUIPMENT/SYSTEM FUNCTIONALITY

The detailed evaluation of quality assurance compliance with the BTP 9.5-1 QA Criteria for each of the major PVNGS fire protection systems is presented in the final sub-section of Section IV of this report. This evaluation indicates general compliance with the QA Criteria for most of the fire protection equipment. It also indicates there are areas where application of the criteria is incomplete. These differences are not deemed to be significant with regard to the proper functioning of fire protection system equipment. However, since compliance is not complete for the nine major Fire Protection System equipment groups, APS has evaluated the functionality of each of these nine Fire Protection equipment groups.

In this evaluation effort, APS has developed detailed justifications for continued operation (JCOs) for Fire Protection System/equipment classified as NQR and systems classified as QAG. The attached JCOs document APS's position regarding the functionality of Fire Protection Systems/equipment.

Attachment	Title
A.	Fire Protection Suppression and Actuation Systems
B.	Fire Detection and Alarm Systems
C.	Fire Barriers
D.	Lube Oil Collection System
E.	Emergency Lighting System
F.	In-Plant Communications System
G.	Lightning Protection
H.	Ventilation
I.	Manual Firefighting Equipment

VI CORRECTIVE ACTIONS

The preceding section identifies two types of actions requiring follow-up:

a) Actions that are related to the general application of the QA criteria to Fire Protection Systems/Equipment, and

b) Actions that are specific to individual Fire Protection System/equipment to address technical questions related to that equipment.

Those actions that are required to effect full compliance with the applicable QA Criteria will be evaluated collectively and are expected to result in a composite set of proposed changes to the PVNGS application of QA criteria to Fire Protection Systems/equipment. It is anticipated that these changes will be completely evaluated and proposed changes finalized by September 30, 1990. Based on this evaluation, the appropriate documents to be determined by the evaluation will be revised to address quality assurance program requirements for fire protection at PVNGS by November 15, 1990

The actions specified in each justification for continued operation regarding technical questions related to that system/equipment will be addressed expeditiously to close any technical questions.

ATTACHMENT A

JUSTIFICATION FOR CONTINUED OPERATION

FIRE PROTECTION SUPPRESSION AND ACTUATION SYSTEMS

Discrepancies in the implementation of the requirements of the PVNGS Operations Quality Assurance Criteria Manual have been identified. These discrepancies have not resulted in the system/equipment being inoperable. Corrective measures to address QA program deficiencies will be resolved through the normal PVNGS corrective action programs.

VII JUSTIFICATION FOR CONTINUED OPERATION

Structural Materials

The engineering evaluation indicates that the PVNGS fire barrier structural materials provide the fire ratings required by the fire hazards analysis.

Doors

Adequate fire protection is being provided by virtue of the fact that each door is either in compliance with specification 13-AN-006 or compensatory measures have been established.

Penetration Seals

Adequate fire protection is being provided by virtue of the fact that each fire barrier, including associated penetrations is in compliance with specification 13-AN-340 or compensatory measures are in place.

The corrective actions specified in CAR 90-007 will address the design basis issues that have been found against penetration seals. Throughout the process, any operability concerns, reportability requirements or compensatory measures are being handled per the appropriate plant procedures.

Seismic Gap Seals

The engineering evaluation indicates that the PVNGS seismic gap seal configurations provide the fire ratings required by the fire hazards analysis.

Fireproofing

The engineering evaluation indicates that the PVNGS fireproofing materials and installed thicknesses provide the fire ratings required by the fire hazards analysis.

Radiant Energy Shields

The engineering evaluation indicates that the PVNGS radiant energy shields provide fire protection required by the fire hazards analysis.

Dampers

Current PVNGS test programs compensatory measures and on-going analyses ensure that dampers in fire area barriers and in walls separating redundant safe shutdown trains are capable of closing under a postulated fire to ensure that at least one train of the equipment required for safe shutdown is protected from fire. Dampers declared inoperable use compensatory administrative controls to isolate the HVAC system to ensure fire damper closure.

Overall Fire Barriers

The operability of a fire barrier is determined by the operability of the individual components that combine functions to form the overall barrier. All components must be operable for the barrier to be operable.

As discussed in the previous paragraphs, the individual barrier components are either capable of performing their required safety function or compensatory measures are in place until this capability is verified or restored. By virtue of this fact, adequate fire protection is being provided.

ATTACHMENT D

JUSTIFICATION FOR CONTINUED OPERATION

LUBE OIL COLLECTION SYSTEM

JUSTIFICATION FOR CONTINUED OPERATION
LUBE OIL COLLECTION SYSTEM

I PROBLEM STATEMENT

Differences between the quality assurance quidelines of BTP 9.5-1, Appendix A, and the quality assurance program applied to the PVNGS RCP Oil Collection System have raised a concern over the systems ability to collect any oil leaking from the RCPs or RCP Motors.

II EQUIPMENT DESCRIPTION

The lube oil collection system, with respect to the RCPs, is installed at RCP Equipment locations that may experience an oil leak. On the RCPs the prime areas of concern are oil lubricated bearings of the motor, and the thrust bearing. The lube oil collection components are attached directly to the motor, thrust bearing, or the motor support stand. The system is composed of drip pans, catch basins, flange oil collectors, and splash guards. The components are piped via 1/2"-20 gage tubing to a 2" collection header from where the oil is channeled to two oil collection tanks. The system is passive with no valves or pumps. Oil collected flows by gravity to the collection tanks. The tanks are a vented container capable of holding the entire RCP lube oil system inventory.

III SAFETY FUNCTION

The RCP Lube Oil Collection system collects leaking oil and removes it to a safe storage location. This precludes fires by removing fuel from the ignition source of hot RCS piping.

IV CONSEQUENCES OF A FAILURE TO PERFORM

A failure of the RCP Lube Oil Collection System may result in a fire fueled by the lubrication oil for the RCP and RCP Motor.

V ENGINEERING EVALUATION

In 1981, APS committed to comply with CFR Part 50, Appendix R, Section III. O,. Combustion Engineering performed the required seismic analysis and reported the results in October of 1981. The lube oil piping was found to remain intact during an SSE with no leakage at the welded joints, however, CE indicated that significant hardware modifications would be required to preclude leakage at non-welded joints. An oil collection system was recommended for all non-welded joints.

JUSTIFICATION FOR CONTINUED OPERATION
LUBE OIL COLLECTION SYSTEM

DCP ICM-RC-027 (Quality Class "S", seismic category "9") was issued in December 1981 to implement the necessary design changes. The NRC approved the lube oil collection system design in SSER NO. 7, issued in December 1984. The installation of the lube oil collection system was completed in January 1985.

A component classification evaluation (CCE) for the RC System was performed in November of 1988 classifying the RCP Lube Oil Collection System as "QAG."

QA approved "Q" or "QAG" work orders and procedures are used when work is performed on the RCP Oil Collection System. There are two exceptions to the application of the Quality Assurance Program to work associated with the RCP Oil Collection System. The first was in the fabrication and installation of Oil Collection System components on replacement RCP motors, performed in 1989 on Unit 1. The work orders were classified "NQR", seismic category "9" corresponding to the original installation DCP classification of Quality Class "S", seismic category "9".

This work order involved the fabrication and installation of the motors' upper bearing and lower bearing oil collection drip pans and oil collection tubing attached to the motors. The remainder of the RCP Oil Collection System was unaffected.

The installation of the replacement motor's Oil Collection System was independently verified by a Nuclear Construction Department Engineer. Welding inspections were performed by a qualified welding inspector. Leak testing of the welded joints was performed in accordance with API-Standard 650 and ANSI/AWWA D100-84. The installed replacement motors and associated Oil Collection System was verified by a post-installation walkdown of the System Engineer. The independent verification by the Nuclear Construction Engineer and the post-installation walkdown by the System Engineer provide assurance that the design configuration and installation of the Unit 1 replacement RCP Motor Oil Collection System are acceptable.

The materials for the Unit 1 replacement Motor Oil Collection System were procured NQR to ASTM A105 and A106 specifications with Quality Class "B" cleanliness requirements. Material verification was performed by APS receipt inspectors and by the vendor performing the surface preparation (pickling) by confirming the presence of the appropriate ASTM markings.

The second instance involves 2 pipe clamps procured "NQR" installed during reassembly of RCP thrust bearing oil collection components on Unit 1 RCP 2A. Since the loads on these clamps are less than 2 lbs per the seismic analysis, the lack of a Quality Assurance Program applied to the procurement of these clamps is insignificant.

VI CORRECTIVE ACTION PLAN

Differences between the quality assurance quidelines of BTP 9.5-1, Appendix A, and the quality assurance program applied to the RCP Lube Oil Collection System have not affected system/equipment functionality, based on the information evaluated as part of this justification for continued operation. Corrective measures to address QA program deficiencies will be resolved through the normal PVNGS corrective action programs.

VII JUSTIFICATION FOR CONTINUED OPERATION

The RCP Oil Collection System, as designed, and installed, meet all the requirements of Section III.O of Appendix R as delineated per SSER NO. 7, issued in 1984. The System is classified as "QAG" and designed to seismic category "9". The exception to the application of the Quality Assurance Program is the fabrication and installation of the Unit 1 replacement RCP motor upper and lower bearing Oil Collection components. The design configuration of the installation has been independently verified by a degreed Nuclear Construction Field Engineer. Weld joints were inspected by a qualified welding inspector and leak tested. A post-installation walkdown was performed by the System Engineer.

The aforementioned inspection and testing provide adequate assurance that the RCP Oil Collection System design configuration and function were maintained during the Unit 1 motor replacements.

ATTACHMENT E

JUSTIFICATION FOR CONTINUED OPERATION

EMERGENCY LIGHTING SYSTEM

JUSTIFICATION FOR CONTINUED OPERATION
EMERGENCY LIGHTING SYSTEM

I PROBLEM STATEMENT

Differences between the quality assurance guidelines of BTP 9.5-1, Appendix A, and the quality assurance program applied to the PVNGS Emergency Lighting System have raised a concern over the system's ability to perform its intended function.

II EQUIPMENT DESCRIPTION

The emergency lighting system consists of 8-hour battery backed lights and 1-1/2 hour battery backed lights.

The 1-1/2 hour battery backed lights are installed for personnel egress to meet Life Safety Code requirements. These lights are not credited for any shutdown procedure, hence are not a part of this evaluation.

Some 8-hour lights are installed to meet the requirements of 10CFR50, Appendix R, Section III.j. They are used to provide local illumination for operation of safe shutdown equipment in the event of a fire where required.

8-hour lights provide additional illumination in desirable areas to enhance the options available to the operators to safely shutdown.

The 8-hour emergency lighting system consists of centralized inverter systems feeding numerous lights for broad lighting applications and local self contained battery backed lighting fixtures for localized lighting applications. The four manufacturers of emergency lighting systems at PVNGS are:

- Holophane

  A centralized inverter system which illuminates the auxiliary building wrap-around areas, the remote shutdown panel area, and the Class 1E switchgear rooms.

- Exide

  A centralized UPS system which illuminates the control room (horseshoe area and select panels).

- Dual-Lite

  Local self-contained battery fixtures at numerous locations throughout plant.

Emergi-Lite

An outdoor suitable self-contained battery backed fixture for the ADV area of the MSSS and the access/egress route to the MSSS.

III SAFETY FUNCTION

The 8-hour emergency lighting system provides local illumination to all areas needed for local manual operation of safe shutdown equipment in the event of a fire and in access/egress routes thereto concurrent with a loss of offsite power.

IV CONSEQUENCES OF A FAILURE TO PERFORM

A failure of an 8-hour emergency light may require compensatory measures to ensure the ability of the operator to safely shutdown PVNGS in the event of a fire.

V ENGINEERING EVALUATION

The 8-hour emergency lighting system was classified as quality class "S" or "NQR" (non-quality related) prior to 1989. The MECP project in 1989 reclassified the 8-hour emergency lighting system to QAG. Discrepancies have been identified in the implementation of this program in CAR 90-010, these are currently being resolved as a part of the CAR resolution.

To verify the functionality of the 8-hour emergency lighting system it must be determined that despite the quality classification change in 1989 the emergency lighting system meets the design basis requirements and has been verified functional through testing that the design basis parameters have been met.

The fire protection design basis for the 8-hour emergency lighting is as specified in the UFSAR section 9.5.1.1, 9.5.3.1.1, 14B.10. These requirements are:

a) In areas needed for operation of safe shutdown equipment and access/egress routes thereto.

b) Applicable to the area for which they are installed

c) Include or exclude sealed beam units

d) Batteries shall be rated for 8-hours

e) Emergency lighting fixtures may or may not be normally lighted but shall automatically energize on a loss of essential ac.

f) Structures supporting the components of emergency lighting systems which serve the main control room and the remote shutdown panel room shall be designed to maintain structural integrity during a SSE.

g) Through testing verify emergency lighting transfer capability, duration of illumination capability and lighting intensity levels in the control room (horseshoe area).

For design basis requirement (a), PVNGS has complied by providing emergency lighting in all areas as described in section 9B.2. This was further verified by walkdowns occurring in May and June of 1989. Where discrepancies have been found they were documented and corrected.

For design basis requirement (b), PVNGS has complied by:

- Providing centralized inverter units where a broad source of light was required (i.e. the control room, remote shutdown panels, switchgear and aux. relay cabinet areas).
- Providing suitable localized self contained battery unit for areas where localized lighting was applicable.
- Providing suitable suitable units in outdoor applications.

For design basis requirement (c), PVNGS has complied by providing sealed/non-sealed beam lamps in all localized self contained battery fixtures and fluorescent lamps for centralized inverter systems.

For design basis requirement (d), PVNGS has complied by providing emergency lighting units with batteries capable of supplying 8-hours of emergency light.

For design basis requirement (e), PVNGS has complied by providing centralized inverter units which remain energized through essential ac power and localized self contained battery units which are fed from essential power and automatically energize upon a loss of essential ac power.

For design basis requirement (f), the control room horseshoe area UPS unit, lighting fixtures and batteries have been qualified to demonstrate capability of withstanding a SSE in accordance with IEEE 344-1975.

For design basis requirement (g), the emergency lighting systems have been tested as part of the start-up test program. In addition, preventive maintenance testing continues to verify that the emergency lighting system is operating in accordance with the design basis.

These design basis requirements have been verified during start-up testing, and continue to be verified through the process of regular 8-hour discharge testing.

Additional confirmation of the functionality of the emergency lighting system has been provided by the recent failure data reviews and design reviews. Where reliability was questioned, such as with the Emergi-lite and the Holophane units, corrective action was taken.

VI CORRECTIVE ACTION PLAN

Differences between the quality assurance guidelines of BTP 9.5-1, Appendix A, and the quality assurance program applied to the Emergency Lighting System have not resulted in the system/equipment to be non-functional based on the information evaluated as part of the justification for continued operation. Corrective measures to address QA program deficiencies will be resolved through the normal PVNGS corrective action programs.

VII JUSTIFICATION FOR CONTINUED OPERATION

Functionality is assured by compliance with the design basis and testing to verify design basis parameters are accomplished. As discussed above this has been verified.

Continued operation is justified based on the emergency lighting system being in compliance with the design basis as set forth in the UFSAR, the assurance provided by the start-up testing history, preventative maintenance testing programs, special testing, and recent corrective actions taken as a result of failure data reviews.

ATTACHMENT F

JUSTIFICATION FOR CONTINUED OPERATION

IN-PLANT COMMUNICATIONS SYSTEM

JUSTIFICATION FOR CONTINUED OPERATION
IN-PLANT COMMUNICATIONS SYSTEM

I PROBLEM STATEMENT

Differences between the quality assurance guidelines of BTP 9.5-1, Appendix A, and the quality assurance program applied to the PVNGS In-Plant Communications System have raised a concern regarding the system's availability and functionality.

II EQUIPMENT DESCRIPTION

Three diverse in-plant communications systems are available to support fire protection activities. The portions of the In-Plant Communications System that support fire protection and plant fire team functions are:

- Sound-Powered Telephone System,
- Automatic Telephone System, and
- Plant Maintenance Radio System (including portable radios carried by fire team members).

Inside the units, the Sound-Powered Telephone System is generally available as a means of communication for fire team coordination. If the Sound-Powered Telephone System is unavailable or fails during use, the Automatic Telephone System (Electronic Private Automatic Branch Exchange or EPABX) and the Plant Maintenance Radio System may be available as an alternate means of communication. No applicable procedure prescribes a specific subsystem to be used to perform needed communication functions. Any available subsystem may be used as required. Each communication system, except the passive Sound-Powered Telephone System, is provided power from an uninterruptible power supply (UPS) which will provide a minimum of 8 hours operation following loss of normal electrical power.

Sound-Powered Telephone System

The Sound-Powered Telephone System has two independent sound-powered systems in each unit. One system (circuit 10) is available for communications between the fuel transfer area, the spent fuel area, and the control room of the unit. The other system consists of circuits 1 through 5 to cover general maintenance areas throughout each unit as follows:

- Circuit 1 - Control building
- Circuit 2 - Auxiliary building
- Circuit 3 - Turbine building
- Circuit 4 - Containment building
- Circuit 5 - Fuel, Diesel Generator, and Radwaste Buildings and the Main Steam Support Structure area.

These circuits may be paralleled at the sound power switching cabinet on the 140' elevation of the control building.

Automatic Telephone System

The Automatic Telephone System provides selection of any telephone on the system by dial impulses from the dialing telephone through a central EPABX cabinet. Telephones are provided in designated areas as follows:

- Administration Building
- Service/Warehouse Complex
- Technical Support Center (TSC) building
- Administration Annex Building
- Emergency Operations Facility (EOF)
- Security Guardhouse
- Water Reclamation Facility (WRF) plant
- Each Power Block Unit

A plant EPABX system is installed in the Service Building and another installed in the North Annex. The EPABX system has jacks provided at certain locations within the power block allowing use of portable handsets and can be used as a backup to the Sound-Powered Telephone System during firefighting activities.

Plant Maintenance Radio System

The Plant Maintenance Ultra-High Frequency (UHF) Radio System (Units 1, 2, and 3) is the portion of the radio system which may be used to support fire protection and fire team members when working inside the units. This radio system consists of base stations with two-way, portable, and truck-mounted mobile radios to maintain voice communications throughout the entire plant area. Multiple base stations and antennas are located throughout the units for general radio coverage. The plant maintenance fixed-frequency base stations are in several unit locations and operate at separate frequencies for each unit.

Additionally, the radio system has remote radio control consoles in the following locations which have control over one or more of the base stations:

- Unit Control Rooms
- Administration Building Simulator Control Room
- TSC
- EOF
- Security Guardhouse (Central Alarm Station or CAS)
- Control Building (Secondary Alarm Station or SAS - Unit 1)
- Satellite Technical Support Center (STSC)
- Remote Shutdown Panel Rooms A and B, and
- WRF Control Room.

Lack of complete Plant Maintenance Radio System coverage prevents its designation as the principal means of communications for fire protection activities.

An intercom feature also exists which allows operators at different control consoles to communicate directly with each other.

III SAFETY FUNCTION

There is no safety design basis for the In-Plant Communications System. Its function in this context is to support safe shutdown and plant fire team members in reporting the description, identifying plant impact, and implementing appropriate actions or countermeasures for fighting a fire or suspected fire affecting the safety of the plant, safety equipment, or plant personnel. UFSAR sections relating to the applicable portions of the In-Plant Communications System are:

9.5.2.1.A	Design Basis
9.5.2.1.E	Design Basis
9.5.2.1.F	Design Basis
9.5.2.1.G	Design Basis
Table 9.5-3	Communication Systems Power Supplies
Table 9.5-4	Summary of Onsite Communications System Capabilities and Noise Considerations During Transients and/or Accidents.
9.5.2.2.1.1	EPABX Telephone System
9.5.2.2.1.4	Sound Powered Telephone System
9.5.2.2.1.5	Radio Intercom
9.5.2.2.1.6	Two-Way Radio
9.5.2.3	Inspection and Testing Requirements
Question 9A.1	NRC Question 430.4
Question 9A.76	Fire Protection Evaluation Report (FPER)
Question 14	
Question 9A.129	FPER Audit Open Item No. 24
9B.2	Fire Hazards Analysis
Table 9B.3-1, Section B, Item 5a)	Administrative Procedures, Controls, and Fire Brigade
Table 9B.3-1, Section C,	Quality Assurance Program
Table 9B.3-1, Section D, Item 5	General Guideline for Plant Protection

IV CONSEQUENCES OF A FAILURE TO PERFORM

No mode of equipment failure common to these three In-Plant Communications subsystems has been identified although it is conceivable that a fire could result in the simultaneous failure of all three subsystems. The design basis of the In-Plant Communications System does not require that the system be designed to preclude such failure.

The concurrent loss of these In-Plant Communications subsystems may result in the failure of plant personnel to take action which ensures the safety of plant personnel and equipment.

V ENGINEERING EVALUATION

General

The diversity of the In-Plant Communications subsystems and the backup means of communication provide a high degree of availability for plant communications for local area, unit, or general site communications. The availability of security personnel and their telecommunication devices (i.e., Security Radio System) provides further assurance that other means of communication will be available if required.

The original installation of the In-Plant Communications System was covered by the APS construction program. Preoperational tests were performed prior to placing the equipment into service.

Installation and maintenance activities on the In-Plant Communications System are controlled by work control (30AC-9ZZ01) except for portions of the Automatic Telephone System as described below.

Additional evaluations of the three In-Plant Communications subsystems that support fire protection and plant fire team functions are included in the following subsections.

Sound-Powered Telephone System

This system has telephone jacks located strategically around the plant for direct telephone connection. The system is a passive two-wire system. Routine usage is the best indicator that it is functioning. If the system were to be shorted or inadvertently powered by some other source, the system would be found inoperable by routine usage and subsequently repaired. If a jack or wire were to become open, the individual circuit would be unavailable and one of the other two diverse In-Plant Communication subsystems may be required to serve as backup.

Automatic Telephone System

Installation and maintenance activities for the Automatic Telephone System equipment and cables are controlled by work control (30AC-9ZZ01) for all installed plant equipment including raceways, trunk cables, and cabinets except the EPABX switch, the telephone sets, and unscheduled cable and raceway. The excepted items and, additionally, telephone terminations are controlled by APS Telecommunications procedures in order to allow rapid restoration of service in the event of a telephone circuit fault. This allows telephone circuits to be repaired as a maintenance activity rather than controlling such a change as a design change. This improves the overall availability of the telephone system.

Routine usage of the equipment by personnel throughout the site provides a general indicator that it is functioning. The telephone switch and telephone sets are tested and maintained by APS Telecommunications in accordance with their procedures and guidelines.

Plant Maintenance Radio System

Routine usage of the equipment for operational and maintenance activities provides a general indicator that it is functioning. A daily functional test of the radio link (on the maintenance frequency) between the unit reactor consoles and the security guardhouse is performed in accordance with procedure 20SP-0SK09. All hand held radios are repaired by the Systems Electric Equipment Communications Department as needed.

Power Supplies

Battery backup power supplies are used on the In-Plant Communications System's providing an alternate source of power for any of the active systems.

Periodic testing, performed on the In-Plant Communications Systems battery backup systems, is controlled by Preventive Maintenance (30AC-9MP02) to ensure system availability. (Reference Tasks: 058480, 058584, 058490, 058587, 058532, 058588, 023113, 023107, 023127, 058915, 029683.)

VI CORRECTIVE ACTION PLAN

Differences between the quality assurance guidelines of BTP 9.5-1, Appendix A, and the quality assurance program applied to the In-Plant Communications Systems have not resulted in the system/equipment being inoperable based on the information evaluated as part of the justification for continued operation. Corrective measures to address QA program deficiencies will be resolved through the normal PVNGS corrective action program.

VII JUSTIFICATION FOR CONTINUED OPERATION

Commitment

PVNGS has not committed to having a single In-Plant Communication subsystem fulfill the requirements for fire protection, but rather that a combination of the three subsystems should be used to meet the requirement.

Table 9B.3-1 compares PVNGS fire protection program commitments to the requirements of Appendix A of NRC Branch Technical Position APCSB 9.5-1. Section D.5(c) of the table gives the BTP requirement: Fixed emergency communications should use voice-powered headsets at preselected stations.

The corresponding PVNGS position is that: Fixed emergency voice-powered headsets are provided at preselected stations. See section 9B.2 for specific zones containing voice-powered headset phone jacks. Section 9B.2 of the UFSAR presents the fire hazards analyses of the PVNGS fire areas. Sound-powered telephone jacks are identified as the means of emergency communications for a significant number of the fire zones; however, other zones do not have jacks available.

Additionally, the response to question 9A.76 in Appendix A of the UFSAR states that three independent means of communication are provided in the control room for communication with the fire team; i.e., the plant radio system, the plant telephone system, and the sound-powered telephone system.

Background

In March 1985, an NRC inspection evaluated the In-Plant Communications System with respect to its ability to accommodate safe shutdown as required by FSAR Section 9.5.2. The In-Plant Communications subsystems whose capabilities were assessed were the Automatic Telephone System and the Plant Maintenance Radio System. Although some communication difficulties were identified which were held as an open item pending verification of the licensee's corrective actions by Region V, no violations or deviations were identified.

After reviewing the results of the Appendix R audit and after performing a modification to permit a squelch adjustment on the individual base station radios, APS retested specific areas to verify needed communication capability existed to perform a safe shutdown from the remote shutdown panel. Specifically, the Plant Maintenance Radio System was evaluated at this time. The results of this evaluation were that, except for the 70 Ft. Auxiliary Building, east and west containment wrap-around rooms and the 70 Ft. Auxiliary Building makeup pump room, communication was

satisfactory. For those locations in the Auxiliary Building in which satisfactory radio communications could not be established, satisfactory radio communications were able to be established at the entrance or doorway. In addition, telephone jacks and sound-powered headset jacks were confirmed to be available inside those rooms (reference letter ANPM-23222 JWR/LLI, April 11, 1985). Subsequently, telephone sets were added to those rooms by DCPs 10J/20J/30J-QF-065.

This open item was finally closed by the NRC as documented in NRC letter dated October 30, 1986, indicating acceptance of the In-Plant Communications System's ability to provide required communications capability to perform safe shutdown.

Conclusion

The communications systems are conventional and have a history of successful operation at existing plants. Most of these systems are in routine use and this will ensure their availability which is consistent with UFSAR Section 9.5.2.3.

ATTACHMENT G

JUSTIFICATION FOR CONTINUED OPERATION

LIGHTNING PROTECTION

JUSTIFICATION FOR CONTINUED OPERATION
LIGHTNING PROTECTION

I PROBLEM STATEMENT

Differences between the quality assurance guidelines of BTP 9.5-1, Appendix A, and the quality assurance program applied to PVNGS Lightning Protection have raised a concern over the ability of the lightning protection to provide a path to ground for the discharge of lightning strikes as stipulated in the fire hazards analysis.

II EQUIPMENT DESCRIPTION

The lightning protection equipment is provided for the outdoor transformers, the containment building, refueling building, control building, radwaste building, diesel generator building and turbine building, as detailed in the design drawings. The lightning protection equipment is connected to the ground grid. The following types of lightning protection equipment are typically supplied: lightning arresters for the protection of the transformers and switchgears; lightning air terminals with the associated cables and hardware for the protection of various building structures. The lightning protection is identified in the fire hazards analysis found in UFSAR section 9B.3 Table 9B.3-1, system description manual Vol. 5, design criteria manual Vol. 2, and detailed design drawings.

III SAFETY FUNCTION

The lightning protection system's function is to protect personnel, equipment, and building structures against lightning hazards.

IV CONSEQUENCES OF A FAILURE TO PERFORM

A failure of the lightning protection system may initiate a fire which could cause the subsequent failure of safety related equipment.

V ENGINEERING EVALUATION

As stated in UFSAR Table 9B.3-1, the PVNGS design basis is to provide a lightning protection system for: (1) Structures in accordance with UL Master Labeled Lightning Protection Program; and (2) All start-up transformers, main transformers and 13.8kV switchgears.

A review of the output documents (Specification 13-EM-046 Rev. 1 and Drawing Number 13-E-ZYG-036 Rev. 11) for structure lightning protection, has confirmed that the design basis requirements have been met by complying with the Underwriter Laboratory (UL) 96A "Installation Requirements for Lightning Protection Systems" and NFPA 78-ANSI C5.1 "Lightning Protection Code". The adequacy of the lightning protection system, including equipment lightning arrestors, in general, was reviewed as a part of a 1986 design review.

VI CORRECTIVE ACTION PLAN

Differences between the quality assurance guidelines of BTP 9.5-1, Appendix A, and the quality assurance program applied to PVNGS Lightning Protection have not resulted in the system/equipment being non-functional based on the information evaluated as part of the justification for continued operation and the recent walkdowns of the system. Corrective measures to address QA program deficiencies will be resolved through the normal PVNGS corrective action programs.

In addition, a PM for inspections of the lightning protection system on a regular basis will be generated. The technical content must be adequate to assure long term reliability and NFPA 78, Section B-2.2, maintenance procedures provide guidance.

VII JUSTIFICATION FOR CONTINUED OPERATION

Functionality is confirmed by compliance with (UL)96A/NFPA78, a 1986 confirmatory design review, and a recent walkdown of the lightning protection system.

Adequate protection is being provided by virtue of the fact that the lightning protection system is designed, and installed in accordance with the design basis requirements.

ATTACHMENT H

JUSTIFICATION FOR CONTINUED OPERATION

VENTILATION

JUSTIFICATION FOR CONTINUED OPERATION
VENTILATION

I PROBLEM STATEMENT

Differences between the quality assurance guidelines of BTP 9.5-1, Appendix A, and the quality assurance program applied to the PVNGS Ventilation Systems have raised concern regarding removal of products of combustion, smoke and gases from safety related areas is in question.

II EQUIPMENT DESCRIPTION

Normal and essential ventilation systems are provided as required in buildings containing safety related equipment. These ventilation systems are classified in accordance with the following quality classification:

Ventilation System	Quality Classification
Control Room Essential Air Filtration System	Q
Control Building Normal Air Handling System	NQR
Auxiliary Building Normal Air Handling System	NQR
Fuel Building Essential Air Handling System	Q
Fuel Building Normal Air Handling System	NQR
Diesel Generator Building Essential Exhaust Fans	Q
Diesel Generator Building Normal Exhaust Fans	NQR
Diesel Generator Control Room Essential Air Handling Unit	Q
Radwaste Building Normal Air Handling System	NQR
Containment Purge System	NQR

The pertinent function of these systems with respect to fire protection is their air handling capability. The air cooling and heating capability of these systems has no impact on smoke, heat and/or hot gas removal.

III SAFETY FUNCTION

Ventilation systems, in conjunction with portable smoke ejectors, are utilized to remove smoke and corrosive gases that may be generated as a result of a fire, to restore habitability and visibility to areas containing safety related equipment. Venting of smoke and corrosive gases using permanent plant equipment is not required in suppression and containment of a fire.

IV CONSEQUENCES OF FAILURE TO PERFORM

A complete failure of the ventilation system without other means of removing the smoke, heat and corrosive gases may allow the accumulation of smoke, heat and corrosive gases to hazardous levels for plant personnel to complete post fire actions. Smoke may also impair visibility for the performance of operator action.

V ENGINEERING EVALUATION

The primary concern in the event of a fire in the PVNGS units is to suppress the fire. The smoke and hot gases are to be removed after the fire is controlled by the fire fighting personnel. Self Contained Breathing Apparatus (SCBA) are available for the operations personnel in order to perform any immediate operator actions required for safe shutdown.

In case of a fire in a building, the HVAC system for the building is utilized in conjunction with portable smoke ejectors in order to remove the smoke and/or corrosive gases. Essential HVAC Systems (such as Fuel Building Essential Air Filtration system) could also be used in order to remove smoke and corrosive gases from certain fire zones.

As an example, the Fuel Building Essential Filtration System can take suction from the Auxiliary Building areas below 100 ft. elevation. In case of a fire in the lower levels of the Auxiliary Building, the Fuel Building Essential Filtration System could be utilized in conjunction with portable ejectors to remove the smoke and gases from the fire zone. Exhaust from the Fuel Building Essential Filtration System is monitored for radioactivity for protection of the public as required by the BTP 9.5-1, Appendix A, Section D.3.c.

Another example is the Control Building Normal Ventilation System. This system has a smoke exhaust fan which is connected to each level of the control building and is capable of removing smoke from one level at a time. This action is performed by manually opening the supply and exhaust valves to the level with smoke. Outside fresh air is then introduced through the air plenum into the level with smoke and smoke is exhausted to the outside when the fan is energized. In case a closed fire damper prevents removal of the smoke from a zone, the smoke from this zone is routed to the other zones (within the same level and train) using portable ejectors and then removed by the smoke exhaust system. Routing of smoke is through doors, corridors, etc.

The power supplies for essential filtration systems are routed outside of the fire area served by the system as required by the BTP 9.5-1, Appendix A, section D-3.b. APS has taken exception to this requirement with respect to the normal ventilation system as shown in Table 9B.3-1 of UFSAR. In such cases, portable smoke ejectors are utilized in order to remove smoke and gases from a fire zone.

The Radwaste, Fuel, Auxiliary and Control Building Normal air handling systems operate continuously and are therefore functional. PVNGS has adopted a preventive maintenance program for these normal air handling units. The program requires inspection of the fan belts for evidence of wear, checks the fans for vibration and/or measures the differential pressure across the HEPA filters. Inspection interval ranges between monthly for vibration measurement to semi-annually for belt tightening. Satisfactory performance of these systems is monitored by implementation of these preventive maintenances.

The Control Building Smoke Exhaust fan which is part of the Control Building Normal Air Handling System is not operated continuously. PVNGS has adopted a preventive maintenance program for this fan. The program requires inspection of the belts and sheaves for evidence of wear on an annual basis. The inspection also requires greasing the fan bearings on a 3 month basis.

The Containment Power Access Purge system is normally operated per PVNGS procedure 4XOP-XCP01 as required to reduce the Maximum Permissible Concentration (MPC) to the levels required for containment entry. PVNGS has adopted a preventive maintenance program for this system. The program requires inspection of belts, sheaves and lubrication of the fan bearing on a semi-annual basis.

The safety related HVAC systems are surveillance tested in accordance with the requirements of PVNGS Technical Specification. In addition work activities on these "Q" classified system are performed quality related.

VI CORRECTIVE ACTION PLAN

Differences between the quality assurance guidelines of BTP 9.5-1, Appendix A, and the quality assurance program applied to the PVNGS Ventilation Systems have not resulted in causing the system/equipment to be nonfunctional based on the information evaluated as part of the justification for continued operation. Corrective measures to address QA program deficiencies will be resolved through the normal PVNGS corrective action programs.

PVNGS is currently evaluating the need to implement operational testing for the Control Building Smoke Exhaust fan and the Containment Power Access Purge System.

VII JUSTIFICATION FOR CONTINUED OPERATION

PVNGS does not rely on the plant installed ventilation system to remove smoke and hot gases. A combination of ventilation system and portable smoke ejectors are used in order to remove the smoke and gases from a fire zone. If the HVAC systems are not available, smoke ejectors alone are utilized. Safe shutdown activities to be performed by the operators outside of the Control Room are capable of being performed using SCBA. The Control Room can be isolated from an outside fire by initiation of a Control Room

Ventilation Isolation Actuation Signal (CRVIAS) which isolates the Control Room and prevents entry of smoke and gases into the area. The Control Room can also be positively pressurized by actuation of the Control Room Essential Filtration Action Signal (CREFAS) which utilizes outside air to pressurize the Control Room and prevent smoke entry into the room from adjacent zones. Both CRVIAS and CREFAS signals route the Control Room return and outside air supply through the Filtration system to maintain a habitable environment for the Control Room personnel.

The CREFAS and CRVIAS signals are tested in accordance with PVNGS procedure 36ST-9SA05 at every refueling outage.

ATTACHMENT I

JUSTIFICATION FOR CONTINUED OPERATION

MANUAL FIREFIGHTING EQUIPMENT

JUSTIFICATION FOR CONTINUED OPERATION
MANUAL FIREFIGHTING EQUIPMENT

I PROBLEM STATEMENT

Differences between the quality assurance guidelines of BTP 9.5-1, Appendix A, and the quality assurance program applied to the PVNGS Manual Firefighting Equipment have raised concerns regarding its availability and functionality.

II EQUIPMENT DESCRIPTION

The following manual firefighting equipment, which is provided for protection of safety related areas, is not specifically classified and for classification purposes should be assumed NQR.

- Portable Fire Extinguishers (Hand Held)
- Fire Hose Station Equipment

  Fire Hoses
  Hose Racks
  Nozzles

- Firefighting Equipment on the Fire Truck (Prior Hose House Equipment)

  2 1/2 Inch Fire Hose
  1 1/2 Inch Fire Hose
  Axe
  Crow Bar
  Portable Lantern
  Universal Spanner Wrenches
  Replacement Hose Washers
  2 1/2 X 1 1/2 Inch Hose Reducers
  1 1/2 Inch Hose Nozzles
  2 1/2 X 1 1/2 X 1 1/2 Inch Gated Wye
  Hose and Ladder Straps
  Adjustable Hydrant Wrenches

- Personal Protective Equipment

  Turnout Gear
  SCBA

- Fire Truck
- Portable Smoke Ejectors

JUSTIFICATION FOR CONTINUED OPERATION
MANUAL FIREFIGHTING EQUIPMENT

Portable fire extinguishers are provided throughout normally accessible areas of the plant using NFPA 10-1975 and OSHA standards as guidance. Extinguishers, as identified in UFSAR Table 9.5-1, are used for mostly backup fire protection and in some areas primary fire protection. Portable extinguishers of the multipurpose type have a capacity of 20 pounds ABC dry chemical with a UL labeled rating of 10-A:40-B:C. Extinguishers for class B and C fires have a capacity of 20 pounds of carbon dioxide and have a UL labeled rating of 10B:C. Pressurized water and carbon dioxide extinguishers are provided in occupied areas of the control room. UFSAR Sections 9.5.1.1.1.L, 9.5.1.2.1.K, 9.5,1.2.2.K, 9.5.1.3.N, 9A.82, 9A.130 and Section 9B describe commitments associated with fire extinguishers.

Standpipe fire hose, racks, and nozzles are provided for all buildings and all floors such that normally assessable areas can be covered by 75 or 100 foot hoses where practical. Isolated cases may allow the use of 125 or 150 foot hose lengths if necessary. Standpipe fire hose, racks and nozzles are part of Fire Hose Stations described in the UFSAR Section 9.5. A list identifying the location and function of the Fire Hose Stations is found in the UFSAR Table 9.5-1. Fire hose is also discussed in Section 9.5.1.1.1.M, 9.5.1.2.1.I, 9.5.1.2.2.I, 9.5.1.3.M, 9A.86, 9A.97, 9A.100, 9A.107, 9A.115, 9A.130, and Section 9B.

Firefighting equipment on the fire truck was previously described in the UFSAR as equipment included in the hydrant hose houses. A revision to the UFSAR was performed in March 1990 to delete the hydrant hose houses and take credit for utilizing a Class A fire truck. Equipment inspections and tests, similar to those required for hose houses, are to be performed on the truck to ensure that equipment is in place and functional. This change is discussed in UFSAR Section 13.5.2.2.I. The following equipment was required for hydrant hose houses:

- Six 50 foot lengths 2 1/2-inch fire hose
- Two 50 foot lengths 1 1/2-inch fire hose
- One pickhead fire axe, 6-pound, 36-inch handle
- One pinch-point crow bar, 51 inches long, 1 1/8-inches square, 12-pound
- One emergency portable lantern, powered by two 6-volt rechargeable dry cells with adjustable beam (one bulb for long range beam and one bulb for emergency beam)--Eight hour operation power
- Six 2 1/2-inch universal spanner wrenches
- Six 2 1/2-inch rubber hose washers
- Two 2 1/2-inch rubber hose washers
- 2 1/2 by 1 1/2 by 1 1/2-inch gated wye
- Two 2 1/2-inch by 1 1/2-inch brass hose reducers

Turnout gear is required to be provided for fire department and fire team advisor use. The requirement for this equipment is discussed in UFSAR Section 9.5.1.1.P and Table 9B.3-1, (Sheet 10 of 68). An individual set of turnout gear is provided to each firefighter which is readily available for emergency use. Each unit has six additional sets stored in the fire equipment lockers located on the 140 foot elevation of the corridor building. The fire team advisor who is a licensed operator obtains equipment from the corridor building lockers.

SCBAs provide for respiratory protection through the use of 'bottled air' and full face positive pressure masks approved by NIOSH. The Fire Team and Control Room personnel are provided with SCBAs with a minimum service life of 1/2 hour. A 1 hour air supply is provided for each SCBA kit and a minimum 6 hour supply of reserve air is provided and arranged to permit quick and complete replenishment of exhausted air supply bottles. Reference UFSAR Sections 9.5.1.1.1.P, 9.5.1.3.P, and Table 9B.3-1, (Sheet 30 of 68, Item 4).

The site fire response truck is utilized for transportation of firefighting equipment and fire department personnel. The truck is equipped with more equipment than previously required for hydrant hose houses. The truck was not an initial UFSAR commitment until March 30, 1990, when the hydrant hose houses were deleted. Credit was taken for the fire truck as equivalency to hydrant hose houses. Reference UFSAR Section 13.5.

Portable smoke ejectors are used in conjunction with normal and/or essential HVAC Systems to remove smoke and corrosive gases. In general, a fire floor or area will be exhausted to the outside utilizing fixed vertical duct systems. Specific zones within these areas will be connected to these vertical ducts by horizontal ducts. Should any fire dampers automatically operate in any zone, the fire team will manually utilize doors, smoke ejectors, and adjacent rooms and corridors to provide alternate horizontal movement to vertical ducts. One portable smoke ejector is located at each of the units fire equipment lockers (140' corridor building). One gas powered smoke ejector and one 4000 watt portable generator with 100' of extension cord are maintained on the site fire response truck for use in the event electrical power is not available. Reference UFSAR Questions 9A-70, 9A-86, and Table 9B.3-1 (Sheets 28-31 of 68, items 4.b, 4.c, 4.g).

III SAFETY FUNCTION

Manual firefighting equipment is provided in accordance with UFSAR Table 9.5-1 for backup or primary fire protection for specific plant areas or equipment. Portable smoke ejectors are provided for removal of products of combustion from within the units following fire extinguishment.

IV CONSEQUENCES OF FAILURE TO PERFORM

Failure of manual firefighting equipment may cause delay in firefighting activities, result in increased damage to safety-related equipment, or in the case of personnel protective equipment, cause injury.

Failure of SCBA involving a smoke-filled atmosphere within the unit could impact the ability of Operations personnel to perform emergency operating procedures.

Failure of portable smoke ejectors may cause delay in removal of products of combustion which could result in delay of recovery actions and increased potential for long term corrosion of plant equipment.

V ENGINEERING EVALUATION

Fire Extinguishers are not specifically classified, and for classification purposes should be assumed NQR. The extinguishers provided in the plant are UL labeled and located in accordance with UFSAR commitments. Administrative procedure 14FT-9FP01, Fire Protection Equipment Testing for the Power Block, provides inspection and maintenance in accordance with NFPA 10-1975. This procedure requires monthly, semi-annual, annual, five year, six year, and twelve year inspection/maintenance activities to be performed based on type of extinguisher. Verification that the extinguishers located throughout the plant are in accordance with UFSAR commitments is also performed by this procedure on a monthly basis.

Fire hoses, racks and nozzles are not specifically classified and for classification purposes should be classified NQR. Fire hose stations are located throughout the power block in accordance with commitments made in the UFSAR. All equipment is inspected and tested in accordance with the applicable NFPA code commitments. The following administrative procedures provide assurance that the equipment will function as required:

- 14AC-0FP09 Fire Protection Test Program
- 14FT-9FP11 Fire Hose Station Visual Inspection
- 14FT-9FP12 Fire Hose Station Inspection
- 14FT-9FP13 Fire Hose Station Operational and Hydrostatic Test
- 14FT-9FP01 Fire Protection Equipment Testing for the Power Block
- 14DP-0FP17 Hose Testing (Hydrostatic)

In the event standpipe fire hose, racks or nozzles are declared non-functional, applicable compensatory measures are taken in accordance with procedure 14AC-0FP01, Fire System Impairment.

JUSTIFICATION FOR CONTINUED OPERATION
MANUAL FIREFIGHTING EQUIPMENT

Firefighting equipment contained on the fire truck and personnel protective equipment (turnout gear) are not specifically classified and for classification purposes should be assumed NQR. PVNGS license commitments are not specific with respect to amount, type, or qualification. The equipment utilized, however, is in accordance with applicable NFPA commitments. Administrative procedures are implemented to assure the equipment will be available and function as required. The following procedures are applicable:

- 14DP-0FP09 Conduct of Fire Shift Operations
- 14AC-0FP09 Fire Protection Test Program
- 14FT-9FP06 Fire Equipment Locker Inspection
- 14FT-7FP01 Fire Protection Equipment Testing for the Ancillary Buildings
- 14DP-0FP17 Hose Testing (Hydrostatic)
- 14FT-0FP06 Monthly Fire Engine Equipment Inspection

Equipment maintained on the fire truck and in the unit fire equipment lockers are inspected for availability and functionality on a monthly basis. SCBAs, which are discussed below, are inspected and maintained by the Site Respiratory Protection Group. With respect to fire hose, hydrostatic testing is performed on an annual basis.

SCBAs are not specifically classified and for classification purposes should be assumed NQR. All SCBAs utilized at PVNGS are NIOSH approved. SCBAs are inspected and maintained by the site Respiratory Protection group on a monthly basis. The following procedures provide assurance that SCBAs will be available and functional:

- 75RP-9EE02 Respiratory Equipment Maintenance, Inspection and Repair
- 75AC-9RP06 Respiratory Equipment Usage in the RCA

The site fire response truck is not specifically classified and for classification purposes should be assumed NQR. The truck is dedicated to the fire department with preventive maintenance being performed on a 90 day frequency by the site transportation maintenance organization. The truck is verified functional on a shift basis by procedure 14DP-0FP09, Conduct of Shift Operations. Backup fire truck capability is provided during such time that the primary response truck is out of service.

Portable smoke ejectors are not specifically classified and for classification purposes should be assumed NQR. The smoke ejectors, including the portable generator, are inspected for availability and functionality on a monthly basis. The following procedures provide assurance that portable smoke ejectors will be available and functional:

- 14FT-9FP06 Fire Equipment Locker Inspection
- 14FT-0FP06 Monthly Fire Engine Equipment Inspection

Backup capability for all types of manual firefighting equipment is available through an offsite fire response agreement with the city of Phoenix Fire Department. This agreement provides for manpower and equipment resources if called upon. Administrative procedure 14AC-0FP02, Emergency Notification and Response and notification and 14AC-0FP10, PVNGS Fire Department Incident Command System, address this agreement.

VI CORRECTIVE ACTION

Differences between the quality assurance guidelines of BTP 9.5-1, Appendix A, and the quality assurance program applied to PVNGS Manual Firefighting Equipment have not resulted in causing the system/equipment to be non-functional based on the information evaluates as part of the justification for continued operation. Corrective measures to address QA program deficiencies will be resolved through the normal PVNGS corrective action programs.

VII JUSTIFICATION FOR CONTINUED OPERATION

Manual firefighting equipment provided for fire team use meets or exceeds the UFSAR commitments. The firefighting equipment used at PVNGS is of standard type and quality used within the fire protection industry. The equipment, with the exception of SCBAs, (which is inspected and tested by Radiation Protection Personnel) is inspected and tested by professional firefighters experienced in its use and function which assures a higher level of quality. Administrative procedures are in place to assure equipment is available and functional.

Penetration Seals

The seal materials and configurations need to be designed, qualified and installed to meet the barriers' required fire rating.

Seismic Gap Seals

The seal materials and configurations need to be designed, qualified and installed to meet the barriers' required fire rating.

Fireproofing

Sufficient thickness and design details of fireproofing need to be specified for building beams and columns in order to protect the structural integrity of the fire barriers. The fireproofing applied to cable tray supports and HVAC supports needs to have sufficient thickness specified in order to protect the integrity of the adjacent penetration fire seal. A structural collapse of the penetrant may damage the penetration seal, preventing the seal from serving its safety function.

Sufficient Thermolag thickness and design details need to be specified to protect the structural integrity of a conduit or cable tray. Thermolag fireproofing is a protective wrap provided for at least one train of safe shutdown circuits when the separation requirements of 10CFR50,Appendix R can not otherwise be met.

Radiant Energy Shields

The primary safety function of the radiant energy shields is to protect at least one train of redundant safe shutdown circuits from fire damage in containment to meet section III.G of 10CFR50, Appendix R.

Dampers

Fire dampers need to meet the fire rating of the barrier in which they are installed and be able to close against the expected pressure differential and air flow.

IV CONSEQUENCES OF A FAILURE TO PERFORM

A failure of a fire barrier may lead to an extension of a fire, which if not protected by manual or automatic suppression, could lead to the failure of a safety related system.

V ENGINEERING EVALUATION

The evaluation of a fire barrier requires the evaluation of each of the barrier components. For simplicity, each of the individual barrier components is evaluated separately as a topical issue in the following paragraphs.

Structural Materials

Concrete walls and floor slabs installed in the power block have been installed under specification 13-CM-365, which is classified as Q class. Installation was controlled by concrete structural design drawings 13-C-ZAS, 13-C-ZCS, 13-C-ZFS , 13-C-ZGS and 13-C-ZRS. The ZAS, ZCS, ZFS and ZJS drawings are classified as Q-class. The ZRS drawings are classified as QAG-class. The existing concrete wall and floor slabs exceed the thicknesses required to maintain their fire rating.

Gypsum board on metal stud and plaster on metal lath walls installed in the power block and listed as fire barriers have been installed in accordance with specification 13-CF-022 (Subcontract 10407-FSC-88), which is classified as quality class 'S' (NQR). Installation was controlled by architectural drawings 13-A-ZAD-201-203 and 13-A-ZJD-501-504 which are classified as quality class 'S' (NQR). Per PVNGS response to Appendix 9A, Question 9A.68 of the UFSAR, gypsum board partitions were installed to Underwriter's Laboratories Fire Resistance Directory design number U-411 (UBC Table 43B No. 71). Section D9.5C, Gypsum Drywall, of Specification 13-CF-022 states, 'Fire wall installation shall be in accordance with approved fire rated designs as follows: 2 hours UL-Design U411; 1 hours USG Design T-1174-OSW.' U-411 Gypsum walls meet the fire rating required by the fire hazards analysis. Per PVNGS response to Appendix 9A, Question 9A.109 of the UFSAR, plaster on metal lath partitions were installed to UBC-1973 (Table 43B, Item No. 61). A wall in accordance with UBC Table 43B provides the fire rating required by the fire hazards analysis. A sample of gypsum and plaster walls were walked down to obtain wall thicknesses. The thicknesses observed are consistent with the values expected for the specified construction.

Reinforced concrete masonry units installed within the power block were purchased and installed under 'S'class (NQR) specification 13-AM-014. Installation of the concrete masonry units was indicated on architectural drawings 13-A-ZAD-203, 13-A-ZAD-207 and 13-A-ZJD-501 through 510. All of which are 'S'class drawings. 'Q'class drawings 13-C-ZJS-100, 120 and 172 show fabrication and reinforcement details of the walls in the Control building. The material per the specification was to conform to ASTM 150, UL 618 and the applicable ACI codes in the UFSAR. The concrete masonry units were specified for non-load bearing and load bearing hollow masonry units. The fire ratings are specified on the architectural drawings. Detailed analyses documented in calculation 13-CC-ZJ-120 evaluate the structural adequacy of the walls.

Based on the above discussion, the structural materials and the installation of these materials for the PVNGS fire barriers provides adequate fire protection.

Doors

The fire doors are Presidential 'W' series and were manufactured by Fenestra Corporation and installed as 'S' class doors during original construction under specification 13-AM-070. Fire doors protecting safety-related equipment were later classified 'ITS' and the doors were re-inspected to comply with the 'ITS' Quality Assurance requirements. Doors which did not meet the NFPA 80 code requirements were declared inoperable and compensatory fire watches put in place. The watches are lifted after the door is brought into NFPA 80 compliance through rework, repair or replacement.

The first set of fire door tests were commissioned to test situations being found in the units. The results of these tests were used to issue specification 13-AN-006 in November, 1987 to cover the installation, rework and repair of fire doors. Throughout the inspection process, many Engineering Evaluation Requests (EER) were generated and dispositioned to address various deficiencies in the doors' as-built conditions. Excessive gaps and popped door skin spot welds made up the majority of these deficiencies. Reportability Evaluation Reports (RER) 86-22 & 86-30 were processed to address the 10CFR21 potential reportability of the observed deficiencies. Both RERs concluded that the condition was not reportable.

In an effort to minimize the door repair/replacement scope, additional fire tests were commissioned to test worst case situations identified by the EERs and anticipated in the future. Study 13-MS-A18 was issued in February, 1989 to document and evaluate the results of all the tests.

Revision 1 of specification 13-AN-006 issued in September, 1989, incorporated the results of the study as well as the EERs dispositioned since Revision 0. The flow of EERs continued to diminish but the number was still undesirable and was causing delays in the door repairs.

Considerable research and site interface time was put into the May, 1990 issuance of Revision 2 to specification 13-AN-006. Its primary impact was the reduction of inspections to only the level necessary to verify that the door meets the 13-MS-A18 fire test parameters. The reduced inspections dramatically decreased the amount of time necessary to rework or repair a door to meet the specification's technical requirements. The technical requirements were not changed. Revision 2 also incorporated the dispositions of the EERs and MNCRs closed since Revision 1.

Fire doors today are either in compliance with specification 13-AN-006 or require repair. As of 6/29/90, 210 of the 522 Unit 1,2, & 3 fire doors that required repair have the repairs completed. Compensatory fire watches remain in place for the doors which are not repaired and are declared inoperable. These watches are lifted as the doors are repaired per specification 13-AN-006.

Based on the above discussion, adequate fire protection is being provided by virtue of the fact that each door is either in compliance with specification 13-AN-006 or a compensatory fire watch is in place.

Penetration and Seismic Gap Seals

The penetration and seismic seals were initially installed by Insulation Consultant & Management Services (ICMS) and Brand Industrial Services, Inc. (BISCO) in accordance with specifications 13-AM-208 , 13-CF-028 (contract FSC-155) and their approved quality assurance program. Fire breaks or stops were installed under Specifications 13-AM-025, 13-CF-028 and 13-AN-340 per Drawings 13-E-ZAC-050 & 080. (Reference Table 9.5-1 Section D.3e and APS response to question 9A.84 in the UFSAR.) The seals are maintained by contractor Williams Power Corp. in accordance with specification 13-AN-340 and PVNGS quality assurance program. All of the specifications are QAG class.

Any modifications to fire barriers after original construction are from the addition and deletion of penetrations and their penetrants through the fire barriers installation and maintenance of penetration and seismic gap seals is controlled by architectural drawings 01-A-ZYD-070 through 01-A-ZYD-511,

02-A-ZYD-070 through 02-A-ZYD-511 and 03-A-ZYD-070 and 03-A-ZYD-511, and procedure 31MT-9ZZ12. All of these drawings are classified as QAG.

APS has experienced penetration seal problems similar to the rest of the industry. Industry wide seal problems are identified in NRC IN 88-04, NRC IN 88-56, NRC IN 88-60. PVNGS problems are identified in LER 89-017-00, CAR 87-0095, CAR 89-0071, CAR 90-0007 and various EERs.

The corrective action program described in the CAR response is presently underway and was developed prior to the issuance of CAR 90-007. The program was patterned after the Davis Besse Nuclear Generating Station's penetration seal adequacy verification program. Their seal situation prompted the issuance of NRC IN 88-04. The program consists of steps to re-verify the design basis, re-verify configuration control and generate user friendly documents that communicate the design basis to users and maintain configuration control.

Fire barrier operability is defined by the original installation requirements and the individual operability of the penetrations within each fire barrier. The operability of the Appendix R fire barriers is verified for integrity every 18 months. The penetration seal functionality is defined as compliance to specification 13-AN-340 and the verification inspection. Each penetration not presently meeting this definition has been declared inoperable and a compensatory measures have been implemented.

Based on the above discussion, adequate fire protection is being provided by virtue of the fact that each fire barrier, including their associated penetrations are in compliance with specification 13-AN-340 or a compensatory measures have been implemented.

The corrective actions specified in CAR 90-007 will address the design basis issues that have been found against penetration seals. Throughout the process, any operability concerns, reportable requirements or compensatory measures will be handled per the appropriate procedures.

Fireproofing

The cementitious fireproofing applied to building steel was installed under 'S' class specification 13-AM-126 primarily to protect the structural integrity of the slabs. The analyses on pages 392-402 of calculation 13-CC-ZA-045 indicate that only select Auxiliary building slabs need this protection. These slabs being the ones on all elevations of

the wraparound areas and the elevation 100 slab between column lines A2-A6 and AA-AL. The Control building slabs rely on the composite strength of the steel beams and concrete slab. These two buildings contain the only slabs supporting systems necessary for safe shutdown which require the protection of the applied fireproofing. All the other fireproofing on building beams is an extra safety measure.

The fireproofing on building columns is applied to protect the structural integrity of the overall building which subsequently protects the structural integrity of the fire barriers.

The fireproofing applied to cable tray and HVAC duct supports was also in accordance with specification 13-AM-126. It protects the structural integrity of the barrier penetrant so that it doesn't collapse and damage the penetration seal.

The removal and repair of fireproofing is controlled by procedure 14AC-9FP02, "Fire Barrier Seal and Structural Steel Fireproofing Removal and Reinstallation". Per 14AC-9FP02 section 3.4 on Fire Barrier Seal Removal Request (FBSRR) closeout, "Upon completion of the reinstallation and QC sign-off the work group shall notify Fire Protection that the work is complete". A FBSRR is required any time building fireproofing is removed and a QC hold point is established.

Fireproofing applied using specification 13-AM-126 was in accordance with the requirements of the UL design listed in the Fire Resistive Directory. Present specification 13-AN-341 governing the installation and repair of spray-on fireproofing has similar technical requirements and is 'QAG' class which requires the appropriate quality assurance measures.

Based on this fact and the above discussion, the fireproofing materials and the installation of these materials for the PVNGS fire barriers provides adequate fire protection.

Installation of Thermolag is governed by specification 13-MN-169, which is quality class QAG. Installation and rework is controlled by Procedure 31MT-9ZZ13 and drawings 01,02,03-E-ZAC-081 through 087 (Auxiliary Building); 01,02,03-E-ZCC-076 through 079 (Main Steam Support Structure) and 01,02,03-E-ZJC-068 (Control Building). The procedure references Operations QA Manual, Quality Control Inspections, 63AC-0QQ01, and Specification 13-MN-168, Electrical Raceway Fireproofing.

Appendix R Thermolag is inspected under Fire Protection procedure 14FT-XFP30, 14 FT-2FP30 and 14FT-9FP17 Inspection of Fire Area Boundary Walls/Floors/Dampers and Thermolag. The inspection is conducted every 18 months.

Based on the above discussion, the Thermolag material adequately meets its fire protection requirements required by the fire hazards analysis.

Radiant Energy Shields

There is only one local area in each unit Containment where fire radiant energy shields are installed. They protect the pressurizer auxiliary spray valves. They were originally installed quality class 'S' under specification 13-MM-163 and further analyzed under EER 90-FP-018. This EER was dispositioned as a design equivalent change to provide the necessary details and instructions to re-install the unit 1 shield. Incident Investigation Report (IIR) 3-1-89-112 was written to assure corrective action for future work. The installation of shields beneath solenoid valves 1,2,3J-CH-HV-205 has been verified in units 1 and 2. New QAG drawing 13-A-ZYD-962 has been processed to document the as-built installations in units 1 and 2. Unit 3 will be documented once the as-built configuration is obtained at the next refueling outage.

Based on the above discussion, the radiant energy shields meet the fire rating required by the detailed fire hazards analysis.

Dampers

NRC requirements and guidelines for fire damper configurations are contained in various documents, including Appendix A to the Branch Technical Position (BTP) APCSB 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976." Section D.1(j) of Appendix A to BTP-APCSB 9.5-1 states in part "...Penetrations for ventilation system should be protected by a standard fire damper where required..." In response to section D.1(j) of BTP APCSB 9.5-1, PVNGS UFSAR Table 9B.3-1 states in part "...For all rated barriers, the penetrations and doors, including ventilation systems, at a minimum, will carry a rating appropriate to that of the barrier itself..."

NRC Information Notice IN 89-52 further clarifies the purpose and functional requirements of the ventilation fire dampers. IN 89-52 states in part "...The objective of these guidelines is to provide a fire damper that will close and latch as required to ensure that those systems and components important to safe shutdown will be capable of performing their intended functions..." IN 89-52 also warns licensees of the possible failure of fire damper to close under HVAC air flow.

The fire dampers were installed as quality classification Q, R or S class in accordance with specification 13-MM-598 at PVNGS. The fire dampers in HVAC systems required for safe shutdown were installed in accordance with quality classification Q. The fire dampers in other HVAC systems serving various safety related areas are installed in accordance with quality classification R. Fire dampers in buildings that do not contain safety related equipment are installed as quality classification S. All dampers were installed by Waldinger Corporation in accordance with their approved quality assurance program for Q, R and S quality classification as applicable. Currently fire dampers that are part of the fire barriers shown in Appendix 9B of PVNGS UFSAR are designated as QAG as shown in PVNGS Component Classification Evaluations.

Fire Dampers regardless of the classification received a fire damper functionality test in accordance with 91GT-0ZZ20, "Fire Damper Initial Operation". This test assured that the installed fire dampers operated smoothly without binding and that gaps between the damper blade and housing were in accordance with the manufacturers requirements.

A 10% random sample of the fire dampers that are part of the fire area barriers or part of walls separating redundant safe shutdown trains from each other are further tested in accordance with PVNGS Administrative procedure 14FT-9FP31 at every refueling outage. If any damper from the initial 10% selection fails, the procedure requires that inspection of the 10% be completed and then followed by an additional 10% random sample inspection. The 10% sample inspection process is continued until a 10% sample selection of dampers passes the acceptance criteria. A fire damper not closing on the first 'drop' test per 14FT-9FP31 is considered inoperable and compensatory measures (i.e. fire watch), at a minimum are put in place.

Fire area barrier fire dampers and dampers in fire walls separating the redundant safe shutdown train (Appendix R) are visually inspected once every 18 months per 14FT-XFP30 for evidence of obstruction and/or to ensure that the damper is in the open position.

In response to IN 89-52, APS performed a study to review the ability of dampers in fire area barriers to close under air flow conditions. Some dampers failed the acceptance criteria of the test. Material Non-Conformance Reports (MNCRs) have been issued for these dampers and compensatory actions have been put in place. Compensatory measures have been initiated to isolate the HVAC system in case of fire. To accomplish this action, ICR 5260 to procedure 4XAO-XZZ04, "Shutdown Outside the Control Room due to Fire and/or Smoke" has been issued so the operators will cut the air flow through the affected dampers allowing them to close. A similar action is already addressed for affected areas outside control room in the PVNGS Fire Strategies which is referred to in procedure 14AC-OFP02, "Emergency Notification & Response".

Testing that was performed by Ruskin Manufacturing Company to ensure fire damper closure did not encompass all the various sizes and flows that exist at PVNGS. Using an analytical approach, APS has determined the maximum air flows that various fire dampers could close under. These calculated air flows were then compared with the 'Worst Case' air flows that were calculated for the various HVAC systems to determine which dampers may not close under air flow. The result of this analytical approach identified some dampers which may not close under air flow. These dampers have not been declared inoperable due to the large amount of conservatism in the analytical approach. Further investigation (i.e. testing under actual air flow) where practical will be performed on these dampers and compensatory measures will be applied as dictated by the test results.

Presently, prior technical specifications required fire barriers are inspected for the verification of their integrity to maintain their rating.

Per the corrective action of CAR 87-095, 100% of the Appendix R fire barriers will be inspected.

VI CORRECTIVE ACTION PLAN

Once again for simplicity, each of the individual barrier components is evaluated separately as a topical issue in the following paragraphs.

Structural Materials

There are no programmatic fire barrier structural material deficiencies requiring a corrective action plan.

Doors

There are no programmatic fire door deficiencies requiring a corrective action plan. The ongoing fire door repair program corrects individual fire door deficiencies by bringing the doors into compliance with specification 13-AN-006.

Penetration Seals

CAR 90-007 corrective action plan addresses all deficiencies in the penetration sealing program at PVNGS.

Seismic Gap Seals

There are no programmatic seismic gap seal deficiencies requiring a corrective action plan.

Fireproofing

There are no programmatic fireproofing deficiencies requiring a corrective action plan.

Radiant Energy Shields

There are no programmatic radiant energy shield deficiencies requiring a corrective action plan.

Dampers

Testing will be performed as operating conditions permit on dampers that analysis indicates require further investigation due to the recent study of dampers in fire area barriers or walls separating redundant safe shutdown trains. If the testing of these dampers concludes that a damper is not functioning properly under 'worst case' air flow, compensatory measures will be established. The dampers will either be replaced or fire damper closure under air flow ensured by other means.

In order to complete the response to IN 89-52, APS will continue to review the effect of air flow on the remainder of the dampers that are installed in order to comply with the requirements of BTP APCSB 9.5-1, Appendix A.