INTRODUCTION

FSAR Table 9B.3-1, "Comparison of Palo Verde Nuclear Generation Station to Appendix A of NRC Branch Technical Position," APCSB 9.5.1, Part C, "Quality Assurance Program," provides the NRC requirements for a Quality Assurance program for Fire Protection along with the ANPP position and basis for compliance to the NRC requirement. The attached evaluation will describe how ANPP has complied with the commitments established in the above-mentioned table. The format used for this evaluation is as follows for each required element of the program as listed in Table 9B.3-1:

I. Requirement stated in the NRC Branch Technical Position

II. ANPP Position

III. ANPP Compliance

While retaining responsibility for the overall Fire Protection Quality Assurance Program, the ANPP has delegated some authority for implementation to Bechtel and its subcontractors.

Bechtel, as the Architect/Engineer/Constructor, is responsible to ANPP for the design, procurement, and construction of the Fire Protection System for the PVNGS Units 1, 2, and 3. Bechtel performed the Fire Hazards Analysis, established the Design Criteria, and constructed the Fire Protection System, subcontracting portions thereof to qualified contractors.

Viking Fire Protection Company is responsible to Bechtel for designing, furnishing, installing, flushing, and testing of the complete deluge, water spray, and sprinkler systems for fire protection.

Ora B. Hopper & Son, Inc. is responsible to Bechtel for furnishing and applying structural spray-on fireproofing.

ISI/ICMS or BISCO is responsible to Bechtel for furnishing and installing fire barrier penetration seal systems.

Insulation Services, Inc. is responsible to Bechtel for furnishing and installing fireproofing systems for electrical raceways.

1. DESIGN CONTROL AND PROCUREMENT DOCUMENT CONTROL

I. Requirement stated in the NRC Branch Technical Position

"Measures should be established to assure that all design-related guidelines of the Branch Technical Position are included in design and procurement documents and that deviations therefrom are controlled."

II. ANPP Position

"PVNGS complies. The measures to be established are delineated in Items (2) through (10) below."

III. ANPP Compliance

A. Design Control

PVNGS FSAR Appendix 9B - Fire Protection Evaluation Report

The PVNGS FSAR Appendix 9B presents an evaluation of the Fire Protection Systems at PVNGS. The evaluation has been performed by comparing the PVNGS Fire Protection features to the guidelines contained in Appendix A of the Branch Technical Position APCSB 9.5-1 and to 10CFR50 Appendix R, Part III, Sections G, J, and O. The Plant Design has been reviewed and design provisions have been included for the preservation of at least one success path which can accomplish the safe shutdown functions. In the event of control room evacuation, alternate shutdown capability is also provided. The Fire Protection System has been examined from the following three viewpoints:

1. To provide a fire hazard's analysis.

2. To identify the compliance with Appendix A of BTP APCSB 9.5-1.

3. To identify compliance with 10CFR50, Appendix R, Part III, Sections G, J, and O.

The result of the evaluation program determined that PVNGS can reach and maintain cold shutdown conditions following a postulated fire, even though several deviations from 10CFR50,

Appendix R, NFPA Standards and Branch Technical Position APCSB 9.5-1 have been identified in the PVNGS FSAR Appendix 9B, Amendment 13 and letter ANPP-31378-EEVB/WFQ, dated December 7, 1984.

The Project General Design Criteria Manual governs the design of PVNGS Systems, Structures and Components.

During the Design Phase of the PVNGS Fire Protection System, fire prevention and separation were both used to ensure against the loss of a safety function due to a fire. Fire Prevention covers the design of automatic fire fighting equipment in accordance with recognized industry standards, and the design/selection of flame retardant materials so that the probability of a fire is very low. Separation criteria uses fire isolation techniques to prevent endangering redundant safe shutdown equipment. The two subjects, while related, are separate and distinct.

In plant areas where fire is postulated to occur, the following separation requirements have been applied:

Plant Arrangement

Redundant safe shutdown equipment must not share an area in which there is a common source of flammable material like fuel oil or lube oil. Walls affecting a separation between such areas meet the requirements of ANSI N18.10, National Fire Code, ANI (NELPIA), and/or the Uniform Building Code.

Where a flow path capable of communicating combustible gases or liquids from one safety area to another exists, instrumentation capable of detecting the transfer of the hazard (e.g., smoke, gas, or liquid detectors) is employed. The automatic trip of any flow moving equipment (e.g., fans, pumps) is accepted as sufficient isolation of any communicating pathway, if it can be shown that natural forces (gravity, dispersion, draft) will not continue flow from offending source.

Barriers

Separation by barriers is considered as an extension of separation by the use of different fire areas. As such, all requirements expressed above apply equally well to the use of barriers. The Plant area barriers meet the design requirements (unless specific deviations have been addressed in FSAR Amendment 13, Section 9B, Fire Protection).

Openings for cables in raceways, trays, and distribution frames shall be closed using fire barriers that meet the design requirements. Voids created where fire barriers join floors, walls, or ceilings, as well as piping that penetrates floors, walls, or ceillings are sealed to prevent communication of flammable liquids and gases. Materials used do not have a rating greater than 25 with respect to flame spread, fuel contribution, or smoke development as determined by ASTM-E84, Method of Test of Surface Burning Characteristics of Building Materials.

Where it can be shown that a partial barrier can insulate equipment from the heat of a fire hazard, it is not required that the barrier be able to completely contain smoke or nonflammable noxious fumes.

Spatial Separation

The primary emphasis for fire hazards isolation is placed on the more definable methods of plant arrangement and barriers. Demonstrating adequate separation between redundant safe shutdown trains to satisfy Regulatory Guide 1.75 is not sufficient to satisfy the design requirements of 10CFR50, Appendix R.

However, where detailed evaluation to show compliance with Regulatory Guide 1.75 (which also considers separation between 1E and non-1E components and cables) is required, an arbitrarily selected separation distance unsupported by Regulatory Guide 1.75, or analysis or testing is not acceptable. Spatial separation analysis shows that PVNGS complies with 10CFR50, Appendix R, Section IIIG, unless specific deviatons have been approved by a Safety Evaluation Report.

Bechtel Power Corporation (BPC)

Design bases for power plant projects undertaken by the Bechtel Engineering Department is provided in Design Criteria Documents. These Design Criteria Documents include applicable standards, codes, regulations and/or other information including ANPP requirements.

Design Criteria Documents prepared by a discipline group were reviewed by the following personnel in accordance with EDP-4.1, "Design Criteria":

— Group Supervisors
— Chief Engineer of the Discipline
— Chief Nuclear Engineer
— Project Engineer

Included in the Fire Protection System Design Reviews were the ANPP Fire Protection Engineer, the insurance broker, ANI (American Nuclear Insurer), ANPP Nuclear Engineering in addition to those involed in the normal Bechtel review cycle.

In addition, the Project Quality Engineer monitored the Design Criteria reviews.

The external design interfaces between the project engineering team and non-Bechtel organizations such as ANPP and consultants were established in accordance with EDP-4.25, "Design Interface Control."

Viking Fire Protection Company (Specification No. 13-MM-650)

Viking designed the complete PVNGS deluge, water spray and sprinkler systems for fire protection. All the design documentation (calculations, Specs., drawings, etc.) were submitted to Bechtel for review and concurrence in accordance with their specification. These design documents received similar reviews and concurrences to Bechtel's design documents.

B. Procurement Document Control

Bechtel Power Corporation (BPC)

PVNGS specifications were prepared, reviewed, approved, and controlled in accordance with EDP-4.49, "Project Specification." During the specification preparation, the following were considered:

- Project design criteria, system or structure functional requirements, and SAR (where applicable).
- Applicable codes, standards, and regulatory requirements.
- Appropriate quality standards and acceptance criteria.
- The need for design analyses such as physics, stress, materials, thermal, hydraulic, radiation or accident as a basis for the specification requirements.
- Design or operational test requirements necessary to ensure that the item will perform satisfactorily in service.
- Requirements for packaging, handling, shipping, storage, cleaning and protective coatings.
- Engineering required hold points, including drawing approvals.
- Required documentation in accordance with the EDP on specifying Engineering and Quality Verification Documentation, including Form G-321-E & V or D which shall be appendices to the appropriate specification.
- Quality Program Requirements.
- Data sheets which are utilized to convey any technical specification requirements from Bechtel to the supplier and data sheets that are to be completed by the supplier for the purpose of reporting engineering information from the Supplier to Bechtel.

The Engineering specifications were checked by a qualified engineer other than the originator of the Specification. Additionally, the Discipline Group Supervisor, Chief Engineer, and the Project Engineer reviewed and approved the Specification, and revisions thereto.

ANPP

After preparation and approval of Engineering Specifications by Bechtel, a Purchase Order is prepared and submitted to ANPP for review, evaluation, and acceptance.

The ANPP Responsible Engineer reviews the Purchase Order to assure that it incorporates the resolution of the Bid Evaluation comments and routes it for concurrence to: 1) the Supervising Engineer, 2) the Nuclear Quality Assurance Manager, or his designee, 3) if applicable, to the Nuclear Construction Manager and Legal Counsel, and 4) the Nuclear Engineering Manager, in accordance with NS-4, "Procurement Document Control."

Upon receipt of signatures indicating acceptance, the Purchase Order is routed to the Vice President, Nuclear Production, for signature on the Purchase Order Acceptance Form.

Viking Fire Protection Company (Purchase Order Number 10407-13-MM-650)

The following major design requirements were incorporated:

a. Codes and Standards

   1. NFPA 13, 15, 72D, etc.

   2. NEMA, UL, OSHA in general

   3. ANSI B16.1, 16.5, etc.

   4. ASTM A53, A120, etc.

   5. IEEE - 383

b. System Cleanliness per ANSI 45.2.1

c. Testing per NFPA 13, 15, 72D, etc.

ORA B. Hopper & Son, Inc. (Purchase Order Number 10407-13-AM-126)

The following standards and codes were incorporated:

1. Underwriters Labortories, Inc. (UL)
2. Fire Restistive Directory

ISI/ICMS (Purchase Order Number 10407-13-AM-208)

The following major codes and standards were incorporated:

1. ASTM E84, E119, D149, D257
2. Regulatory Guide 1.36
3. IEEE 634 (subject to the exception of NRC Task RS809-5)

Insulation Services, Inc. (Purchase Order 10407-13-MM-301)

The following major codes & standards were incorporated

1. Regulatory Guides 1.36 and 1.38
2. ASTM A36, A478, B209, C167, C335, etc.
3. AWWA/WPCF

2. INSTRUCTION, PROCEDURES AND DRAWINGS

I. Requirement Stated in the NRC Branch Technical Position

"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."

II. ANPP Position

"PVNGS complies."

III. ANPP Compliance

A. Instructions and Administrative Controls

Instructions (procedures and/or drawings) were utilized by Bechtel, ANPP, and the Subcontractors in the design, installation, testing, training and inspections of the PVNGS Fire Protection System.

Bechtel Power Corporation (BPC)

Refer to Attachment A for a sample of procedures used.

Viking Fire Protection Company

Instructions, procedures, quality and acceptance criteria are a part of the system installation drawings as prepared by Viking's Design Department.

ORA B. Hopper & Son, Inc.

Manufacturer's published procedures and recommendations for storage, handling, surface preparation, application, touch-up and repair, curing and inspection were required for use in their specification.

ISI/ICMS

The various procedures/instructions utilized by this subcontractor are contained in the following three manuals:

- Production Work Instruction Manual
- Quality Assurance Procedure Manual
- Quality Control Procedure Manual

Insulation Services, Inc.

The various procedures/instructions utilized by this Subcontractor are contained in the Quality Assurance Manual and the Quality Control Procedure and Production Work Instructions for Installing Thermal Lag 330-1 Subliming Compound Manual.

B. Test

Refer to the "Test and Test Control" section of this report for compliance.

C. Fire Drills & Training

During the construction phase of PVNGS, Bechtel implemented the "Fire Protection and Prevention Manual." It has as its basic minimum the requirements of OSHA as detailed in Federal Register, Volume 37, No. 243, dated December 17, 1972.

The Site Construction Manager/Project Superintendent instituted a Fire Brigade with a qualified Fire Brigade Chief. The Fire Brigade Chief plans, supervises, and conducts regularly scheduled training meetings and practice drills as necessary to insure complete understanding of Fire Fighting Plans and of the equipment provided.

For the operations phase, Administrative procedures, Fire Protection Controls and the fire brigade are discussed in Section B of FSAR Table 9B.3-1.

The PVNGS fire protection program is governed by the documents listed below.

Fire Protection Documents

1. Fire Protection Policy - 2P426.00.00
2. Fire Protection Program No. 14PR-0ZZ01
3. Technical Specifications
4. Fire Protection Equipment Testing and Maintenance Procedures No. 14MT-9FP01
5. Control of Combustible Materials No. 14AC-0ZZ04
6. Fire Protection Systems Surveillance Test Procedures No. 14ST-1ZZ02 thru 14ST-9ZZ26
7. Fire Team Training No. 83TR-0ZZ07
8. Fire Watch Duties No. 14AC-0ZZ05
9. Fire System Impairment No. 14AC-0ZZ01
10. Pre-Fire Strategies Book
11. Hot Work Authorization No. 14AC-0ZZ03
12. Plant Change Package and Design Change Package Review for Fire Protection No. 14AC-0ZZ06

3. CONTROL OF PURCHASED MATERIAL, EQUIPMENT AND SERVICES

I. Requirement Stated in the NRC Branch Technical Position

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

II. ANPP Position

PVNGS complies by requiring each supplier/subcontractor to furnish the following documents for their respective fire protection equipment or services:

- Code Compliance documents which are prepared by the manufacturer or installer and certified by the Authorized Code Inspector.
- Performance Test Verification Reports (where applicable).
- Pressure Test Verification Reports (hydro, air, leak, or vacuum as applicable).
- Certificates of Compliance for Shipment.
- Material Certificates of Compliance (where required by code).

III. ANPP Compliance

Subcontractors and Suppliers submit the documentation required by their specifications as noted below:

Viking Fire Protection Company (13-MM-601)

Performance Test Report of System
Pressure Test Hydro
Installation Inspection and Verification Report

Ora B. Hopper (13-AM-126)

Prototype Test Reports
Material Specifications and Data
Manufacturer's Material and Application Certificates

ISI/ICMS & BISCO (13-MM-301 & 13-AM-208)

Fire Endurance Test Reports
Installation Certificate of Compliance

Honeywell, Inc. (13-MM-651)

Code Compliance
Inspection and Verification Report

CHEMETRON, Inc. (13-MM-652)

Performance Tests and Verification Report
Air Bubble Test Report
Code Data Sheets

Over and above the aforementioned commitments, PVNGS has utilized audits, monitoring, inspections and testing as methods to provide additional assurance that purchased materials and equipment perform their intended functions.

Verification of implementation of the measures established in the procurement documents is documented by the following:

- Audits/Surveillance (refer to "Audit" section of this report)
- Inspection/Walkdowns (refer to "Inspection" section of this report)
- Test (refer to "Test and Test Control" section of this report)
- Review cycle for Procurement Document (refer to "Design and Procurement Control" section of this report)

4. INSPECTION

I. Requirement Stated in NRC Branch Technical Position

"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."

II. ANPP Position

PVNGS complies by utilizing the American Nuclear Insurers (ANI) as the independent inspection organization, ANI is included in the review cycle for all installation drawings and witness of system acceptance tests.

III. ANPP Compliance

In addition to the ANI review of installation drawings and witness of system acceptance tests, the ANI representative has conducted inspections to verify the systems have been designed/installed in accordance with the applicable codes and standards. ANI acceptance of Fire Protection Systems is documented by official correspondence.

Over and above the aforementioned commitment, PVNGS has utilized additional inspection activities to provide an additional level of confidence that installation requirements have been met.

Bechtel Power Corporaton

Prior to subsystem transfer from Bechtel to Startup and to Operations, a walkdown of the subsystem is performed in accordance with WPP/QCI 31.0, Subsystem Transfer Acceptance. This procedure also applies to the transfer/acceptance of components within a subsystem.

IP-5.26, "Configuration Verification Walkdowns," provides specific walkdown verifications of existing plant conditions in support of the project configuration control program. Attachment 5.26-04, "Fire

Protection Design Documentation Walkdown Program," provides the guidelines for performing a walkdown of the station fire protection features to verify that the systems have been installed in accordance with the design requirements. Walkdowns were required of all buildings and outside areas as listed below:

Control Building
Diesel Generator Building
Fuel Building
Auxiliary Building
Radwaste Building
Main Stam Support Structure
Fire Water Pump House
Main Transformer
ESF Transformer
Auxiliary Transformer
Normal Service Transformer
Startup Transformer
Lube Oil Storage Tanks
Turbine Building
Auxiliary Boilers
Guard House

WPP/QCI 205.0, Fire Protection Sprinkler Piping Installation, establishes requirements for the inspection of Quality Class "R" Fire Protection Sprinkler Piping and associated pipe supports installed in accordance with engineering drawings which implement the requirements of Specification 13-MM-650 and applicable codes and standards.

Special Construction Inspection Plan (CIP) 544.0, Fire Protection Sprinkler Piping, was used by Field Engineering for the inspection of a representative sample (10%) of Unit 1 Quality Class "R" Fire Protection Sprinkler Piping and associated pipe supports installed in accordance with 13-MM-650.

On November 19, 1984, Bechtel Engineering initiated a sampling program to perform an independent assessment of the MONOKOTE Fire Retardant application thickness adequacy. The unit of sampling inspection was defined as an individual beam or column. A total of 19 inspection units were sampled within Unit 3, and 9 inspection units within Unit 1.

Selection of inspection units was performed by partitioning the sampled areas into cells representing all elevations and plan locations. Of the approximately 280 individual thickness measurements made during sampling, zero were more than 1/8 inch below the required average thickness. Thus, no "low point" exceeding the UL Fire Resistance Directory minimum acceptance thicknesses were discovered.

ANPP

73AC-0ZZ04, Subsystem/System Acceptance by PVNGS Nuclear Operations, delineated the methods and responsibilities for the process of jurisdictional "Acceptance" of a system/subsystem from Startup or Construction Groups by PVNGS Nuclear Operations. This procedure applies for Units 1, 2, 3, and common.

The System Completion Group (SCG) conducted an acceptance walkdown of the Fire Protection Systems.

5. TEST AND TEST CONTROL

I. Requirement Stated in the NRC Branch Technical Position

"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 on."

II. ANPP Position

PVNGS complies.

III. ANPP Compliance

PVNGS FSAR Chapter 14, "Initial Test Program," defines the requirements beginning with the transfer of the system from construction through Power Ascension Testing of PVNGS Units 1, 2, and 3. The testing phase has been broken into the following phases:

- Prerequisite Testing consists of tests and inspections required to assure construction is complete and that systems are ready for Phase I Testing.

- Phase I Testing (Preoperational Testing) demonstrates that structures, systems and components operate in accordance with design operating modes, throughout the full design operating range.

The ANPP Startup Organization, is responsible for implementing the requirements of the Test Program described above. Administrative Control procedures are utilized to control and implement the requirements of Prerequisite and Preoperational Testing (Phase I Testing). Attachment "B" provides a sample of Administrative/Implementing Test Procedures used by the Startup organization to verify proper design and installation of the Fire Protection System. The personnel performing these tests are independent of the construction/installation organization.

As part of the normal procedure review cycle of the Phase I Test procedures, ANPP Quality Assurance Department provides an independent review of these procedures and changes thereto to verify that regulatory and quality requirements have been properly addressed. Additionally, the Fire Protection test procedures and results have been found acceptable for insurance purposes by ANI.

Test results are reviewed and evaluated by qualified individuals and/or groups in accordance with 90AC-0ZZ18, "Test Results Review."

Implementation of the testing program was verified by the conduct of Audits and Surveillances. Refer to the "Audit" section of the report.

For the Operational Phase Testing Activities (Phase II to IV), the Technical Specification requirements are implemented by 73AC-9ZZ04, "Surveillance Testing."

Bechtel Power Corporation

WPP/QCI 203.0, Piping System Pressure Testing, establishes a procedure for the performance and documentation of piping systems pressure testing. These tests are witnessed by teh AFE/PTE.

WPP/QCI 202.4, Holiday Testing, establishes a proceduree for the performance and documentation of Holiday Testing of underground piping. These tests are witnessed by the AFE.

Viking Fire Protection Company

The following tests were conducted in accordance with NFPA 15 and are usually witnessed by ANI, ANPP Nuclear Construction and Bechtel:

- Hydrostatic Testing
- Sprinkler Flow Testing
- Sprinkler Perfromance Testing

6. INSPECTION, TEST AND OPERATING STATUS

I. Requirement Stated in the NRC Branch Technical Position

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

II. ANPP Position

PVNGS complies

III. ANPP Compliance

Inspection, Test, and Operating Status is verified prior to transfer of systems from Construction to Startup and prior to acceptance of a system by Nuclear Operations.

Transfer of components or subsystems and supporting documentation from Construction to PVNGS Startup is performed in accordance with 90GA-0ZZ04, "Startup System Turnover."

Open items that potentially impact the completion of the Project are tracked on the Master Tracking System (MTS) in accordance with 90GA-0ZZ05, Startup Master Tracking System beginning at Construction Transfer and continuing through Acceptance by PVNGS Nuclear Operations.

Acceptance of a system/subsystem from Startup to PVNGS Nuclear Operations is performed in accordance with 73AC-0ZZ04, "Subsystem/System Acceptance by PVNGS Nuclear Operations."

Open items that potentially impact the completion of the Project are tracked on the Operation Master Tracking System in accordance with 73AC-0ZZ31, Operations Master Tracking System beginning at Subsystem Acceptance by PVNGS Nuclear Operations.

ANPP Corporate Quality Assurance reviews a sampling of documentation records on Quality Class "Q" and "R" systems, and the subsystem/areas that are considered "Important to Safety" as defined in 73AC-0ZZ01. These reviews verify compliance with the following, as a minimum:

- Document is identifiable to the Item/Test for which it applies.
- Installation records are consistent with the installation.
- Document entries are completed in accordance with applicable procedural requirements.
- Document has required stamps, signatures, initial, dates, etc., per applicable procedural requirements.
- Installation, Test and/or Inspection Records indicate acceptability.
- Deficiencies and exceptions are properly identified and documented.

The above activity is performed in accordance with QADP 6.6, Subsystem/Area Document Review.

After the operations acceptance package reviews are performed and determined to be acceptable, the package is routed to the PVNGS Plant Manager for final acceptance.

Startup Testing (Prerequisite and Preoperational) is monitored by the Discipline Test Schedule (DTS) in accordance with 90GA-0ZZ22, Startup Discipline Test Schedule.

7. NONCONFORMING ITEMS

I. Requirement stated in the NRC Branch Technical Position

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

II. ANPP Position

PVNGS complies.

III. ANPP Compliance

Bechtel Power Corporation (BPC)

During the construction phase, the identification, documentation, segregation, review, disposition and notification to affected organizations of materials, parts, components or services which are found to nonconforming to specific requirements for all quality classes are documented in accordance with WPP/QCI 5.0, "Nonconforming Material, Parts and Components."

EDP-4.61, Nonconformance Reports, defines a method for review, evaluation, disposition and control of NCRs received by Project Engineering.

Field Change Requests received by Product Engineering are reviewed, evaluated, dispositioned and controlled via EDP-4.62, Field Change Request.

Supplier/Subcontractor deviations from procurement documents are documented on a Supplier Deviation Disposition Request (SDDR) in accordance with their respective specifications. Bechtel reviews and dispositions the SDDR in accordance with EDP 4.63, "Supplier Deviation Disposition Request."

ANPP

During the PVNGS Startup phase, the identification, documentation, segregation, review, disposition and notification to affected organizations of materials, parts, components, or services which are found to be nonconforming to specified requirements are documented, reviewed and dispositioned in acccordance with 90GA-0ZZ19, "Startup Field Report."

8. CORRECTIVE ACTION

I. Requirement Stated in the NRC Branch Technical Position

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

II. ANPP Position

PVNGS complies.

III. ANPP Compliance

Bechtel Power Corporation (BPC)

Control of design deficiencies is achieved by the use of various documents which are used after discovery of the deficiency. Attachment "C" shows a matrix which summarizes the various documents used to identify and initiate correction of deficiencies, for which Engineering has responsibility for resolution of deficiency in design. It also references the document defining each method and the normal point of discovery. The matrix includes a summary of the self-closing documents as well as other methods used to identify design deficiencies (refer to EDP 4.65, "Design Deficiency Processing").

Design deficiencies indicated by the document types listed in the matrix shall be assessed for possible additional reporting under either of the following:

10CFR50.55(e) - Significant Deficiency Reporting

10CFR Part 21 - Substantial Safety Hazard Defects and Noncompliance Reporting

Corrective Action Request, Nonconformance Report, Field Change Request, Supplier Deviation Disposition Request, etc. are reviewed for reportability in accordance with the EDPs governing these items. If a reviewer of any of these believe that he/she has noted a Potentially Reportable Condition, a Deficiency Evaluation Report (DER) is initiated in accordance with EDP 4.66, "Substantial Safety

Hazard and Significant Deficiency Reporting (Deficiency Evaluation Report)" and reviewed by ANPP in accordance with NS-17, Processing Deficiency Evaluation Reports.

Corrective Action Requests (CAR) provide objective evidence for the identification and resolution of deficiencies in the implementation of the Quality Program. PQPM No. 16.0, Corrective Action governs the use of Bechtel CARs.

A "subsequent system jurisdictional transfer/release" form is generated in accordance with WPP/QCI 31.0, Subsystem Transfer Acceptance which states that "all construction to be performed by subcontractor is complete, including final inspection documentation verifying that subcontractors portion of the subsystem is in accordance with applicable specifications and drawings and is ready for functional testing, calibration and/or operations." This form also allows for exceptions to be attached on an IIL/PL.

ANPP

Quality Assurance Department Procedures 16.0 controlled the use of Corrective Action Requests for ANPP during the construction and startup phases.

Appropriate methods to identfy and correct deficiencies during the transfer of Fire Protection Systems/Subsystems from Construction to Startup and subsequent acceptance by Operations have been established. The details of these methods are discussed in "Inspection" and "Inspection, Test and Operating Status".

9. RECORD

I. Requirement Stated in the NRC Technical Branch Position

"Records should be prepared and maintained to furnish evidence that criteria enumerated above are being met for activities affecting the Fire Protection Program."

II. ANPP Position

PVNGS complies.

III. ANPP Compliance

Bechtel Power Corporation

Bechtel controls construction documentation through the following programmatic and implementation documents:

PQPM 17.0, "Quality Assurance Records"
PQPM 17.1, "Supplier Quality Assurance Records - House Office Procurement"
EDP 4.37, "Design Calculations"
EDP 5.32, "Nuclear Project Records Management (Design Office)
EDP 5.15, "Design Drawing Control"
EDP 5.16, "Supplier Document Control"
IP 5.32, "Project Records Retention (Design Office)"
IP 4.25, "Transmittal of Drawings & Data"
IP 4.33, "As-Built Records"

Bechtel retains these records on behalf of ANPP pending review and acceptance by ANPP based on contractual stipulations.

Subcontractors/Suppliers

Subcontractors/Suppliers submit both engineering documents and quality verification documents to Bechtel in accordance with the requirements of their purchase specification. Section 3 of this report identifies types of documents submitted.

ANPP

ANPP Drawing and Document Control (DDC) retains all transferred records from Bechtel DDCC and other ANPP generated records, eg., Start-up Test Results, for established retention periods in accordance with the Records Management Procedures Manual.

10. AUDITS

I. Requirement Stated in the NRC Branch Technical Position

"Audits should be conducted and documented to verify copliance with the fire protection program including design and procurement documents; instruction; procedures and drawings; and inspection and test activities."

II. ANPP Position

PVNGS complies

III. ANPP Compliance

Bechtel Power Corporation (BPC)

Bechtel Quality Assurance Department conducted and documented numerous fire protection subcontractor audits and surveillances in accordance with "the Project Quality Program Manual, sections 18.0, (audits), 18.3", (Subcontractor Audits - Jobsite) and 18.6. (Project QA Surveillance)". Attachments D and E to this section provide a list of these audits and surveillances.

ANPP

ANPP Quality Assurance Department conducted and documented numerous fire protection audits and surveillances in accordance with the Quality Assurance Manual, section 18.0, (audits). Attachments D and E to this section provide a list of these audits and surveillances.

In addition, the ANPP Quality Assurance Program establishes annual,biennial, and triennial audits of the PVNGS Fire Protection Program as required by Technical Specifications.

PVNGS audits have been conducted as required by the commitment to verify the implementation of the QA Program. In those cases, where Fire Protection Systems were not specifically the subject of an audit, the generic controls which are applied to a function have been audited. For example, the design and procurement programs used by

Bechtel are the same whether the systems are Quality Class "Q", "R", or "S". Therefore, these audits provide an adequate level of confidence that the controls are sufficient to assure proper implementation of programs.

CONCLUSION

As previously noted, a Quality Assurance Program was in place to meet the requirements of Appendix A of the NRC Branch Technical Position APCSB 9.5-1.

The following is a brief synopsis of the three major Branch Technical Position Criteria: Design Control and Procurement Document Control, Inspection, and Test and Test Control.

The Design activities were accomplished in accordance with approved procedures, instructions or drawings and were reviewed and approved by competent individuals. Included in the Fire Protection System Design reviews were the ANPP Fire Protection Engineer, The Insurance Broker, ANI, ANPP Nuclear Engineering and those involved in the normal Bechtel review cycle (Chief Engineer, Discipline Group Supervisor, etc.).

The result of the evaluation program defined in the PVNGS FSAR Appendix determined that PVNGS can reach and maintain cold shutdown conditions following a postulated fire, even though several deviations from 10CFR50, Appendix R, NFPA Standards and Branch Technical position APCSB 9.5-1 have been identified in the PVNGS FSAR Appendix 9B, Amendment 13 and letter ANPP-31378-EEVB/WFQ dated December 7, 1984.

In addition, as a result of the NRC Inspection dated July 9-13, 1984, a full-scale seismic computer analysis of "worst case" sprinkler piping conditions was performed by Viking. Also, an independent verification of the entire Category IX sprinkler piping installation was conducted by Bechtel to verify design adequacy (Reference B/ANPP-E-123389).

Similarly, ANPP Nuclear Engineering has reviewed the following material regarding Fire Protection System Category IX Design and concludes that the design meets the applicable Category IX requirements (Reference ANPP-21406 ACR/GJV and ANPP-21516 MFH/GJV):

-- Bechtel Seismic Category IX Evaluation Calculations, 13,MC-ZZ-004

-- Viking Hanger details and calculations, M650-200-4

-- Viking Seismic Analysis Verification, M-650-824-1

-- Bechtel Cable Tray Supports Calculation, 13-CC-ZS-005

-- NRC Item 50-528/84-25

In addition to the Design Documents receiving ANPP review, Procurement Documents also were reviewed by ANPP personnel which included Nuclear Engineering, Site Construction, Quality Assurance, Legal Counsel and the Vice President of Construction Projects.

Even though the personnel conducting the verification walkdowns for "R" and "S" installations did not necessarily meet the qualification requirements of ANSI N45.2.6, independent verification of the Fire Protection installations was achieved as follows:

-- ANI inspection of Fire Protection Installation

-- Bechtel Engineering Walkdowns prior to system acceptance in accordance with WPP/QCI 31.0

-- Bechtel Engineering configuration, verification walkdowns in accordance with IP-5.26.

-- Bechtel Engineering walkdowns for verification of Subcontractor rework in accordance with WPP/QCI 205.0

-- Bechtel 10% walkdowns of seven (7) Fire Protection subsystems/systems in accordance with Special CIP 544.0

-- ANPP Engineering subsystem/system acceptance walkdowns performed in accordance with 73AC-0ZZ04

-- Bechtel Engineering sample verification of structural steel fire retardant coating application.

Finally, as delineated above, not only were the tests required by the various specifications performed, but also, ANPP conducted extensive testing of the Fire Protection System in accordance with the requirements described in the FSAR, Chapter 14, PVNGS Technical Specifications and also the PVNGS Station Manual. These tests have assured compliance of the Fire Protection System to meet the Design Criteria and perform its intended function. Additionally, ANI has accepted the PVNGS Fire Protection System for insurance purposes.

ATTACHMENT A

a. Design

EDP - 4.1, "Design Criteria"
EDP - 4.25, "Design Interface Control"
EDP - 4.37, "Design Calculations"
EDP - 4.46, "Project Drawings"
IP - 4.1, "Design Criteria"
IP - 4.2, "Design Calculations"
IP - 4.10, "Product Engineering Drawings"

b. Procurement

EDP - 6.5, "Bid Evaluation"
EDP - 5.10, Supplier Quality Assurance Program Selection and Evaluation"
IP - 1.24.0, "Evaluation and Selection of Potential Suppliers"
IP - 1.24.5, "Preparation, Processing and Content of Purchase Orders"
IP - 1.24.8, "Purchase Order Revision"

c. Installation and Inspection

WPP/QCI 101.0, "Welding Control"
WPP/QCI 151.0, "Mechanical Equipment Installation"
WPP/QCI 202.0, "Piping System Installation"
WPP/QCI 203.0, "Piping Systems Pressure Testing"
WPP/QCI 258.0, "Electrical Equipment Installation"
WPP/QCI 302.0, "Instrumentation Installation"

ATTACHMENT B

FIRE PROTECTION - STARTUP PHASE TEST PROCEDURES

90AC-0ZZ02	Startup Test Conduct
90AC-0ZZ18	Test Results Review
91PE-1CL01	Local Leak Rate Test
91PE-1FP01	Fire Protection System
91PE-1FP02	Pre-Operational Test of the Halon 1301 Fire Suppression System
91PE-1FP03	Carbon Dioxide Flooding Test
91GT-0ZZ20	Fire Damper Initial Operation
92PE-1QK01	Fire Detection and Alarm System
92GU-0ZZ54	Cardox for Battery and Switchgear Rooms
92GS-0ZZ23	ACI Model A888-134 Control Unit
92GS-0ZZ25	ACI Model A888-M135 Control Unit with Aci Battery Backup Control Unit
92GU-0ZZ41	Smoke Detectors
92GU-0ZZ49	Ansul Model PID-9 Ionization Smoke Detector
92GU-0ZZ50	Protectowire Control Panel ACR1615 (5 systems) ACR16J8 (6 systems)

92GU-0ZZ51	Protectowire Control Panel ACRJ603
92GU-0ZZ53	Pyrotronics Fire Protection Control Panel System 3 Battery Pack
92GU-0ZZ55	Alison Model A888-M135A Control Panel with ACI Battery Backup
92GU-0ZZ56	ACI Panel A888-MJ36
92GU-0ZZ91	Alison Model A12000 and N12000 Combustion Defectors
92GU-0ZZ92	Pyrotronics Ionization Detector Model No. DI-2
92GU-0ZZ98	Honeywell W940A Panel Checkout
92GU-0ZZ36	ANSUL Autopulse Dual Zone Panel Model 1060-Halon 1301
MF-323.1	Flushing Hone Stations Turbine Building
MF-323.2	Flushing Radwaste, Control & Corp. Bldg. Fire Hose Statopms
MF-323.3	Velocity Flush for F.B. Fire Hose Stations
MF-323.4	Flushing Containment Fire Hose Stations
MF-323.5	Flushing Deluge/Preaction Valves

MF-323.6	Flushing Auxiliary Building Fire Hose Stations
MF-323.7	Fire Protection Systems CO_2 Flush

NOTE: These test procedures are available upon request.

ATTACHMENT C

DESIGN DEFICIENCY PROCESSING MATRIX

Document Type	Origin Authority	Reference Document	Point Of Discovery
Nonconformance Report (NCR)	Field	Field Inspection Manual Engineering Department Procedures	Field
Field Change Request (FCR)	Field	Engineering Department Procedures	Field
Supplier Deviation Disposition Request (SDDR)	Suppliers	Engineering Department Procedures	Supplier Shop
Audit Finding Report (AFR)	Quality Assurance	Nuclear Quality Assurance Manual/ Quality Assurance Program	Engineering Construction Supplier
Quality Engineering Reports	Project Quality Engineer	Project Procedures	Engineering
Shop Inspection Reports	Procurement	Procurement Inspection Department Manual	Supplier
Procurement Audit Reports	Procurement	Procurement Inspection Department Manual.	Supplier Shop

Document Type	Origin Authority	Reference Document	Point Of Discovery
Corrective Action Report (CAR)	Quality Assurance	Nuclear Quality Assurance Manual/ Quality Assurance Program	Engineering Construction Supplier
Startup Field Report (SFR)	Startup	Startup Field Report Index	Startup

ATTACHMENT D

AUDITS PERFORMED ON FIRE PROTECTION SYSTEM

AUDIT NO.	ORGANIZATION	PURPOSE
80-VFP-S-27	BPC	To verify the implementation of the Viking Quality Assurance Manual and Subcontract 13-MM-650.
81-VFP-S-10	BPC	To verify the implementation of the Viking Quality Assurance Manual and Subcontract 13-MM-650.
81-VFP-S-27	BPC	To verify the implementation of the Viking Quality Assurance Manual and Subcontract 13-MM-650.
82-VFP-S-9	BPC	To verify the implementation of the Viking Quality Assurance Manual and Subcontract 13-MM-650.
82-VFP-S-27	BPC	To verify the implementation of the Viking Quality Assurance Manual and Subcontract 13-MM-650.
83-VFP-S-11	BPC	To verify the implementation of the Viking Quality Assurance Manual and Subcontract 13-MM-650.
83-VFP-S-21	BPC	To verify the implementation of the Viking Quality Assurance Manual and Subcontract 13-MM-650.

AUDIT NO.	ORGANIZATION	PURPOSE
84-VFP-S-9	BPC	To verify the implementation of the Viking Quality Assurance Manual and Subcontract 13-MM-650.
84-VFP-S-19	BPC	To verify the implementation of the Viking Quality Control Manual and compliance with Subcontracts 13-MM-650. Included in this audit was an assessment of corrective ation taken to resolve previously identified deficiencies and verification of BCI Construction implementation of WPP 205.0 , "Fire Protection Sprinkler Piping Installation."
84-UA-S-20	BPC	Verify implementation of the Ora B. Hopper and Son Subcontract 13-AM-126.
84-ISI-S-15	BPC	To verify implementation of the Insulation Services Subcontract 13-MM-301
83-ICMS/ISI-S-14	BPC	To verify implementation of the ICMS/ISI Subcontract 13-AM-208.
83-ICMS/ISI-S-26	BPC	To verify implementation of the ICMS/ISI Subcontract 13-AM-208.
83-ISI-S-30-UA	BPC	To verify implementation of the ISI Subcontract 13-MM-301.

AUDIT NO.	ORGANIZATION	PURPOSE
82-ICMS/ISI-S-20	BPC	To verify implementation of the ICMS/ISI Subcontract 13-AM-208.
82-ICMS/ISI-S-32	BPC	To verify implementation of the ICMS/ISI Subcontract 13-AM-208:
C83-10	ANPP	To verify compliance by both Bechtel and Subcontractor to Project Specifications and applicable portions of NRC Technical Branch Position APCSB 9.5-1. Additionally, audit verify corrective action taken to resolve NRC Open Item.
083-14	ANPP	To verify the adequacy of the Fire Protection Program, Administrative Control and Implementing Procedure.
S-83-037	ANPP	To verify the Fire Protection Administrative Program during startup phase activities, is in compliance with Branch Technical Position ASB 9.5-1, Appendix A, the FSAR and the Operations Quality Assurance Criteria Manual.
Trend Analyses CAR CA-84-0111	ANPP	Problems identified with Subcontractor control.
ANI Triennial Fire Protection Audit	ANI	Verification of compliance with different Fire Protection Criteria.
84-024	ANPP	Annual audit to verify the adequacy of the Fire Protection Program.

ATTACHMENT E

FIRE PROTECTION SURVEILLANCE REPORTS

NO/DATE	ORGANIZATION	ITEM/OPERATION
6/4/80	BPC	Storage
6/8/80	BPC	Installation
7/7/80	BPC	Receiving Inspection
7/8/80	BPC	Installation
7/9/80	BPC	Drawing Control
7/29/80	BPC	Installation
8/6/80	BPC	Fabrication/Installation
8/6/80	BPC	Storage
10/27/80	BPC	Fabrication/Installation
11/25/80	BPC	Fabrication/Installation
12/17/80	BPC	Record
12/17/80	BPC	Installation
1/15/81	BPC	Storage
1/17/81	BPC	Installation
1/28/81	BPC	Operations/Test
1/28/81	BPC	Records
1/28/81	BPC	Hydrostatic Testing
3/9/81	BPC	Receiving Inspection

NO/DATE	ORGANIZATION	ITEM/OPERATION
4/2/81	BPC	Verification of QA Manual
4/21/81	BPC	Storage/Housekeeping
5/29/81	BPC	Storage/Housekeeping
6/21/82	BPC	Document Control
6/21/82	BPC	Acceptance Test
6/21/82	BPC	Control of M&TE
9/29/82	BPC	Drawing Submittals
9/29/82	BPC	Handling, Storage & Shipment
3/2/83	BPC	Control of M&TE
3/22/83	BPC	Procurement Document Control
8/5/83	BPC	Instruction, Procedures and Drawings
10/6/83	BPC	Handling, Storage & Shipping
10/21/83	BPC	Installation
11/2/83	BPC	Work Control
11/2/83	BPC	Handling, Storage & Shipping
1/19/84	BPC	Review of Drawings
5/4/84	BPC	Use of Field Drawings
6/5/84	BPC	Drawing Control
9/10/84	BPC	Calibration of M&TE

NO/DATE	ANPP CONDUCTED SURVEILLANCES	ITEM/OPERATION
7/30/84	BPC	Control of Purchase Materials Equipment and Services
7/30/84	BPC	Handling, Storage & Shipping
9/13/84	BPC	Housekeeping
32/9-27-76	ANPP	Excavation and Firewater Storage Tank
46/10-8-76	ANPP	Rain, Flood & Fire Protection
120/3-4-77	ANPP	Flushing
176/6-6/77	ANPP	Handling, Storage & Shipping
330/10-26-77	ANPP	Storage
535/3-2-79	ANPP	Placement
579/8-1-79	ANPP	Storage
696/5-21-80	ANPP	Testing
717/6-27-81	ANPP	Storage
787/1-27-81	ANPP	Testing
805/3-11-81	ANPP	Walkdowns
807/3-14-81	ANPP	Testing
835/7-29-81	ANPP	Storage
863/11-18-81	ANPP	Work Completion
864/11-19-81	ANPP	Work Completion

NO/DATE	ANPP CONDUCTED SURVEILLANCES	ITEM/OPERATION
1003/5-9-82	ANPP	Corrosion Problems
10028/8-26-82	ANPP	Control of Purchase Materials
1113/10-26-82	ANPP	Installation - Seismic IX Hangers
1114/10-31-82	ANPP	Work Completion
1179/10-15-82	ANPP	Seismic IX Hangers (Inspect)
1206/12-28-82	ANPP	Installation
1260/2-4 to 7/83	ANPP	Fire Protection Sprinkler Fab. Shop
1275/2-15-83	ANPP	FP Alarm System Installation
287/2-22-83	ANPP	Verification of Viking Activities
1315/2-14 to 28-83	ANPP	Investigation of Underground Piping.
1338/4-4-83	ANPP	Testing (Hydro)
1339/4-4-83	ANPP	Vendor Surveillance (Viking)
1411/4-22 to 25-83	ANPP	Alarm System Installation
1437/5-26-83	ANPP	FP Sprinkler Fabrication Shop
1481/6-21-83	ANPP	Testing (Hydro)
1499/6-30-83	ANPP	Alarm System Installation
R84-062/1-12-84	ANPP	Followup on Audit C83-10
R84-0466/2-13-84	ANPP	Investigation 83-25