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 STN-50-530 Palo Verde Nuclear Station, Unit 3, Arizona Publi 05000530

AUTH. NAME      AUTHOR AFFILIATION  
 CONWAY, W.F.      Arizona Public Service Co. (formerly Arizona Nuclear Power  
 RECIPIENT NAME      RECIPIENT AFFILIATION  
 MARTIN, J.B.      Region 5 (Post 820201)

SUBJECT: Forwards QA program description for fire protection that will be implemented as app to QA program. QA plan under internal review & will be submitted for review & approval during First Quarter 1991.

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WILLIAM F. CONWAY  
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December 31, 1990

161-03677-WFC-MEP-KLMC

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 to J. B. Martin, NRC, from W. F. Conway, APS, dated November 13, 1990. Subject: Updated Information Related to Evaluation of Fire Protection System Equipment Schedule for Completion of Selected Actions (161-03585).
- 2) Letter to J. B. Martin, NRC, from W. F. Conway, APS, dated November 15, 1990. Subject: Reply to Notice of Violation and Proposed Imposition of Civil Penalty - NRC Inspection Report Nos. 50-528/90-02, 90-25, 90-25 (161-03592).

Dear Mr. Martin:

Subject: Palo Verde Nuclear Generating Station (PVNGS)  
Units 1, 2, and 3  
Fire Protection Quality Assurance Program  
File: 90-019-026; 90-056-026

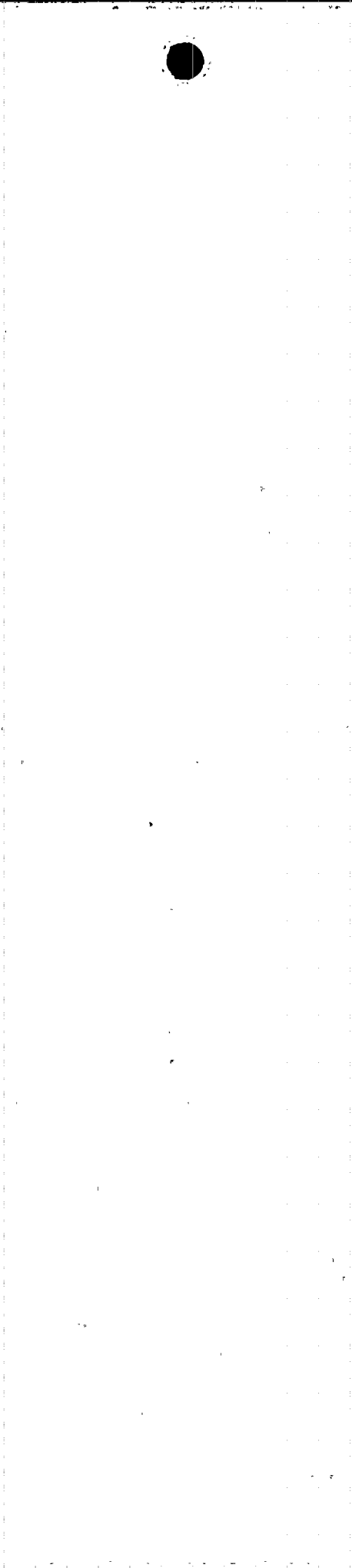
Reference 1 provided the status of the ongoing activities associated with the Fire Protection Systems evaluation. Included in Reference 1 was the commitment to submit the revised Quality Assurance Program for Fire Protection. Attachment 1 provides the description of the Quality Assurance Program for fire protection that will be implemented at Palo Verde as an appendix to the PVNGS Quality Assurance Program description (the QA Plan). The QA Plan is in internal review, and based on our current schedule will be submitted to the NRC for review and approval during the first quarter of 1991. Any changes made to the Quality Assurance Program for Fire Protection during the review process will be highlighted in the submittal of the QA Plan.

Also discussed in Reference 1 were the activities of the Fire Protection Review Team. A summary of their activities is as follows:

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Add: NRC/DLPR/LPEB*

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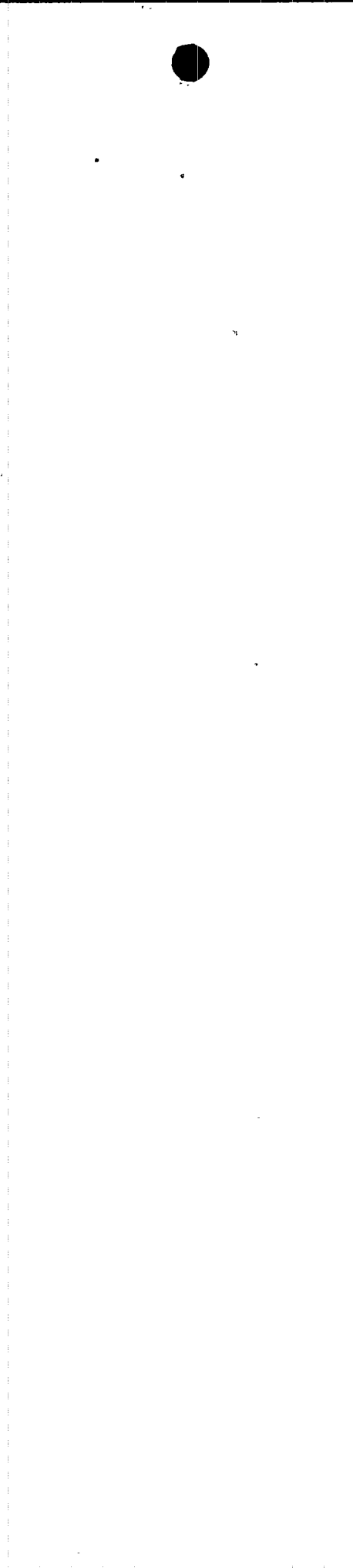
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- Evaluate and disposition open items which were identified in the following documents:
  - . Recent regulatory correspondence related to emergency lighting or fire protection,
  - . several internal documents identifying open questions or concerns related to emergency lighting or fire protection, and
  - . the ABB/Impell Corporation Emergency Lighting Study.
  
- Develop engineering studies which will:
  - . Determine the proper quality classification of Fire Protection Program related systems and equipment.
  - . Provide a plan for revising design output documentation, as needed, to achieve compliance with Quality Assurance (QA) criteria.
  - . Provide a plan for documenting the adequacy of existing systems and equipment to perform its design function.
  
- Prepare UFSAR revisions, as necessary, to assure the Fire Protection Program description is consistent with the QA classification of the system or equipment.
  
- Evaluate and revise the Fire Protection Program procedure to clarify the organization and its responsibilities.

Attachment 2 provides a list of the Fire Protection Systems and equipment which are required to achieve compliance with the technical requirements of 10 CFR 50, Appendix R, and BTP APCS 9.5-1. The Quality Assurance Program for fire protection will be applied to these systems and equipment.

Reference 2 discussed the Quality Augmented (QAG) Program Review that is currently in progress. The QAG Program Review has been completed for the following areas:

- Radwaste Management Systems
  
- Post Accident Monitoring Instrumentation



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- Seismic Category 9 equipment
- Expendables and Consumables
- Radiation Protection and Calibration Standards
- Emergency Plan equipment

Deficiencies were identified in the Radwaste Management Systems and Post Accident Monitoring Instrumentation areas. Corrective action documents have been generated to address these deficiencies, where appropriate, and procedure changes have been generated and implemented to address the deficiencies that did not require the generation of a corrective action document. Justifications for Continued Operation (JCOs) have been completed for the Radwaste Management Systems.

The following is a list of additional activities to be performed by the QAG Program Review:

- Review and evaluate QAG implementation associated with:
  - . equipment identified with footnote (aa) in Table 3.2-1 of the PVNGS UFSAR,,
  - . operational phase activities, and
  - . Security.
- Generate UFSAR changes to clarify radwaste management and post accident monitoring commitments.
- Generate a recommended QA plan for Seismic Category 9 equipment.
- Obtain review and approval for procedures or procedure changes governing hardware classification, activity classification and procedure classification.
- Generate the final report on the QAG Program Review efforts.
- Monitor the corrective actions to assure that the QAG improvements and enhancements are properly implemented.





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As discussed in Reference 2, both the Fire Protection and Quality Augmented Program reviews are expected to be complete in February 1991.

If you should have any questions, contact Mr. Michael E. Powell at (602) 340-4981.

Sincerely,



WFC/MEP/KLMC  
Attachments

cc: Document Control Desk  
D. H. Coe  
A. C. Gehr  
A. H. Gutterman



## ATTACHMENT 1

### QUALITY ASSURANCE FOR FIRE PROTECTION

#### 1.0 SCOPE

- 1.1 This Appendix provides the Quality Assurance criteria for fire protection as required by Branch Technical Position, APCSB 9.5-1, Appendix A, and the NRC Guidance Letter dated August 29, 1977, entitled "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance", Attachment 6 "Quality Assurance".
- 1.2 Items and activities to which this Appendix applies are identified and classified in accordance with PVNGS Administrative Control procedures.
- 1.3 This Appendix along with its implementing procedures comprise the PVNGS Fire Protection Quality Assurance Program.

#### 2.0 PURPOSE

- 2.1 The purpose of this Appendix is to ensure that the critical aspects of design, procurement, maintenance, and testing are applied so that fire protection equipment is available and functional. The Quality Assurance requirements described herein are applied to the extent necessary to ensure that the safe shutdown capability of the plant is maintained and to minimize any radioactive release to the environment if a fire does occur.

#### 3.0 REQUIREMENTS

##### 3.1 General

- 3.1.1 The fire protection program shall include provisions for:
- a. Conducting a fire hazards analysis and annual updates, as necessary, to evaluate the effect of a fire on nuclear safety. The analysis shall evaluate plant design, potential fire hazards in the plant, potential threat of these hazards in the plant, and the effect of postulated fires on the capability to safely shut down the plant and to minimize radioactive releases to the environment.
  - b. Establishing the organizational and administrative responsibilities for the program.
  - c. Training, which shall include fire drills, and qualification of Fire Department personnel.
  - d. General employee training on fire protection and prevention.
  - e. Controlling the use and storage of combustibles (such as wood and flammable gases and liquids) and ignition sources (such as welding, cutting, and open flame). Work activities shall be reviewed to identify potential fire hazards (including housekeeping), and precautions shall be taken to prevent the initiation and spread of fire.
  - f. Reporting of a fire, fire emergency procedures, and coordination of fire fighting activities with offsite fire departments.



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- g. Compensatory actions to be taken in the event that a fire protection system is out of service.
  - h. Conducting reportability evaluations of violations of the requirements of the fire protection program described in the UFSAR which could have adversely affected the ability to achieve and maintain safe shutdown in the event of a fire.
- 3.1.2 Those items associated with fire protection that are not part of the permanent plant (i.e., communications equipment, portable smoke ejectors, manual fire fighting equipment, etc.), shall be procured to an appropriate commercial quality standard. The activities associated with assuring that these items are functional and available for use shall be delineated in Administrative Control procedures and shall be classified as quality related.

### 3.2 Quality Assurance

- 3.2.1 The extent to which the requirements of this Appendix and its implementing documents are applied to an item or activity will be based on a graded approach using the following criteria:
- a. The effect of a malfunction or failure of the item on nuclear safety or safe plant operation.
  - b. The design and fabrication complexity or uniqueness of the item.
  - c. The need for special controls, surveillance or monitoring of processes, equipment and operational activities.
  - d. The degree to which functionality can be demonstrated by inspection or test.
  - e. The quality history and degree of standardization of the item.

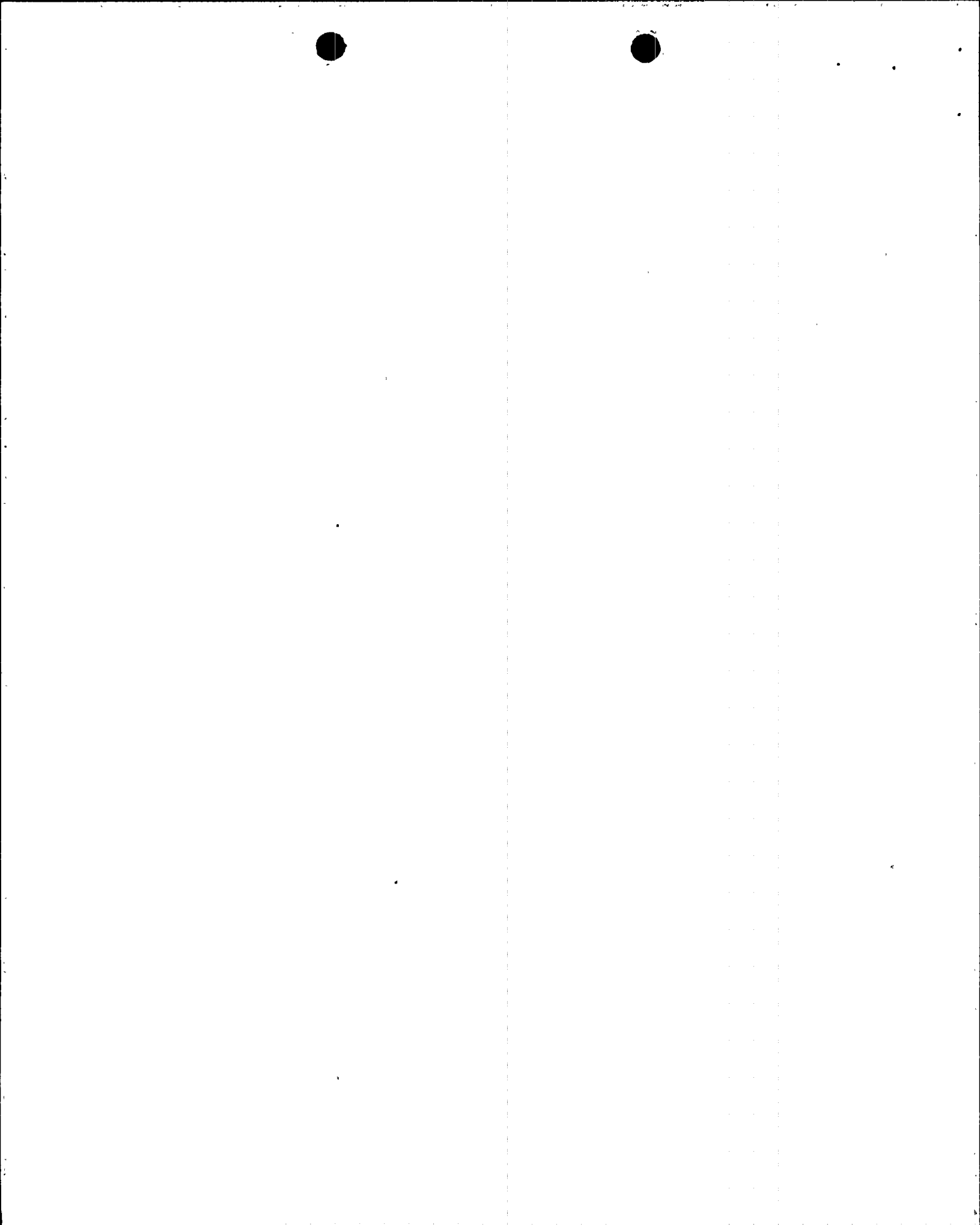
When the graded approach is utilized, the justification and basis for grading shall be documented and retrievable. Application of the graded approach shall be accomplished in accordance with procedures concurred with by the QA Organization.

Grading of requirements applicable to items shall be the responsibility of the Vice President, Engineering and Construction.

Grading of requirements applicable to activities shall be the responsibility of the organization responsible for performing the activity.

### 3.2.2 Design Control and Procurement Document Control

- 3.2.2.1 Measures shall be established to assure that the applicable guidelines of the Branch Technical Position are included in design and procurement documents and that deviations therefrom are controlled. These measures shall assure that:



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### QUALITY ASSURANCE FOR FIRE PROTECTION

- a. Design and procurement document changes, including field changes and design deviations are subject to the same level of controls, reviews, and approvals that were applicable to the original document.
- b. Quality standards are specified in the design documents such as appropriate fire protection codes and standards, and deviations and changes from these quality standards are controlled.
- c. New designs and plant modifications, including fire protection systems, are reviewed by qualified personnel to assure inclusion of appropriate fire protection requirements. These reviews shall include items such as:
  1. Design reviews to verify adequacy of wiring isolation and cable separation criteria.
  2. Design reviews to verify appropriate requirements for room isolation (sealing penetrations, floors, and other fire barriers).
- d. A review and concurrence of the adequacy of fire protection requirements and quality requirements stated in procurement documents are performed and documented by qualified personnel. This review shall determine that fire protection requirements and quality requirements are correctly stated, inspectable and controllable; there are adequate acceptance and rejection criteria; and the procurement document has been prepared, reviewed, and approved in accordance QA program requirements.

#### 3.2.3 Instructions, procedures and drawings

##### 3.2.3.1 Inspections, tests, administrative controls, fire drills, and training that govern the fire protection program shall be prescribed by documented instructions, procedures or drawings and shall be accomplished in accordance with these documents. The following provisions shall be included:

- a. Indoctrination and training programs for fire prevention and fire fighting shall be implemented in accordance with documented procedures.
- b. Activities such as design installation, inspection, test, maintenance, and modification of fire protection systems shall be prescribed and accomplished in accordance with documented instructions, procedures and drawings.
- c. Instructions and procedures for design, installation, inspection, test, maintenance, modification and administrative controls shall be reviewed to ensure the proper inclusion of fire protection requirements. Requirements to be considered are precautions, control of ignition sources and combustibles, provisions for backup fire protection if the activity requires disabling a fire protection system, and restriction on material substitution unless specifically permitted by design and confirmed by design review.
- d. The installation or application of penetration seals and fire retardant coatings shall be performed by trained personnel using approved procedures.





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- e. Instructions, procedures and drawings shall be controlled to prevent the use of superseded information.
- f. Program and Administrative Control procedures shall be reviewed and concurred with by the Quality Assurance Organization.
- g. Instructions and procedures which prescribe the performance of quality related activities shall be clearly marked as quality related.

#### 3.2.4 Control of Purchased Material, Equipment, and Services

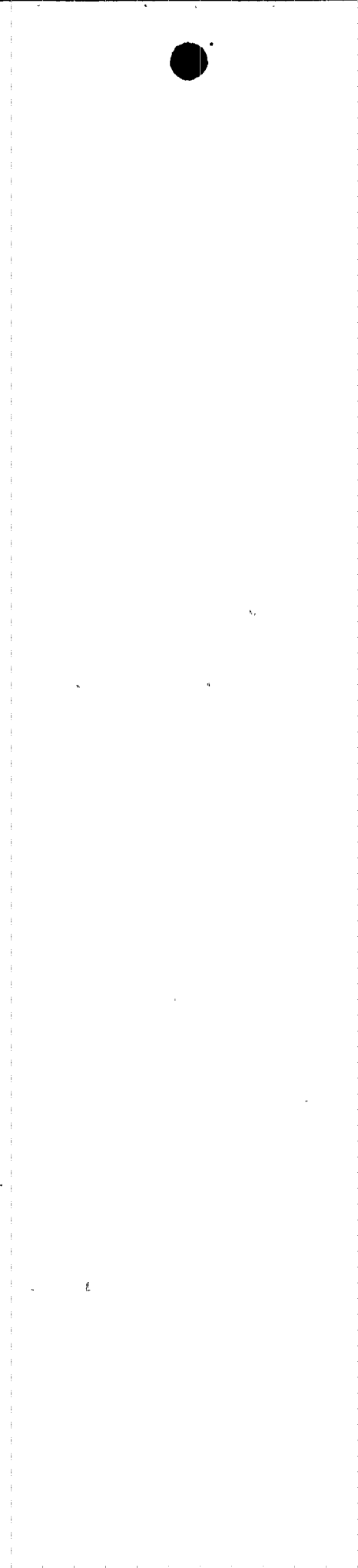
3.2.4.1 Measures shall be established to assure that purchased material, equipment and services conform to the procurement documents. These measures shall include:

- a. Provisions, as appropriate, for source evaluation and selection, objective evidence of quality furnished by the contractor, inspections at suppliers, or receiving inspections.
- b. Source or receiving inspection, as a minimum, for those items whose quality cannot be verified after installation.

#### 3.2.5 Inspection

3.2.5.1 A program for inspection of activities affecting fire protection shall be established by or for the organization performing the activity to verify conformance to documented installation drawings and test procedures for accomplishing activities. The program shall include:

- a. Inspections of (1) installation, maintenance, modification, and tests of fire protection systems; and (2) emergency lighting and communication equipment to assure conformance to design and installation requirements.
- b. Inspection of penetration seals and fire retardant coating installations to verify the activity is satisfactorily completed.
- c. Inspections of cable routing to verify conformance with design requirements.
- d. Inspection to verify that appropriate requirements for room isolation (sealing penetrations, floors, and other fire barriers) are accomplished during construction.
- e. Measures to assure that inspection personnel are independent from the individuals performing the activity being inspected and are knowledgeable in the design and installation requirements for fire protection.
- f. Inspection procedures, instructions, and checklists which provide for the following:
  - 1. Identification of characteristics and activities to be inspected.



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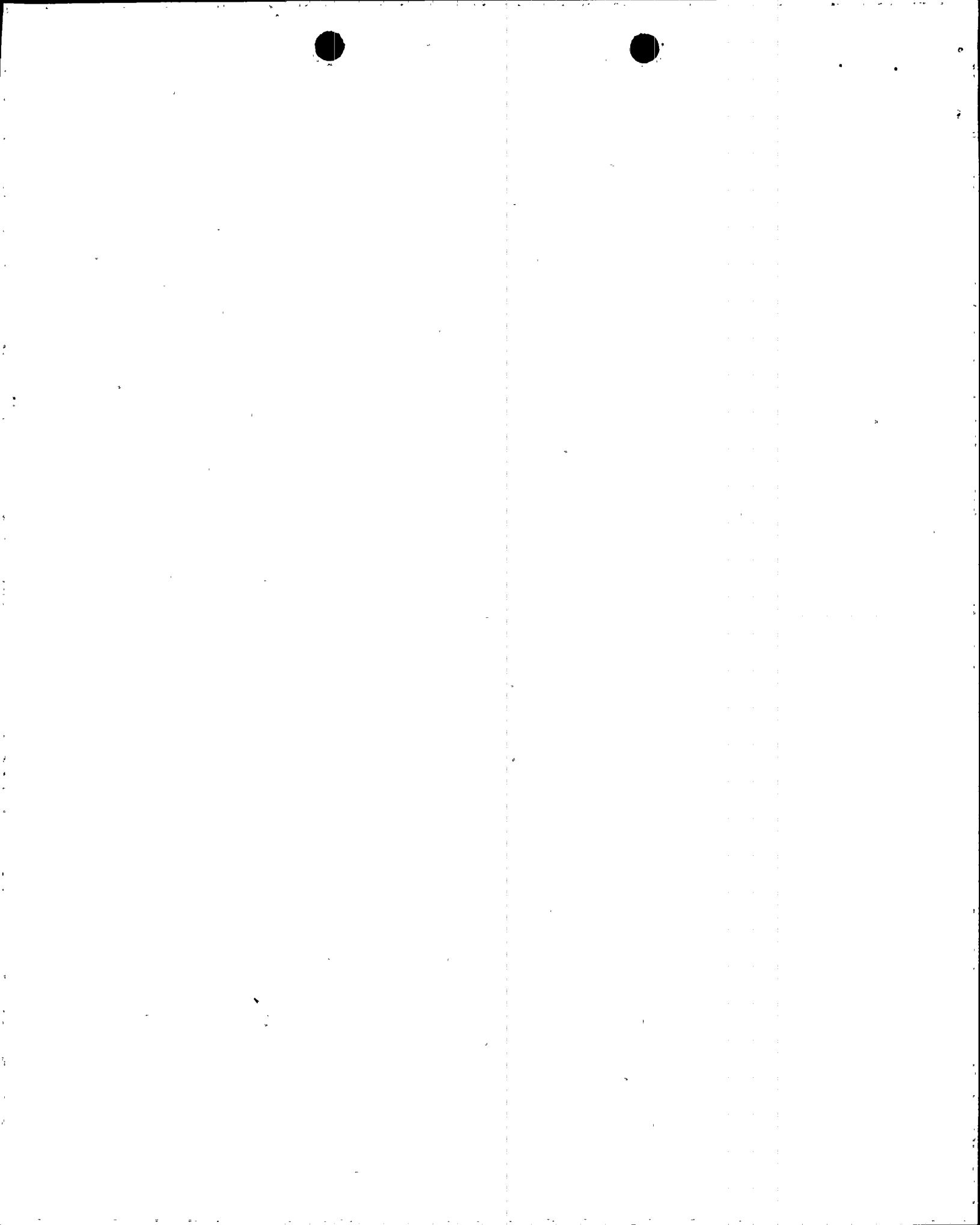
### QUALITY ASSURANCE FOR FIRE PROTECTION

2. Identification of the individuals or groups responsible for performing the inspection operation.
3. Acceptance and rejection criteria.
4. A description of the method of inspection.
5. Recording evidence of completing and verifying a manufacturing, inspection or test operation.
6. Identification of the inspector or data recorder and the results of the inspection operation.
- g. Periodic inspections of fire protection systems, emergency breathing and auxiliary equipment, emergency lighting, and communication equipment to assure the acceptable condition of these items.
- h. Periodic inspection of materials subject to degradation such as fire stops, seals, and fire retardant coatings to assure these items have not deteriorated or been damaged.
- i. The identification of any required independent inspections to be performed by the Quality Assurance Organization.

#### 3.2.6 Test and Test Control

3.2.6.1 A test program shall be established and implemented to ensure that testing is performed and verified by inspection and audit to demonstrate conformance with design and system readiness requirements. The tests shall be performed in accordance with written test procedures; test results shall be properly evaluated and acted upon. The test program shall include the following:

- a. Installation testing - Following construction, modification, repair, or replacement, sufficient testing shall be performed to demonstrate that fire protection systems, emergency lighting and communication equipment will perform satisfactorily in service and that design criteria are met. Written test procedures for installation tests incorporate the requirements and acceptance limits contained in applicable design documents.
- b. Periodic testing - The schedules and methods for periodic testing shall be developed and documented. Fire protection equipment, emergency lighting, and communication equipment are tested periodically to assure that the equipment will properly function and continue to meet the design criteria.
- c. Provisions for the Quality Assurance organization to verify testing of fire protection systems and to verify that test personnel are effectively trained.
- d. Test results are documented, evaluated, and their acceptability determined by a qualified responsible individual or group.



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### QUALITY ASSURANCE FOR FIRE PROTECTION

#### 3.2.7 Inspection, Test and Operating Status

3.2.7.1 Measures shall be established to provide for the identification of items that have satisfactorily passed required tests and inspections. These measures shall include appropriate provisions for identification by means of tags, labels, or similar temporary markings to indicate completion of required inspections and tests, and operating status.

#### 3.2.8 Nonconforming Items

3.2.8.1 Measures shall be established to control items that do not conform to specified requirements to prevent inadvertent use or installation. These measures shall include provision to assure that:

- a. Nonconforming, inoperative, or malfunctioning fire protection systems, emergency lighting, and communication equipment are appropriately tagged or labelled.
- b. The identification, documentation, segregation, review disposition, and notification to the affected organization of nonconforming materials, parts, components, or services are procedurally controlled.
- c. Documentation identifies the nonconforming item, describes the nonconformance and the disposition of the nonconforming item and includes signature approval of the disposition.
- d. Provisions are established identifying those individuals or groups delegated the responsibility and authority for the disposition and approval of nonconforming items.

#### 3.2.9 Corrective Action

3.2.9.1 Measures shall be established to ensure that conditions adverse to fire protection such as failures, malfunctions, deficiencies, deviations, defective components, uncontrolled combustible material and nonconformances are promptly identified, reported and corrected. These measures shall assure:

- a. Procedures are established for evaluation of conditions adverse to fire protection (such as nonconformance, failures, malfunctions, deficiencies, deviation, and defective material and equipment) to determine the necessary corrective action.
- b. In the case of significant or repetitive conditions adverse to fire protection, including fire incidents, the cause of the condition is determined and analyzed, and prompt corrective actions are taken to preclude recurrence. The cause of the condition and the corrective action taken are promptly reported to cognizant levels of management for review and assessment.



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#### 3.2.10 Records

3.2.10.1 Records shall be prepared and maintained to furnish evidence that the criteria enumerated above are being met for activities affecting the fire protection program. The following provisions shall be included:

- a. Records are identifiable and retrievable and shall demonstrate conformance to fire protection requirements. The records shall include results of inspection, tests, reviews, and audits; nonconformance and corrective action reports; construction, maintenance and modification records; and certified manufacturer's data.
- b. Record retention requirements are established.

#### 3.2.11 Audits

3.2.11.1 Audits shall be conducted and documented to verify compliance with the fire protection program, including design and procurement documents, instruction, procedures, and drawings, and inspection and test activities. These audits are performed by Quality Assurance personnel in accordance with preestablished written procedures or check lists and conducted by trained personnel not having direct responsibilities in the area being audited.

3.2.11.2 Audit results are documented and then reviewed with management having responsibility in the area audited.

3.2.11.3 Followup action is taken by responsible management to correct the deficiencies revealed by the audit.

3.2.11.4 Audits are annually performed to provide an overall assessment of conformance to fire protection requirements.

#### 4.0 RESPONSIBILITIES

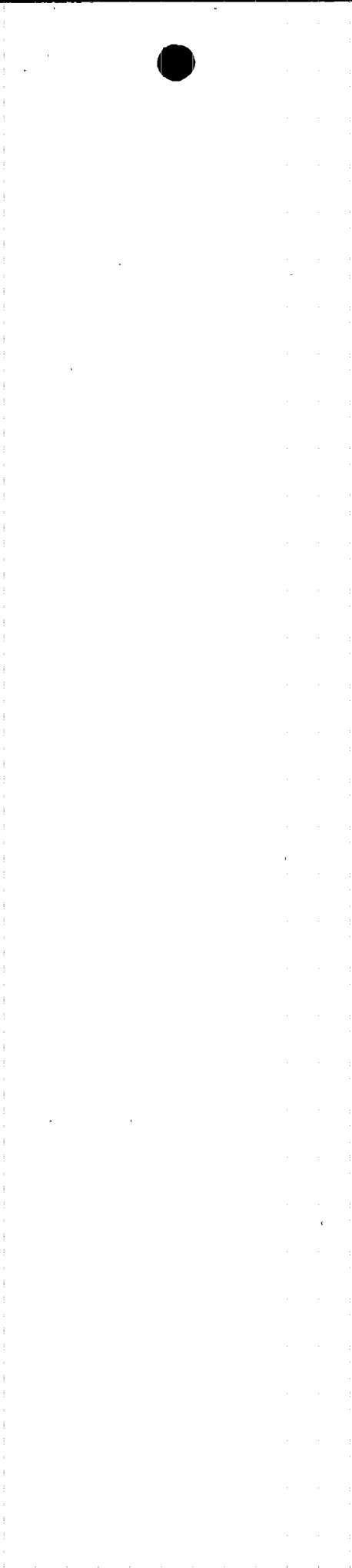
4.1 The Director, Site Services, is responsible for implementing and maintaining in effect all provisions of the approved fire protection program for the Palo Verde Nuclear Generating Station (PVNGS), as required by the Operating Licenses.

4.2 The Vice President, Engineering and Construction, is responsible for establishing all technical and quality classification requirements for the engineering and design of fire protection structures, systems and components, including changes and modifications.

4.3 The Director, Quality Assurance, is responsible for:

4.3.1 Performing independent inspection, when required;

4.3.2 Performing an audit of the Fire Protection Program and implementing procedures at least once per 24 months.





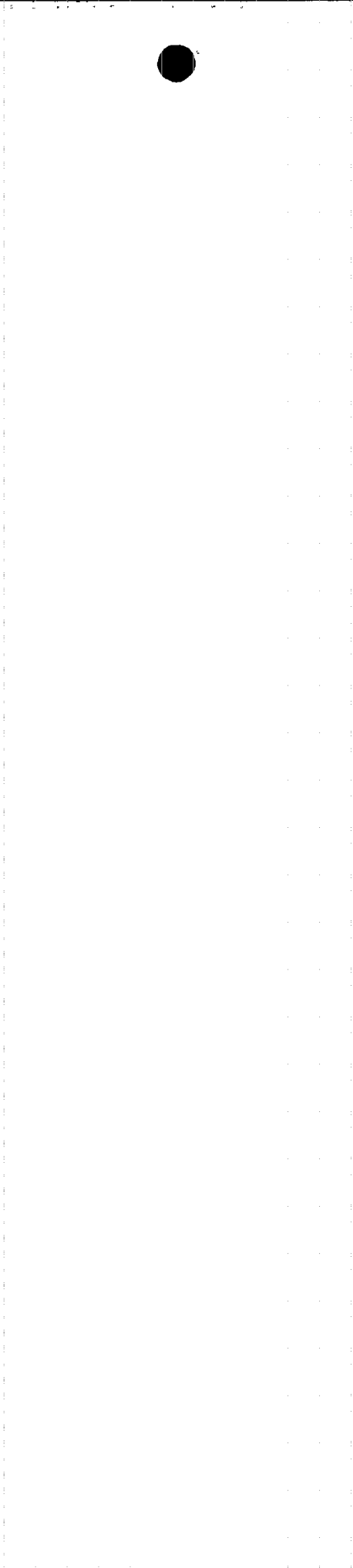
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### QUALITY ASSURANCE FOR FIRE PROTECTION

- 4.3.3 Performing an audit of the Fire Protection and Loss Prevention Program, utilizing either qualified offsite company personnel or an outside fire protection firm, at least once per 12 months.
- 4.3.4 Performing an audit of the Fire Protection and Loss Prevention Program, utilizing a qualified outside fire consultant, at least once per 36 months.
- 4.3.5 Reviewing and concurring with Fire Protection Program and Administrative Control procedures.
- 4.3.6 Trending of quality deficiencies.
- 4.3.7 Resolving disputes on matters concerning the quality classification of activities.
- 4.3.8 Performing periodic monitoring to ensure that the requirements of this Appendix are properly implemented.

#### 4.4 Vice Presidents, Directors, and General Managers

Vice Presidents, Directors, and General Managers are responsible for assisting in the implementation of the fire protection program as specified by administrative controls and implementing procedures.



ATTACHMENT 2

QAG FIRE PROTECTION SYSTEMS AND EQUIPMENT

Principal Components

Location

Fire Suppression and Actuation Systems

Fire water storage tanks and interconnecting pipe to fire pumps

OU

Fire pumps and associated drivers, controllers, fuel supplies

OU

Fire water underground main piping (Quality Class break at isolation valve discharge flange for NQR sections of system)

OU

Fire suppression system water riser supply branch piping

AB, CB, DG  
FB, RW, MS

Water, CO<sub>2</sub> and halon fixed fire suppression and actuation systems

AB, CB, DG,  
FB, RW, MS, OU

CO<sub>2</sub> storage tank and associated piping and components

CB, OU

Supports and hangers

AB, CB, DG  
FB, RW, MS

Fire hydrants for exterior fire exposure protection.

OU

Fire Detection and Alarm Systems  
(QK and FP Systems)

Panels

AB, CB, C, FB  
DG, RW, MS, OU

Fire and smoke detectors

AB, CB, C, FB  
DG, RW, MS, OU

Backup power supplies

AB, CB, C, FB  
DG, RW, MS, OU

Alarms/annunciators

(includes control room communication console, security computer, dorado racks and concentrators)

AB, CB, C, FB  
DG, RW, MS, OU



**QAG FIRE PROTECTION SYSTEMS AND EQUIPMENT**  
(continued)

<u>Principal Components</u>	<u>Location</u>
<b>Fire Barriers</b>	
Fire walls, floors, ceilings, partitions	AB, CB, C, FB DG, RW, MS, OU
Acoustical ceilings	AB, CB
Fire doors	AB, CB, C, FB DG, RW, MS, OU
Fire dampers	AB, CB, C, FB; DG, RW, MS, OU
Penetration seals, seismic gap seals, fire breaks	AB, CB, C, FB, DG, RW, MS, OU
Radiant energy shields	C
Fire-proofing (structural, electrical raceway, HVAC and electrical supports)	AB, CB, MS, C
<b>RCP Lube Oil Collection System</b>	C
<b>Emergency Lighting</b>	
8-hour designed emergency lighting systems.	AB, CB, DG, MS, TG, OU
<b>In-Plant Communications</b>	
Sound-powered phone systems	AB, CB, FB, C DG, MS, RW
In-plant radio system	AB, CB, FB, C, DG, MS, RW
<b>Lightning Protection System</b>	
Structure protection	AB, CB, C, FB DG, RW, TG, MS, CO



**QAG FIRE PROTECTION SYSTEMS AND EQUIPMENT**  
(continued)

<u>Principal Components</u>	<u>Location</u>
Lightning Arrestors for Start-up Transformers, main transformers, and 13.8 kV switchgear 13-E-NAN-S03 and 13-E-NAN-S04	OU
Interior Manual Fire Suppression Systems and Equipment	
Standpipe and hose systems including piping, valves, fire hose, hose racks/reels, nozzles, supports and hangers, and associated components	AB, CB, C, FB DG, RW, MS, OU
Portable fire extinguishers including mounting bracket	AB, CB, C, FB, DG, RW, MS, OU
Manual Fire Fighting Equipment for Site Fire Department Use (Application of QAG Program to the extent necessary to assure equipment is functional and available)	
Fire emergency response vehicle(s)	NA
Personal protective equipment (turnout gear, SCBA)	NA
Portable smoke ejectors and support equipment	NA
Fire hose, valves, nozzles and associated equipment	NA
Tools (portable lanterns, axes, crowbars)	NA

**LEGEND**

- AB - Auxiliary Building
- C - Containment
- CB - Control Building
- CO - Corridor Building
- DG - Diesel Generator Building
- FB - Fuel Building
- MS - Main Steam Support Structure
- RW - Radwaste Building
- TG - Turbine Building
- OU - Outside Areas (includes applicable structures, systems,  
and components other than the locations listed above)
- NA - Not Applicable (equipment controlled by Site Fire Department)



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