COMANCHE PEAK STEAM ELECTRIC STATION

UNIT 1 and COMMON

CORRECTIVE ACTION PROGRAM

PROJECT STATUS REPORT

MECHANICAL SUPPLEMENT B
FIRE PROTECTION

TU ELECTRIC

Generating Division

TU ELECTRIC
COMANCHE PEAK STEAM ELECTRIC STATION
UNIT 1 AND COMMON

IMPELL CORPORATION
PROJECT STATUS REPORT

FIRE PROTECTION

SUPPLEMENT B
MECHANICAL PROJECT STATUS REPORT

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EXECUTIVE SUMMARY

This Project Status Report (PSR) summarizes the systematic validation process for the fire protection portion of the Corrective Action Program (CAP) at Comanche Peak Steam Electric Station (CPSES) Unit 1 and Common[1]. This Project Status Report (PSR) presents the results of the design validation and describes the Post Construction Hardware Validation Program (PCHVP). Fire protection activities are governed by the TU Electric Corrective Action Program (CAP) which requires:

1. Establishment of a consistent set of CPSES Unit 1 and Common fire protection design criteria that complies with the CPSES licensing commitments.

2. Production of a set of design control procedures that assures compliance with design criteria.

3. Evaluation of fire protection systems, structures and components and direction of the corrective actions recommended by the Comanche Peak Response Team (CPRT) and those determined by Corrective Action Program (CAP) investigations to be necessary to demonstrate that fire protection systems, structures and components are in conformance with the design.

4. Assurance that the validation resolves the fire protection related design and hardware issues identified by the Comanche Peak Response Team (CPRT), external sources[2], and the Corrective Action Program (CAP).

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[1]Common refers to areas in CPSES that contain both Unit 1 and Unit 2 systems, structures and components.

[2]External sources include:
- NRC Staff Special Review Team (SRT-NRC)
- NRC Staff Special Inspection Team (SIT)
- NRC Staff Construction Appraisal Team (CAT)
- Citizens Association for Sound Energy (CASE)
- Atomic Safety and Licensing Board (ASLB)
- NRC Region IV Inspection Reports
- NRC Staff Technical Review Team (TRT) [SSERs 7-11]
- CYGNA Independent Assessment Program (IAP)

Comanche Peak Response Team (CPRT) issues are issues identified by the following:
- CPRT Design Adequacy Program (DAP)
- CPRT Quality of Construction Program (QOC)

5. Validation that the design of fire protection systems, structures and components is in conformance with the licensing commitments and that the installed hardware is in conformance with the validated design.

6. Production of a set of consistent and validated design documentation.

A consistent set of design criteria for CPSES Unit 1 and Common fire protection systems, structures and components has been established and used for the design validation process. This set of design criteria is in conformance with the CPSES licensing commitments. It has been independently and extensively reviewed by the Comanche Peak Response Team (CPRT).

Design and design control procedures were developed to implement the design criteria and engineering methodologies, and to govern work flow and technical interfaces with other organizations for both the design and hardware validation processes. These procedures specify the processes which have been implemented throughout the fire protection portion of the Corrective Action Program (CAP).

Analyses have been performed to validate the CPSES Unit 1 and Common fire protection systems, structures and components. The results are documented in six Design Validation Packages (DVPs). The as-built hardware for fire protection systems, structures and components is being validated to the design by the Post Construction Hardware Validation Program (PCHVP).

The fire protection related design and hardware issues identified by the Comanche Peak Response Team (CPRT) have been resolved by incorporation of engineering methodologies and design criteria into fire protection design and design control procedures and Post Construction Hardware Validation Program (PCHVP) implementing procedures. No additional issues were identified during the performance of the fire protection portion of the Corrective Action Program (CAP) which were determined to be reportable under the provisions of 10CFR50.55(e).

The Post Construction Hardware Validation Program (PCHVP) assures that fire protection systems, structures and components are installed in conformance with the validated design. The CPSES Unit 1 and Common fire protection related installation/procurement specifications have been reviewed and revised. Also, the revised construction procedures and the revised Quality Control (QC) inspection procedures were reviewed to assure that they implement the requirements of the validated installation/ procurement specifications. The Post Construction Hardware Validation Program (PCHVP) for fire protection systems, structures and components, including the inspections, engineering walkdowns and evaluations, implements the corrective actions recommended by the Comanche Peak Response Team (CPRT), as well as those required by the Corrective Action Program (CAP) investigations.

TU Electric will be provided with a complete set of validated design documentation for CPSES Unit 1 and Common fire protection systems, structures and components including fire protection calculations, drawings, design changes and hardware modifications. This documentation can provide the basis for CPSES configuration control[3] to facilitate maintenance and operation throughout the life of the plant.

In-depth quality and technical audits performed in accordance with the Impell Quality Assurance (QA) Program, EPM Quality Assurance (QA) Program, TU Electric Quality Assurance (QA) Program and the independent Engineering Functional Evaluation (EFE) verified that the implementation of the validation program was in conformance with 10CFR50, Appendix B quality assurance requirements. These audits assure that the fire protection procedures, design criteria and design comply with the licensing commitments.

The CPSES Unit 1 and Common fire protection portion of the Corrective Action Program (CAP) validates that:

- The fire protection design complies with the CPSES licensing commitments.
- The as-built fire protection systems, structures and components comply with the validated design.

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[3]Configuration control is a system to assure that the design and hardware remain in compliance with licensing commitments throughout the life of the plant.

ABBREVIATIONS AND ACRONYMS

ASLB	Atomic Safety and Licensing Board
ANI	Authorized Nuclear Inspector
CAP	Corrective Action Program (TU Electric)
CAR	Corrective Action Request
CASE	Citizens Association for Sound Energy
CAT	Construction Appraisal Team (NRC)
CFR	Code of Federal Regulations
CPE	Comanche Peak Engineering (TU Electric)
CPRT	Comanche Peak Response Team (TU Electric)
CPSES	Comanche Peak Steam Electric Station
CYGNA	CYGNA Energy Services
DAP	Design Adequacy Program (CPRT)
DBCP	Design Basis Consolidation Program
DBD	Design Basis Document
DIR	Discrepancy Issue Report (CPRT-DAP)
DR	Deficiency Report
DVP	Design Validation Package
Ebasco	Ebasco Services Incorporated
EER	Engineering Evaluation Report (CPRT-DAP)
EFE	Engineering Functional Evaluation
EPM	Engineering Planning and Management, Inc.
FHA	Fire Hazards Analysis
FPPR	Fire Protection Program Review
FSAR	Final Safety Analysis Report
FSSA	Fire Safe Shutdown Analysis
FVM	Field Verification Method
GFPS	Grinnell Fire Protection Systems Co.
GIR	Generic Issue Report
HSP	Hot Shutdown Panel
HVAC	Heating, Ventilation and Air Conditioning
IAP	Independent Assessment Program (CYGNA)
Impell	Impell Corporation
INDMS	Integrated Nuclear Database Management System
IRR	Issue Resolution Report (CPRT)
ISAP	Issue Specific Action Plan (CPRT)
NCR	Nonconformance Report
NFPA	National Fire Protection Association
NRC	United States Nuclear Regulatory Commission
NSSS	Nuclear Steam Supply System
NUREG	NRC Document
OSP	Office of Special Projects (NRC)
PCHVP	Post Construction Hardware Validation Program
PSR	Project Status Report
QA	Quality Assurance
QOC	Quality of Construction and QA/QC Adequacy Report (CPRT)

QC	Quality Control
SDAR	Significant Deficiency Analysis Report (TU Electric)
SER	Safety Evaluation Report (NRC, NUREG-0797)
SIT	Special Inspection Team (NRC Staff)
SRT	Senior Review Team (CPRT)
SRT-NRC	Special Review Team (NRC)
SSER	Supplemental Safety Evaluation Report (NRC, NUREG-0797)
SWEC	Stone & Webster Engineering Corporation
SWEC-PSAS	Stone & Webster Engineering Corporation - Pipe Stress and Support Project
TAP	Technical Audit Program (TU Electric)
TERA	Tenera, L.P.
TRT	Technical Review Team (NRC Staff, SSERs 7-11)
UL	Underwriters Laboratories, Inc.

1.0 INTRODUCTION

In October 1984, TU Electric established the Comanche Peak Response Team (CPRT) to evaluate issues that have been raised at CPSES and to prepare a plan for resolving those issues. The Comanche Peak Response Team (CPRT) program plan was developed and submitted to the NRC.

In mid-1986, TU Electric performed a qualitative and quantitative review of the preliminary results of the Comanche Peak Response Team (CPRT) (References 1 and 2). This review identified that the Comanche Peak Response Team (CPRT) findings were very broad in scope and included each discipline. TU Electric decided that the appropriate method to correct the issues raised and to identify and correct any other issues that potentially existed at CPSES would be through one integrated program rather than a separate program for each issue. TU Electric decided to initiate a comprehensive Corrective Action Program (CAP) to validate the entirety of CPSES safety-related designs[1,2]. The scope of the CAP has the following objectives:

- Demonstrate that the design of safety-related systems, structures and components complies with licensing commitments.
- Demonstrate that the existing systems, structures and components are in compliance with the design or develop modifications which will bring systems, structures and components into compliance with design.
- Develop procedures, an organizational plan, and documentation to maintain compliance with licensing commitments throughout the life of CPSES.

The Corrective Action Program (CAP) is thus a comprehensive program to validate both the design and the hardware at CPSES, including resolution of specific Comanche Peak Response Team (CPRT) and external issues.

TU Electric contracted and provided overall management to Stone & Webster Engineering Corporation (SWEC), Ebasco Services Incorporated (Ebasco), and

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[1]Portions of selected non-safety-related systems, structures and components are included in the Corrective Action Program (CAP). These are Seismic Category II (Reference 26) systems, structures and components, and fire protection systems.

[2]NSSS design and vendor hardware design and their respective QA/QC programs are reviewed by the NRC independently of CPSES and are not included in the Corrective Action Program (CAP) as noted in SSER 13; however, the design interface is validated by the CAP.

Impell Corporation (Impell) to implement the Corrective Action Program (CAP), and divided the CAP into eleven disciplines as follows:

Discipline	Responsible Contractor
Mechanical	SWEC
-Systems Interaction	Ebasco
-Fire Protection	Impell
Civil/Structural	SWEC
Electrical	SWEC
Instrumentation & Control	SWEC
Large Bore Piping and Pipe Supports	SWEC-PSAS
Cable Tray and Cable Tray Hangers	Ebasco/Impell
Conduit Supports Trains A, B, & C >2"	Ebasco
Conduit Supports Train C ≤2"	Impell
Small Bore Piping and Pipe Supports	SWEC-PSAS
Heating, Ventilation and Air Conditioning (HVAC)	Ebasco
Equipment Qualification	Impell

A Design Basis Consolidation Program (DBCP) (Reference 3) was developed to define the methodology by which the design and hardware validation was performed. The approach of this Design Basis Consolidation Program (DBCP) is consistent with other contractors' efforts and products.

The design validation portion of the Corrective Action Program (CAP) identified the design-related licensing commitments. The design criteria were established from the licensing commitments and consolidated in the Design Basis Documents (DBDs). The DBDs identify the design criteria for the design validation effort. If the existing design did not satisfy the design criteria, it was modified to satisfy the design criteria. The design validation effort for each of the eleven Corrective Action Program (CAP) disciplines was documented in Design Validation Packages (DVPs). The DVPs provide the documented assurance (e.g., calculations and drawings) that the validated design meets the licensing commitments, including resolution of all Comanche Peak Response Team (CPRT) and external issues.

The design validation effort revised the installation/procurement specifications to reflect the validated design requirements. The validated installation/procurement specifications also contain the inspection requirements necessary to assure that the as-built hardware complies with the validated design.

The hardware validation portion of the Corrective Action Program (CAP) is being implemented by the Post Construction Hardware Validation Program (PCHVP), which demonstrates that existing fire protection systems, structures, and components are in compliance with the installation/procurement specifications (validated design), or identifies

modifications that are necessary to bring the hardware into compliance with the validated design.

The results of the performance of the Corrective Action Program (CAP) for each discipline are described in a Project Status Report (PSR). This PSR describes the results of the fire protection portion of the Corrective Action Program (CAP).

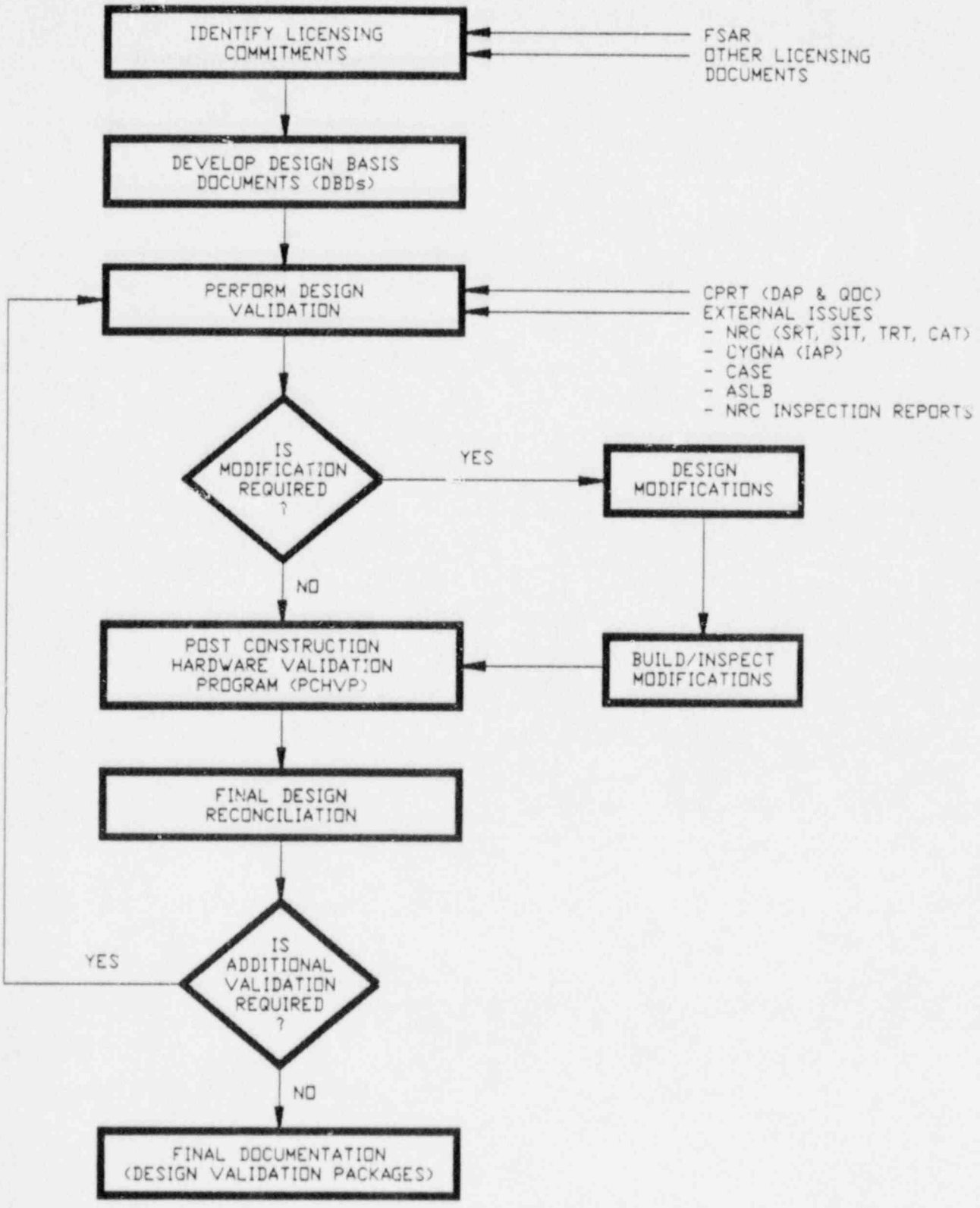
A comprehensive validation has been performed in order to demonstrate that the CPSES Unit 1 and Common fire protection design complies with licensing commitments. Impell was initially contracted by TU Electric in 1986 to validate the fire protection systems, structures and components at CPSES. When the Corrective Action Program (CAP) was created later in 1986, it incorporated and expanded upon Impell's existing program, including the addition of the Fire Safe Shutdown Analysis (FSSA) being performed by Engineering Planning and Management, Inc. (EPM). The validation process is conducted in accordance with the Impell Design Basis Consolidation Program (DBCP) which controls implementation of the fire protection portion of the TU Electric Corrective Action Program (CAP). The fire protection portion of the Corrective Action Program (CAP) resolved the Comanche Peak Response Team (CPRT) Issue Resolution Report (IRR) and Engineering Evaluation Report (EER) issues (References 4 and 42). The fire protection portion of the Corrective Action Program (CAP) is shown schematically in Figure 1-1. The fire protection design criteria are contained within the CPSES Design Basis Documents (DBDs) (References 5 through 10).

The methodology used in implementing both the design and hardware-related validations for CPSES Unit 1 and Common fire protection systems, structures and components and the results of the design validation effort are presented in this Project Status Report (PSR).

This fire protection Project Status Report (PSR) describes the validation effort from the early stages of design criteria establishment through the development and implementation of the detailed design and design control procedures. This Project Status Report (PSR) addresses the updating of installation/procurement specifications and construction/Quality Control (QC) procedures, the implementation of the Post Construction Hardware Validation Program (PCHVP) to validate the as-built hardware, and the completion of the CPSES Unit 1 and Common Design Validation Packages (DVPs).

FIGURE 1-1

CORRECTIVE ACTION PROGRAM (CAP)
FIRE PROTECTION



2.0 PURPOSE

The purpose of this Project Status Report (PSR) is to demonstrate that the fire protection systems, structures and components in CPSES Unit 1 and Common are in conformance with the CPSES licensing commitments, satisfy design criteria, and will satisfactorily perform their design functions.

3.0 SCOPE

The fire protection portion of the Corrective Action Program (CAP) implemented for CPSES Unit 1 and Common as summarized in this Project Status Report (PSR) includes:

1. Fire protection features
    - Fire barriers
    - Fire suppression systems
    - Fire detection system
    - Communication system
    - Emergency lighting
    - Reactor coolant pump oil collection system
2. Fire protection analyses
    - Fire Hazards Analysis (FHA)
    - Fire Safe Shutdown Analysis (FSSA)[1]

The fire protection portion of the Corrective Action Program (CAP) contains a design validation portion and a hardware validation portion to assure that the design documentation corresponds to the as-built hardware. The primary features of the fire protection portion of the Corrective Action Program (CAP) are:

1. Establishment of fire protection design criteria which comply with licensing commitments.

2. Development of the Design Basis Documents (DBDs) for fire protection, which contain the design criteria.

3. Implementation of design and hardware validations, consisting of analysis, identification and implementation of necessary modifications, and field verifications as identified in the Post Construction Hardware Validation Program (PCHVP). Analysis results, including the identification of necessary modifications, are documented in the fire protection Design Validation Packages (DVPs). The as-built configuration of fire protection features is validated by inspections, engineering walkdowns, and evaluations.

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[1]The Fire Safe Shutdown Analysis (FSSA) was performed by EPM and utilized by Impell in the fire protection portion of the Corrective Action Program (CAP).

4. Resolution of the design and hardware-related issues of CPSES fire protection systems, structures and components and implementation of corrective actions for closure of these issues. These issues include Comanche Peak Response Team (CPRT) issues (see Section 4.0).

5. Development of validated design documentation that forms the basis for CPSES fire protection configuration control. The validated design documentation and updated procedures/specifications can be utilized by TU Electric to facilitate operation, maintenance, and future modifications following issuance of an operating license.

Section 5.1.1 describes the methodology by which the CPSES fire protection licensing commitments were identified, the design criteria were established and consolidated in the Design Basis Documents (DBDs), and the technical and design control procedures were developed.

Section 5.1.2 describes the design validation process, including the review of calculations, drawings and fire test reports; the performance of engineering walkdowns; and updating of specifications.

Section 5.1.3 describes the Post Construction Hardware Validation Program (PCHVP) process and the procedures for engineering walkdowns and engineering evaluations required to be implemented to validate that the as-built fire protection systems, structures and components are in compliance with fire protection design documentation.

Section 5.2 presents a summary of the fire protection portion of the Corrective Action Program (CAP) results. It includes design validation and Post Construction Hardware Validation Program (PCHVP) results.

Section 5.3 describes the quality assurance program implemented for the validation process, including the Impell Quality Assurance (QA) audits, EPM Quality Assurance (QA) audits, TU Electric Quality Assurance (QA) audits and the Engineering Functional Evaluation (EFE) audits.

Section 5.4 describes the corrective and preventive actions.

Appendix A of this Project Status Report (PSR) describes the details of the Corrective Action Program (CAP) resolution of Comanche Peak Response Team (CPRT) issues.

4.0 SPECIFIC ISSUES

The fire protection portion of the Corrective Action Program (CAP) resolved all of the fire protection related Comanche Peak Response Team (CPRT) issues. This section lists the fire protection related issues addressed in this Project Status Report (PSR). Technical review and resolution of all Comanche Peak Response Team (CPRT) issues and the resulting corrective and preventive actions are described in Appendix A. No additional issues were identified during the performance of the fire protection portion of the Corrective Action Program (CAP) which were determined to be reportable under the provisions of 10CFR50.55(e).

Comanche Peak Response Team (CPRT) issues are identified in the Issue Resolution Report (IRR) DAP-E-EIC-505 and Engineering Evaluation Report (EER) DAP-E-EIC-011 and are incorporated in Subappendices A1 through A9.

Comanche Peak Response Team (CPRT) issues are listed below (issue number corresponds to subappendix number in Appendix A):

Issue No.	Issue Title
A1	Fire Exit Routes
A2	Flame Spread Rating of Interior Finishes
A3	Fire Damper Testing
A4	Fire Detection System
A5	Eight Hour Emergency Lighting Units
A6	Fire Protection Systems Interaction
A7	Fire Safe Shutdown/Alternate Shutdown
A8	Work-In-Progress
A9	Hot Shutdown Panel (HSP) Power Loss by Control Room Evacuation Procedure

5.0 CORRECTIVE ACTION PROGRAM (CAP) METHODOLOGY AND RESULTS

This section of the Project Status Report (PSR) addresses the program methodology for the fire protection portion of the Corrective Action Program (CAP). It describes the establishment of design criteria in conformance with CPSES licensing commitments, the development of procedures, the implementation of the design validation process and the Post Construction Hardware Validation Program (PCHVP), as well as the results of the Corrective Action Program (CAP) and identified corrective and preventive actions.

5.1 METHODOLOGY AND WORK PERFORMED

The methodology and work performed in implementing the Corrective Action Program (CAP) for fire protection are discussed in the following sections.

5.1.1 Licensing Commitments, Design Criteria and Procedures

Impell identified the licensing commitments relating to fire protection through an extensive review of CPSES licensing documentation (such as the FSAR, the Safety Evaluation Report (SER), and related supplements (SSERs), NRC Regulatory Guides and TU Electric/NRC correspondence). The fire protection design criteria were established to assure compliance with the licensing commitments. The design criteria are consolidated in the Design Basis Documents (DBDs) (References 5 through 10).

Impell and EPM then developed procedures for their respective scope of responsibility which encompass the following:

- Design criteria
- Resolution of Comanche Peak Response Team (CPRT) issues
- Impell/EPM experience gained through the design of fire protection systems, structures and components and Fire Hazards/Safe Shutdown Analyses for several licensed United States nuclear power plants
- Regulatory and professional society guidance, such as applicable codes and standards

The procedures which implemented the fire protection portion of the Corrective Action Program (CAP) are shown in Table 5-1.

5.1.1.1 Verification of Design Criteria, Procedures and Resolution of Issues

Technical audits and surveillances have been performed to provide additional assurance that the design criteria are technically correct and embody the fire protection licensing commitments and that all Comanche Peak Response Team (CPRT) issues have been resolved. To assure that the fire protection related licensing commitments have been identified,

and appropriate design criteria have been established, the TU Electric Quality Assurance (QA) Program and the Comanche Peak Response Team (CPRT) conducted overviews. TU Electric Quality Assurance (QA) audits were performed as described in Section 5.3. The Comanche Peak Response Team (CPRT) overview is being performed by the TU Electric Engineering Functional Evaluation (EFE) and TU Electric Technical Audit Program (TAP) as described in Section 5.3.

The TU Electric Technical Audit Program (TAP) is auditing the fire protection portion of the Corrective Action Program (CAP) to assure that the design criteria are reconciled with the licensing commitments.

Resolution of the Comanche Peak Response Team (CPRT) issues is described in Appendix A of this Project Status Report (PSR).

5.1.2 Design Validation Process

The design validation was conducted to provide assurance that the fire protection systems, structures and components comply with the design criteria and that all Comanche Peak Response Team (CPRT) issues were resolved.

Review of calculations, drawings and fire test reports; engineering walkdowns; and specification updates were performed during the fire protection design validation process. These activities included National Fire Protection Association (NFPA) code compliance reviews and engineering evaluations.

Calculations

The original fire protection calculations for CPSES Unit 1 and Common were reviewed to assure compliance with the design criteria specified in the Design Basis Documents (DBDs). As a result of this review, new and replacement calculations were developed to validate the fire protection design.

Drawings

The original fire protection related drawings for CPSES Unit 1 and Common were reviewed to assure compliance with the design criteria specified by the Design Basis Documents (DBDs). The original fire protection related drawings were validated by revision or replacement where required to assure compliance with the design criteria.

Fire Test Reports

To validate that fire protection materials were adequately tested for their CPSES applications the original test reports were reviewed and additional tests were performed to assure that:

- Fire testing was performed by recognized testing laboratories
- Accepted test procedures and practices were used
- Test configurations were representative of CPSES installations
- Test results were in conformance with acceptance criteria

Engineering Walkdowns

Engineering walkdowns were performed to obtain as-built information that was used as input to the design validation process. These engineering walkdowns developed the following information:

- Fire extinguisher location
- Fire detector location
- Fire suppression system coverage
- Communication system location
- Emergency lighting location and coverage
- Reactor coolant pump oil collection system configuration
- Fire safe shutdown component location

Specifications

The original fire protection installation/procurement specifications were reviewed and revised to be consistent with the design criteria as specified in the Design Basis Documents (DBDs) and to identify the required inspection attributes and acceptance criteria. The specifications received interdisciplinary and interorganizational review for design interface consistency. Construction/Quality Control (QC) inspection procedures were revised to assure consistency with the installation/procurement specifications and were subsequently used for installation and inspection activities.

5.1.2.1 Fire Protection Features

Fire Barriers

Fire barriers such as walls, floors, ceilings, doors, fire dampers, fire stops, Thermo-Lag protective barrier wrap and radiant energy shields are utilized to provide fire resistance ratings in accordance with the design criteria as specified in the Design Basis Document (DBD) (Reference 5).

Design drawings and fire test reports were reviewed and engineering walkdowns (References 32 and 36) were performed to validate that the barriers are located in accordance with the fire protection design criteria. They were also validated to assure that the materials and configuration utilized are consistent with the results of the fire test reports.

Penetration seals[1] are also used to provide a fire resistance rating commensurate with the ratings of the barriers in which they are installed. In addition to this, the penetration seals may be utilized to provide radiation shielding, flooding protection, and environmental sealing.

Design and installation drawings were reviewed to validate that penetration seals are in compliance with vendor documentation and test reports for other penetration seal functions (radiation shielding, flooding protection, and environmental sealing).

Where required, fire barrier design changes were developed to assure that the validated design complies with the design criteria. The design validation of the fire barriers provides assurance that they will perform their design functions.

Fire Suppression Systems

Fire suppression systems (portable extinguishers; standpipe and hose stations; and sprinkler, fixed water spray, and halon extinguishing systems) are provided to extinguish a fire that may occur.

Design drawings and calculations were reviewed and engineering walkdowns (Reference 33) were performed to validate that the systems were designed and installed in accordance with the requirements of their appropriate National Fire Protection Association (NFPA) standards (Reference 13 through 18) as specified in the Design Basis Document (DBD) (Reference 10).

Where required, fire suppression system design changes were implemented to assure that the validated design complies with the design criteria. The design validation of the fire suppression systems provides assurance that they will perform their design functions.

Fire Detection System

A fire detection system is provided at CPSES in order to promptly detect a fire and transmit an alarm to the plant operating personnel.

Design drawings were reviewed and engineering walkdowns (Reference 34) were performed to validate that the detection system was designed in accordance with National Fire Protection Association (NFPA) Standard 72D (Reference 19) and that fire detectors were of the proper type and

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[1]Penetration seals are utilized to seal openings through walls, floors and ceilings for piping, conduit, instrumentation tubing, ductwork and cable trays.

located in accordance with NFPA Standard 72E (Reference 20) as specified in the Design Basis Document (DBD) (Reference 9).

Where required, fire detection system design changes were developed to assure that the validated design complies with the design criteria. The design validation of the fire detection systems provides assurance that a fire will be detected and that an alarm will be transmitted to alert the plant operating personnel.

Communication System

The communication system design was reviewed to validate its ability to achieve and maintain communication in the event of a postulated fire for the following:

- Communication to achieve safe shutdown of the reactor
- Communication with the fire brigade
- Communication with off-site organizations
- Communication for plant evacuation

Design drawings were reviewed and engineering walkdowns (Reference 41) were performed to validate that the communication system was designed in accordance with the design criteria.

Where required, communication design changes were developed to assure that the validated design complies with the design criteria. The design validation of the communication capabilities provides assurance of availability in the event of a fire for the situations described above.

Emergency Lighting

Eight hour battery pack emergency lighting units are provided for access/egress and local operation of equipment required to achieve and maintain safe shutdown of the reactor in the event of a postulated fire coincident with the loss of off-site power.

Design drawings were reviewed and engineering walkdowns (Reference 31) were performed to validate that the units were installed in accordance with the design criteria as specified in the Design Basis Document (DBD) (Reference 39).

The design validation of the eight hour emergency lighting units provides assurance of the adequacy of the lighting for access/egress routes and local operation of equipment required to achieve and maintain safe shutdown of the reactor in the event of a postulated fire coincident with the loss of off-site power.

Reactor Coolant Pump Oil Collection System

A reactor coolant pump oil collection system is provided at CPSES Unit 1 and Common to collect and drain reactor coolant pump lubricating oil in the event of a postulated leak to prevent it from becoming a fire hazard. The NSSS vendor reactor coolant pump technical manual (Reference 40) was reviewed to determine the maximum postulated reactor coolant pump lubricating oil leakage and the location of the potential leak points (e.g., flanged and gasketed connections). In addition, engineering walkdowns (Reference 41) were performed to obtain as-built information required as input for design validation.

The design validation of the reactor coolant pump oil collection system provides assurance that the system complies with the design criteria specified in the Design Basis Document (DBD) (Reference 5) and that it will perform its design function.

5.1.2.2 Fire Protection Analyses

Fire Hazards Analysis (FHA)

The CPSES Unit 1 and Common Fire Hazards Analysis (FHA) extends the concept of defense-in-depth to fire protection with the following objectives:

- To prevent a fire from starting;
- To detect, control and extinguish a fire;
- To provide protection for CPSES Unit 1 and Common systems, structures and components required to achieve and maintain safe shutdown of the reactor in the event of a postulated fire coincident with the loss of off-site power.

The Fire Hazards Analysis (FHA) was performed by qualified fire protection engineers. It identifies installed combustibles and considers potential transient combustibles to determine the effects of a postulated fire in any location in CPSES Unit 1 and Common.

The Fire Hazards Analysis (FHA) establishes the CPSES Unit 1 and Common fire areas[2] and describes the fire detection and suppression systems which are provided to minimize the probability and consequences of postulated fires. The completion of the Fire Hazards Analysis (FHA) validates the availability of systems, structures and components required to achieve and maintain safe shutdown of the reactor in the event of a postulated fire.

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[2]A fire area is that section of the plant that is separated from other areas of the plant by fire barriers.

Fire Safe Shutdown Analysis (FSSA)

The Fire Safe Shutdown Analysis (FSSA) was performed to assure that required CPSES Unit 1 and Common systems, structures and components are available to achieve and maintain safe shutdown of the reactor in the event of a postulated fire coincident with a loss of off-site power.

The Fire Safe Shutdown Analysis (FSSA) design validation activities included:

- Identification of systems, structures and components required to achieve and maintain safe shutdown of the reactor in the event of a postulated fire coincident with a loss of off-site power
- Performance of engineering walkdowns (Reference 27) to identify the location of the above systems, structures and components and their relation to fire protection features
- Development and evaluation of Fire Safe Shutdown Analysis (FSSA) fault tree analyses[3] documenting the ability to achieve and maintain safe shutdown of the reactor in the event of a postulated fire coincident with a loss of off-site power

If evaluations indicated that the required design criteria as specified in the Design Basis Document (DBD) (Reference 7) could not be accomplished with the available configuration of systems, structures and components and fire protection features, design changes were developed to assure that the validated design complies with the design criteria.

5.1.2.3 Interfaces

The validation process involves interfaces with TU Electric and with other organizations involved in the Corrective Action Program (CAP). Organizational interfaces shown in Figure 5-1 included those between Impell/EPM and TU Electric, Westinghouse, SWEC, SWEC-PSAS and Ebasco. Interfaces with these organizations are procedurally controlled to assure:

- Consistency of design criteria
- Completeness of the information incorporated in each Design Validation Package (DVP)
- Proper transfer of design data between interfacing organizations

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[3]Fault tree analyses are methods of modeling the various ways by which a system can achieve its design function. These analyses can be utilized to determine how a postulated component fault (e.g., failure or malfunction of a component because of a fire) can be evaluated to assure the system will achieve its design function.

- Uniform application of design control procedures
- Coordination of corrective and preventive actions

5.1.2.4 Final Reconciliation Process

The purpose of the final reconciliation process is to consolidate design validation analyses, hardware modification and inspection documentation to assure consistency of the fire protection design documentation with the hardware installation. The final reconciliation of the fire protection design incorporates the following:

- Post Construction Hardware Validation Program (PCHVP) results
- Resolution of fire protection related Comanche Peak Response Team (CPRT) issues.

Final reconciliation includes confirmation that the interfacing organizations have accepted the fire protection results as compatible with their validated design. Interfacing organizations are depicted on Figure 5-1.

In addition, open items, observations and deviations related to systems interaction portion of the Corrective Action Program (CAP) that were identified by the TU Electric Technical Audit Program (TAP) and the Engineering Functional Evaluation (EFE) are resolved prior to the completion of the reconciliation phase. Open items from TU Electric Significant Deficiency Analysis Reports (SDARs) (10CFR50.55(e)) are resolved during the final reconciliation process. At the conclusion of final reconciliation, the CPSES Unit 1 and Common Design Validation Packages (DVPs) are compiled.

5.1.3 Post Construction Hardware Validation Program (PCHVP)

The Post Construction Hardware Validation Program (PCHVP) (Reference 12) is the portion of the TU Electric Corrective Action Program (CAP) which validates the final acceptance attributes for safety-related[4] hardware. The Post Construction Hardware Validation Program (PCHVP) process is shown diagrammatically in Figure 5-2.

The input to the Post Construction Hardware Validation Program (PCHVP) is contained in the installation/procurement specifications. The installation/procurement specifications implement the licensing commitments and design criteria of the Design Basis Documents (DBDs), which were developed during the Corrective Action Program (CAP) design validation process.

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[4]Portions of selected non-safety-related systems, structures and components are included in the Corrective Action Program (CAP). These are Seismic Category II (Reference 26) systems, structures and components, and fire protection systems.

Final acceptance inspection requirements identified in the validated installation/procurement specifications were used to develop the Post Construction Hardware Validation Program (PCHVP) attribute matrix. This matrix is a complete set of final acceptance attributes identified for installed hardware. The Post Construction Hardware Validation Program (PCHVP), by either physical validation or through an engineering evaluation methodology, assures that each of the attributes defined in the attribute matrix is validated.

Physical validation of an attribute is performed by Quality Control (QC) inspection or engineering walkdown, for accessible components. Quality Control (QC) inspections and engineering walkdowns are controlled by appropriate Field Verification Method (FVM) procedures.

The Post Construction Hardware Validation Program (PCHVP) engineering evaluation depicted in Figure 5-2 is procedurally controlled to guide the Corrective Action Program (CAP) responsible engineer through the evaluation of each item on the attribute matrix to be dispositioned by the engineering evaluation method. Disposition of each attribute will be clearly documented. If the technical disposition of the final acceptance attribute is "not acceptable" or the attribute cannot be dispositioned based on available information, an alternate plan consisting of additional evaluations, testing, inspections/walkdowns or modifications, as necessary, will be developed to demonstrate and document the acceptability of the attribute.

Recommendations from the Comanche Peak Response Team (CPRT) effort comprise a portion of the evaluation. A major component of the Comanche Peak Response Team (CPRT) program has been the inspection of a comprehensive, random sample of existing hardware using an independently derived set of inspection attributes. The inspection was performed and the results were evaluated by Third Party personnel in accordance with Appendix E to the Comanche Peak Response Team (CPRT) Program Plan (References 1, 2, and 28). The scope of the inspection covered the installed safety-related hardware by segregating the hardware into homogeneous populations (by virtue of the work activities which produced the finished product). Samples of these populations were inspected to provide reasonable assurance of hardware acceptability in accordance with Appendix D to the Comanche Peak Response Team (CPRT) Program Plan.

Corrective action recommendations were made to TU Electric based on the evaluated findings when a Construction Deficiency existed, an Adverse Trend existed, or an Unclassified Trend existed as defined in accordance with Appendix E to the Comanche Peak Response Team (CPRT) Program Plan.

The Post Construction Hardware Validation Program (PCHVP) assures that all Comanche Peak Response Team (CPRT) recommendations are properly dispositioned.

Figure 5-2 illustrates that during the evaluation of a given attribute from the Post Construction Hardware Validation Program (PCHVP) attribute matrix, the initial task of the Corrective Action Program (CAP) responsible engineer is to determine if any of the following statements are true:

a. The attribute was recommended for reinspection by the Comanche Peak Response Team (CPRT)

b. Design validation resulted in a change to design or to a hardware final acceptance attribute that is more stringent than the original acceptance attribute or the Comanche Peak Response Team (CPRT) did not inspect the attribute

c. Design validation resulted in new work, including modification to existing hardware

If the Comanche Peak Response Team (CPRT) had no recommendations and items b. or c. above do not apply, the attribute under consideration will be accepted. This conclusion is justified by the comprehensive coverage of the Comanche Peak Response Team (CPRT) reinspection and the consistently conservative evaluation of each finding from both a statistical and adverse trend perspective. The attribute matrix is then updated to indicate that neither the engineering walkdown nor Quality Control (QC) inspection of the attribute is necessary. A completed evaluation package is prepared and forwarded to the Comanche Peak Engineering (CPE) organization for concurrence. The evaluation package becomes part of the Design Validation Package (DVP) after Comanche Peak Engineering (CPE) concurrence is obtained.

If any of the three statements above are true, it is assumed that the final acceptance attribute must be further evaluated as follows:

Determine Attribute Accessibility

The Corrective Action Program (CAP) responsible engineer will determine if the attribute is accessible. If the attribute is accessible, a field validation of the item's acceptability will be performed and documented in accordance with an approved Field Verification Method (FVM).

If the Corrective Action Program (CAP) responsible engineer reaches the conclusion that the attribute is inaccessible, an engineering evaluation will be conducted by technical disposition of available information.

After completing the attribute accessibility review, the Corrective Action Program (CAP) responsible engineer will update the attribute matrix, as necessary, to reflect the results of that review.

Technical Disposition

The Corrective Action Program (CAP) responsible engineer identifies the data to be considered during the subsequent technical disposition process. Examples of such items used in this disposition may include, but are not limited to:

- Historical documents (e.g., specifications, procedures and inspection results)

- Comanche Peak Response Team (CPRT) and external issues
- Construction practices
- Quality records
- Test results
- Audit reports
- Authorized Nuclear Inspector (ANI) records
- Surveillance reports
- NCRs, DRs, SDARs, and CARs
- Inspections conducted to date
- Results of Third Party reviews
- Purchasing documents
- Construction packages
- Hardware receipt inspections

After compiling the data identified as pertinent to the attribute, the technical disposition will be performed. The actual steps and sequence of actions required for each technical disposition will differ; however, the tangible results from each technical disposition will be consistent. These results will include as a minimum:

- A written description of the attribute;
- A written justification by the Corrective Action Program (CAP) responsible engineer for acceptance of the attribute;
- A written explanation of the logic utilized to conclude that the attribute need not be field validated;
- A chronology demonstrating that the attribute has not been significantly altered by redesign;
- All documents viewed to support the disposition;
- Concurrence of the acceptance of the attribute's validity by Comanche Peak Engineering (CPE).

If the Corrective Action Program (CAP) responsible engineer concludes that the data evaluated represents evidence of the attribute's acceptability, the conclusion will be documented. The documentation will be reviewed and approved by Comanche Peak Engineering (CPE) and filed in the Design Validation Package (DVP). If the Corrective Action Program (CAP) responsible engineer determines that the data reviewed does not provide evidence of the attribute's acceptability, the documentation will explain why the attribute cannot be accepted and recommend an alternate course of action. The alternate course of action may take various forms such as making the attribute accessible and inspecting it, or testing to support the attribute's acceptability. This alternate plan, after approval by Comanche Peak Engineering (CPE), will be implemented to validate the attribute.

In summary, the Post Construction Hardware Validation Program (PCHVP) is a comprehensive process by which each attribute in the PCHVP attribute matrix is validated to the validated design. The TU Electric Technical Audit Program (TAP) will audit the Post Construction Hardware Validation Program (PCHVP). This audit program is complemented by the Engineering Functional Evaluation (EFE) being performed by an independent team comprised of Stone & Webster, Impell, and Ebasco engineering personnel working under the Stone & Webster Quality Assurance (QA) Program and subject to oversight directed by the Comanche Peak Response Team's (CPRT) Senior Review Team (SRT). The Post Construction Hardware Validation Program (PCHVP) will provide reasonable assurance that the validated design has been implemented for safety-related hardware.

To provide assurance that the as-built hardware complies with the validated design, the Post Construction Hardware Validation Program (PCHVP) for fire protection developed a matrix of final acceptance attributes based on the validated installation/procurement specifications. A summary of the fire protection final acceptance attributes is provided in Table 5-2. The specific final acceptance attributes are contained in the Commodity/Attribute Matrix (Reference 35).

A brief description of the Field Verification Methods (FVMs) implemented in the Post Construction Hardware Validation Program (PCHVP) for CPSES Unit 1 and Common fire protection is given below:

- **FVM-055**
  Field Verification Method (FVM) CPE-IM-FVM-FP-055 (Reference 21) was developed to control the collection of as-built data for penetration seals and fire stops.

- **FVM-091**
  Field Verification Method (FVM) CPE-IM-FVM-FP-091 (Reference 22) was developed to control the collection of as-built data for Thermo-Lag protective barrier wrap.

- **FVM-092**
  Field Verification Method (FVM) CPE-IM-FVM-FP-092 (Reference 23) was developed to control the collection of as-built data for radiant energy shields.

- **FVM-093**
  Field Verification Method (FVM) CPE-IM-FVM-FP-093 (Reference 24) was developed to control the collection of as-built data for portable fire extinguishers.

- **FVM-094**
  Field Verification Method (FVM) CPE-IM-FVM-FP-094 (Reference 25) was developed to control the collection of as-built data for fire suppression systems.

Procedures have been developed by other Corrective Action Program (CAP) organizations who are responsible for the installation/procurement specification for the following CPSES Unit 1 and Common fire protection features:

- Fire dampers - Ebasco HVAC (Reference 43)
- Fire detection systems - SWEC Instrumentation & Control (Reference 37)
- Cable routing - SWEC Electrical (Reference 45)
- Walls, floors and ceilings - SWEC Civil/Structural (Reference 44)
- Fire doors - SWEC Civil/Structural (Reference 44)

These Corrective Action Program (CAP) organizations are implementing the Post Construction Hardware Validation Program (PCHVP) for these fire protection features.

5.2 RESULTS

This section discusses the results of the fire protection portion of the Corrective Action Program (CAP).

5.2.1 Design Validation Results

The validation of the CPSES Unit 1 and Common fire protection design has been completed as described in this Project Status Report (PSR). This effort included:

- Review of approximately 35 original calculations
- Review of approximately 215 original design drawings
- Development of approximately 100 replacement and new calculations
- Development of approximately 35 new design drawings
- Performance of approximately 15 engineering walkdowns to obtain design validation input
- Review of approximately 40 fire test reports
- Revision of 6 installation/procurement specifications
- Resolution of 18 Tenera, L.P. (TERA) Discrepancy Issue Reports (DIRs)
- Development of approximately 130 fault tree diagrams

The results of this design validation effort determined that some hardware modifications were required which included the following:

- Relocating and/or adding approximately 90 fire detectors
- Adding approximately 30 eight hour battery pack emergency lighting units
- Providing an alternate power supply for the fire detection system
- Enhancing the communication system reliability (e.g., addition of an alternate power supply and an automatic power supply transfer switch)
- Replacing 17 fire hydrants
- Adding Thermo-Lag barrier wrap for protection of approximately 250 cable trays/conduits

The design validation effort, in conjunction with the design modifications, results in a fire protection design and associated documentation that is in conformance with CPSES licensing commitments and provides assurance that the fire protection systems, structures and components are designed to perform their design functions.

5.2.2 Post Construction Hardware Validation Program (PCHVP) Results

The Post Construction Hardware Validation Program (PCHVP) is being implemented through the validation of the final acceptance attributes for fire protection features in CPSES Unit 1 and Common as discussed in Section 5.1.3.

5.3 QUALITY ASSURANCE (QA) PROGRAM

All activities of the CPSES Unit 1 and Common fire protection portion of the Corrective Action Program (CAP) were performed in accordance with the Impell or EPM Quality Assurance (QA) Programs as applicable. Work is performed in accordance with these Quality Assurance (QA) Programs which comply with 10CFR50 Appendix B, ANSI N45.2 (Reference 29) and appropriate ANSI daughter standards. The Impell and EPM Quality Assurance (QA) Programs were reviewed and approved by the TU Electric Quality Assurance (QA) organization.

5.3.1 Impell Quality Assurance (QA) Program

Prior to initiation of the fire protection validation, a Fire Protection Project Quality Plan (Reference 30) was developed in accordance with the Impell Corporate Quality Assurance (QA) Program. The Project Quality Plan has been reviewed by TU Electric and serves to control all Impell work performed to validate the CPSES Unit 1 and Common fire protection design. The Fire Protection Project Quality Plan includes specific procedures to supplement the Impell Corporate Quality Assurance (QA) Program.

To provide additional assurance of the technical adequacy of the design validation effort, the Impell Corporate Quality Assurance (QA) Program has established a Technical Quality Review Program. The Technical Quality Review consists of a detailed technical assessment by qualified engineers of each type of technical activity performed. Technical Quality Reviews are documented and are made part of project records.

In accordance with the Fire Protection Project Quality Plan, detailed fire protection project procedures were developed. These procedures controlled the design validation effort and the organization and format of engineering documents. These procedures were distributed to Impell supervisory engineers and were readily available to fire protection personnel. The issuance of these procedures and their revisions were followed with detailed training programs for the applicable personnel.

An Impell Project Quality Assurance (QA) Manager who reports to an Impell Corporate Vice President and who has management experience in auditing and Quality Assurance (QA) Program procedure development for engineering activities, was assigned to the project in the earliest stages of project mobilization. This reporting responsibility assures independence of Quality Assurance (QA) functions. Quality Assurance (QA) personnel provide assurance that the Quality Assurance (QA) Program properly addresses all project activities and assist project personnel in properly implementing the Quality Assurance (QA) Program.

To date, more than 12,000 man-hours have been expended by Impell in activities directly attributable to the fire protection Project Quality Assurance (QA) Program (i.e., training, procedure development, auditing, and the project QA supervisor staff).

5.3.2 Engineering Planning and Management (EPM) Quality Assurance (QA) Program

All work performed for the CPSES Unit 1 and Common Fire Safe Shutdown Analysis (FSSA) is in accordance with EPM's Quality Assurance (QA) Manual and associated Quality Assurance (QA) procedures. EPM implemented the Fire Safe Shutdown Analysis (FSSA) CPSES specific project procedures (See Table 5-1) applicable to the design validation activities. These procedures encompass organizational, administrative and technical aspects of EPM's Fire Safe Shutdown Analysis (FSSA) validation effort, assuring that implementation of design criteria, performance of calculations, engineering walkdowns and evaluations, and design interfaces are consistent with the TU Electric Corrective Action Program (CAP). These procedures were distributed to EPM supervisory engineers and were readily available to all fire protection personnel. The issuance of these procedures and their revisions was followed with detailed training programs for the applicable personnel.

The Manager Quality Assurance (QA) has the overall responsibility for ensuring the successful implementation of EPM's Quality Assurance (QA) program. The Manager Quality Assurance (QA) reports directly to the President of EPM on quality matters. This reporting responsibility assures independence of Quality Assurance (QA) functions. The Manager Quality Assurance (QA) has the authority to initiate corporate action(s) necessary to resolve any deficiencies identified internally or externally with quality activities.

To date, more than 3,000 work hours have been expended by EPM in Quality Assurance (QA) activities directly related to the Fire Safe Shutdown Analysis (FSSA) validation (i.e. training, procedure development and auditing).

5.3.3 Summary of Fire Protection Quality Assurance (QA) Audits, Surveillances and Inspections

The adequacy and implementation of these Quality Assurance (QA) Programs were extensively audited and surveilled by Impell's Quality Assurance Engineering Audit Group, EPM's Quality Assurance (QA) Group and TU Electric Quality Assurance (QA).

To date, a total of 37 audits and surveillances of the fire protection portion of the Corrective Action Program (CAP) were performed by these organizations for CPSES Unit 1 and Common as shown on Table 5-3.

The TU Electric Quality Assurance (QA) Technical Audit Program (TAP)[5] and the TU Electric Quality Assurance (QA) Engineering Surveillance Group also evaluated the technical adequacy of the engineering product (e.g., Design Basis Documents (DBDs), calculations, specifications, drawings, engineering walkdowns and evaluations).

The following list of audit and surveillance subjects describes the depth of review that has been performed:

- Adequacy of project technical and design control procedures
- Technical adequacy and documentation of calculations
- Non-Conformance Reports (NCRs)
- Specification validation
- Calculation validation
- Records maintenance
- Generic Issue Report (GIR)
- Discrepancy Issue Reports (DIRs)
- Design Basis Documents (DBDs)
- Indoctrination and training
- Licensing activities
- Corrective Action Requests (CARs)
- Personnel qualification and experience verification
- Design modifications

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[5]The TU Electric Technical Audit Program (TAP) has been in effect since January, 1987. Prior to January 1987, the TU Electric Quality Assurance (QA) Department performed audits of selected engineering service contractors using technical specialists as part of its vendor audit program.

These audits and surveillances collectively assessed the adequacy and implementation of the applicable Quality Assurance (QA) Program. These audits and surveillances have resulted in enhancements to the procedures and methods and thus contributed to the overall quality of the fire protection design.

In addition to the audits and surveillances described above, TU Electric has initiated the Engineering Functional Evaluation (EFE) (Reference 38). The EFE began auditing the fire protection portion of the Corrective Action Program (CAP) in June 1987. The Engineering Functional Evaluation (EFE) is an overview program which is performing an independent, in-depth technical evaluation of the Corrective Action Program (CAP) to provide additional assurance that the Corrective Action Program (CAP) is effectively implemented. The Engineering Functional Evaluation (EFE) is conducted under the SWEC Quality Assurance (QA) Program and is directed by a Program Manager who reports to the SWEC Chief Engineer, Engineering Assurance. The Engineering Functional Evaluation (EFE) is performed by highly qualified and experienced engineers from SWEC, Impell and Ebasco who have not been involved with previous engineering and design work at CPSES. The Engineering Functional Evaluation (EFE) is performed in a formal, preplanned and fully documented manner to provide objective evidence of completion of the planned scope of the evaluation and to provide documentation of its results and conclusions. The Engineering Functional Evaluation (EFE) is comparable in scope, level of effort and personnel qualifications to integrated, independent design inspections and verifications conducted at other nuclear plants.

The audits and surveillances collectively represent a very detailed and complete assessment of the following:

- Adequacy of the Quality Assurance (QA) Programs
- Implementation of the Quality Assurance (QA) Programs
- Technical adequacy of the design criteria and procedures
- Implementation of the design criteria and procedures

In some cases, these audits and surveillances identified the need for procedure modifications and specific calculation revisions to provide clarification. Additional training in implementation of procedures in these cases is provided as required. Each item identified in the audit report was carefully reviewed and response to all items was provided. Any corrective/preventive actions determined to be necessary as a result of the audit findings were identified and implemented. Proper implementation of commitments made in response to the audit items is verified during subsequent audits.

The NRC Office of Special Projects (OSP) conducted an inspection of the fire protection portion of the Corrective Action Program (CAP) in October 1987. The inspection involved technical evaluations of the design validation process and included the review of calculations, drawings, specifications procedures and Design Basis Documents (DBDs), and their compliance with fire protection licensing commitments.

In summary, an appropriate level of attention has been given to the quality of all fire protection activities; the Impell Quality Assurance (QA) and EPM Quality Assurance (QA) Programs are appropriate for the scope of work; project performance has been demonstrated to be in compliance with the Quality Assurance (QA) Programs; and appropriate corrective and preventive actions have been taken whenever they were required.

5.4 CORRECTIVE AND PREVENTIVE ACTIONS

Impell and EPM have developed Design Basis Documents (DBDs) and procedures to implement the fire protection portion of the Corrective Action Program (CAP). The Design Basis Documents (DBDs) contain the design criteria for validating the fire protection design of CPSES Unit 1 and Common. The procedures assure compliance with the design criteria and the resolution of the Comanche Peak Response Team (CPRT) issues. As a result of the fire protection portion of the Corrective Action Program (CAP), the CPSES Unit 1 and Common systems, structures and components are validated as being capable of performing their fire protection functions.

This validation is documented in the calculations, drawings, evaluations and specifications which are contained in the Design Validation Packages (DVPs). This validated design documentation will be provided to TU Electric at the completion of the Corrective Action Program (CAP). The Design Basis Documents (DBDs) and procedures used for validation will also be provided to Comanche Peak Engineering (CPE). The validated design documentation, Design Basis Documents (DBDs) and procedures can provide the basis for configuration control of CPSES systems, structures and components and can be utilized by TU Electric to facilitate operation, maintenance and future modifications in accordance with licensing commitments following issuance of an operating license.

Interfaces between organizations have been identified and addressed in detail within the procedures. Those fire protection interfaces are discussed in Section 5.1.2.3.

Practical experience has been provided to Comanche Peak Engineering (CPE) engineers who have worked alongside Impell/EPM engineers during the ongoing validation process. Experience gained by Comanche Peak Engineering (CPE) engineers included changes in design documents, and familiarization with procedures followed and regulatory requirements.

TU Electric Comanche Peak Engineering (CPE) is developing a program to assure a complete and orderly transfer of the engineering and design function from Impell/EPM to CPE. The program provides for the identification of those tasks presently being performed by Impell/EPM which are to be transferred to Comanche Peak Engineering (CPE) and the identification of all procedures, programs, training and staffing requirements. The program is based upon three prerequisites: (a) the Corrective Action Program (CAP) effort to support plant completion is finished for the particular task; (b) the fire protection Design Validation Packages (DVPs) are complete; and (c) any required preventive action taken, as discussed in Appendix A, is complete.

FIGURE 5-1

CORRECTIVE ACTION PROGRAM (CAP) TECHNICAL INTERFACES
FIRE PROTECTION

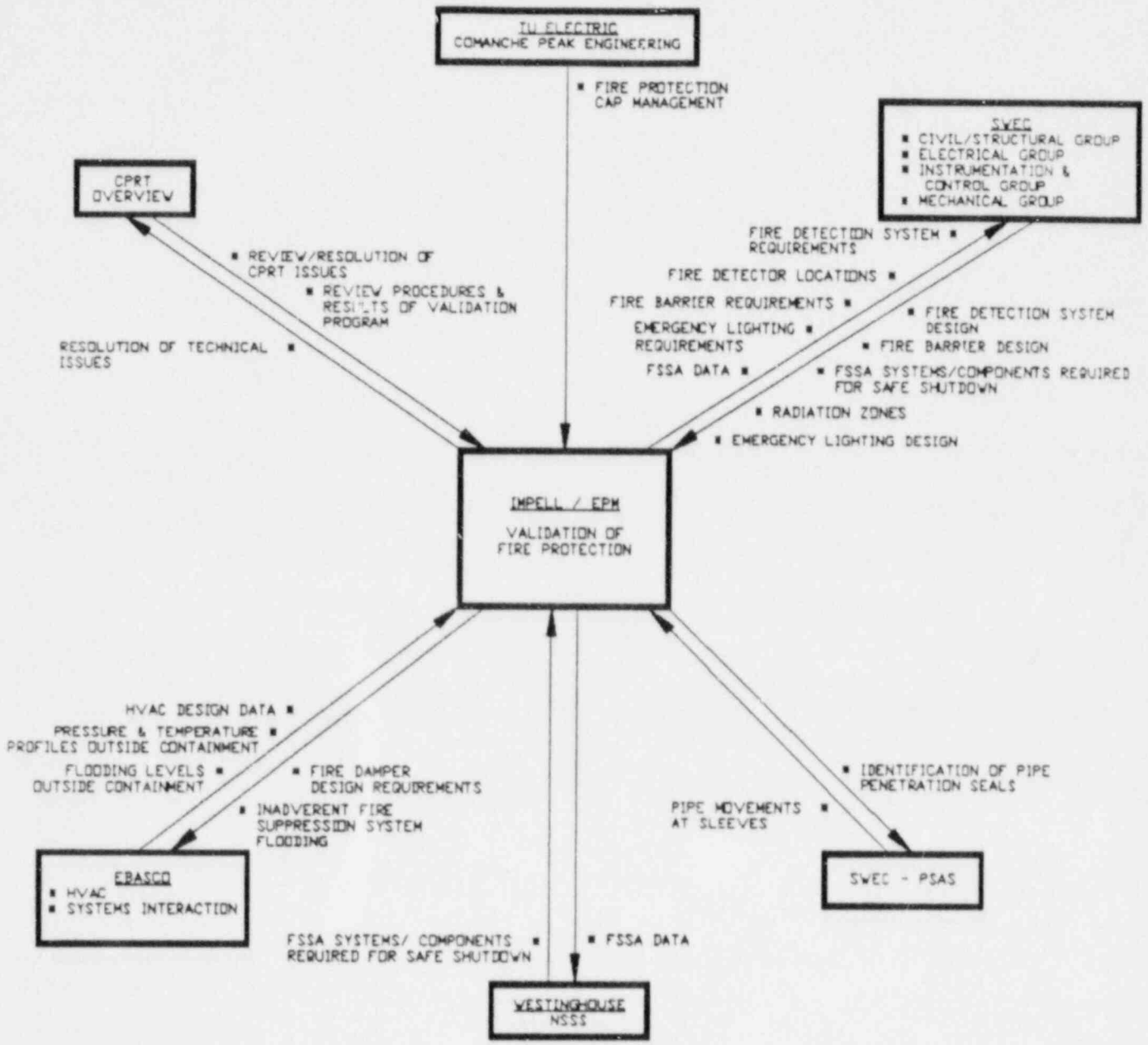

FIGURE 5-2

POST CONSTRUCTION HARDWARE VALIDATION PROGRAM (PCHVP)

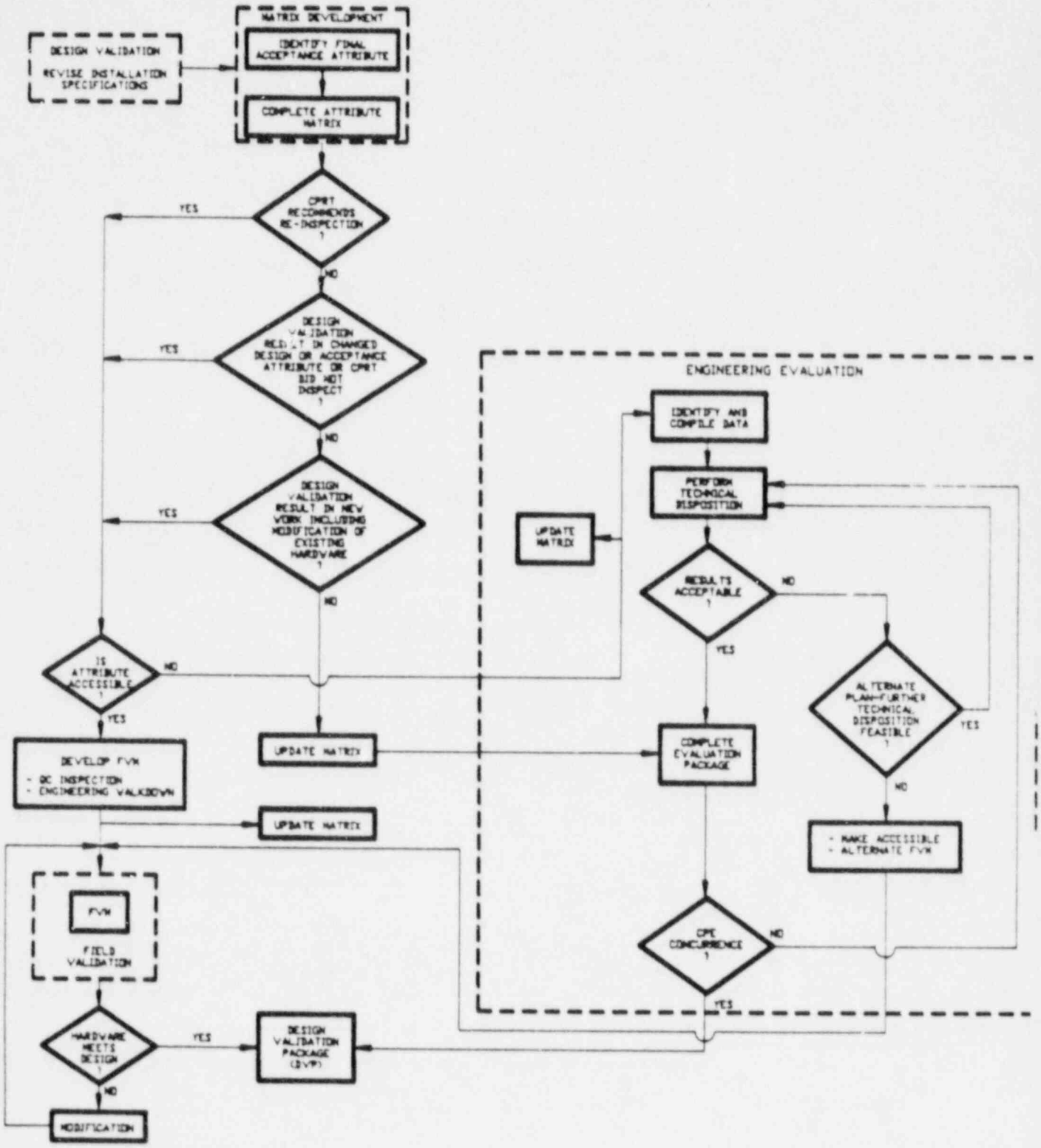

TABLE 5-1
PROCEDURES GOVERNING FIRE PROTECTION DESIGN VALIDATION

Procedure No.	Title
IMT-AD-03	Preparation of Project Instructions
IMT-AD-04	Personnel Indoctrination and Training
IMT-AD-05	Correspondence Control
IMT-AD-08	Control of Quality Assurance Records
IMT-AD-11	Preparation and Review of Specification
IMT-AD-12	Interdisciplinary Review (IDR) of Drawings
IMT-AD-13	Preparation and Review of Design Change Authorizations (DCAs)
IMT-AD-13-1	Preparation and Review of Engineering Change Notices (ECNs)
IMT-AD-13-2	Review and Resolution of Field Change Requests (FCRs)
IMT-AD-14	Review and Processing of Package Process Forms (PPFs) and Design Modification (DMs)
IMT-AD-14-1	Preparation and Review of Package Process Forms (PPFs)
IMT-AD-15	Preparation and Review of Design Engineering Packages (DEPs)
IMT-AD-15-1	Preparation and Review of Design Basis Documents (DBDs)
IMT-AD-16	Design Verification of Engineering Documents
IMT-AD-20	Design Control General Requirements
IMT-AD-23	Review and Transmittal of RFIs (Request for Information Clarification)
IMT-AD-24	As-Built Package Preparation (Field Verification)
IMT-AD-26	Processing of Discrepancy Issue Resolution Reports (DIRs)

TABLE 5-1
(CONTINUED)

Procedure No.	Title
IMT-AD-27	Review and Update of FSAR
IMT-AD-28	Design Verification and Interdisciplinary Review of DCAs and NCRs
IMT-AD-30	Initiation and Review of Corrective Action Requests (CARs)
IMT-FP-01	GFPS Document Review
IMT-FP-02	GFPS FCAs
IMT-FP-03	Disposition of GFPS Nonconformance Reports
IMT-FP-04	Conducting and Documenting NFPA Code Compliance Reviews
IMT-FP-05	Production and Revision of Drawings
IMT-FP-06	Maintenance of FHA
IMT-FP-07	Review and Update of FHA
IMT-FP-08	Preparation of Construction Travelers
IMT-FP-09	Review and Analysis of Existing Fire Protection Deviations
IMT-FP-10	Identification of Licensing Commitments
IMT-FP-10-1	Verification of Implementation of Licensing Commitments
IMT-FP-11	As-Built Verification Method for Mechanical Piping Penetrations
IMT-FP-12	Review of Fire Tests
IMT-FP-13	Determination of Penetration Sealing Requirements
IMT-FP-15	Computerized Penetration Seal Schedule
IMT-FP-16	Cable/Raceway Firestops
IMT-FP-18	Penetration Seal Clearance Calculation (Enlarged Annular Gap) Preparation and Review

TABLE 5-1
(CONTINUED)

Procedure No.	Title
IMT-FP-19	Vendor Document Review
IMT-FP-19-1	Vendor Document Review (VDC and VDI)
IMT-FP-20	Drafting Standardization Instruction
IMT-FP-21	Preparation and Review of Fire Protection Calculations
IMT-FP-23	Communication Requirement Evaluation
IMT-FP-24	Fire Protection Interfaces
IMT-FP-25	Review of TNE Design Deficiency Reports (TDDRs)
IMT-FP-25-1	Initiation of TNE Design Deficiency Reports (TDDRs)
IMT-FP-26	Review of Nonconformance Reports (NCRs)
IMT-FP-27	Review of Test Deficiency Reports (TDRs)
IMT-FP-28	Revision of CPE-Held Fire Protection Related Drawings
IMT-FP-29	Review and Approval of GFPS As-Built Design Documents and Drawings
IMT-FP-30	Interdisciplinary Review (IDR) Performed by Impell Fire Protectoin
IMT-FP-33	Fire Protection Filing System
IMT-FP-34	Maximum Permissible Fire Loading and Non-Rated Features Analysis
IMT-FP-35	Initiation of Deficiency Reports (DRs)
IMT-FP-36	Inadvertent Actuation Evaluation
IMT-FP-37	Identification, Evaluation and Resolution of Deficient Conditions
IMT-FP-38	Review of Corrective Action Requests (CARs)
IMT-FP-39	Fire Protection Preventive Action Program
IMT-FP-40	Instructions for Interfacing with Vendor
IMT-FP-41	Engineering Review of Procurement Documentation

TABLE 5-1
(CONTINUED)

Procedure No.	Title
IMT-FP-42	Preparation of Pre-Operating License Safety Evaluations
IMT-FP-45	Review and Approval of GFPS Procedures
IMT-FP-46	Smoke Removal Analysis
IMT-FP-47	NFPA 72E Deviation Evaluation
IMT-FP-48	Emergency Lighting Evaluation
IMT-FP-49	Field Verification
IMT-FP-50	Thermo-Lag and Radiant Energy Shield Schedule
IMT-FP-53	Partial Sprinkler Coverage Evaluation
IMT-FP-54	High Impedance Fault Study
IMT-FP-55	Control of Fire Protection Calculations
IMT-FP-56	Fire Protection Post Construction Hardware Validation Program
IMT-FP-57	Thermo-Lag Reduction/System Interaction Analysis
IMT-FP-59	Cable Tray Support Analysis
IMT-FP-60	Initiation of Design Modification Requests (DMRs)
EPM-SITE-ADM-001	Preparation of Site and Project Procedures
EPM-SITE-ADM-002	EPM Site Organization and Interfaces
EPM-SITE-ADM-003	Correspondence Control
EPM-SITE-ADM-004	Document Control
EPM-SITE-TEC-005	Verification of Software Systems
EPM-SITE-TEC-006	Preparation and Review of Design Basis Documents
EPM-SITE-TEC-008	Verification of Databases
EPM-SITE-TEC-009	Preparation and Review of Design Drawings
EPM-SITE-TEC-010	Design Control General Requirements

TABLE 5-1
(CONTINUED)

Procedure No.	Title
EPM-SITE-ADM-011	Personnel Indoctrination and Training
EPM-SITE-TEC-012	Design Verification of Engineering Documents
EPM-SITE-TEC-013	As-Built Package Preparation
EPM-SITE-TEC-014	Disposition of Discrepancy/Issue Resolution Reports
EPM-SITE-TEC-016	FSAR Change Requests
EPM-SITE-TEC-018	Reporting and Control of Nonconformances
EPM-SITE-TEC-019	Reporting and Control of Deficiencies
EPM-SITE-ADM-020	Stop Work Orders
EPM-SITE-ADM-021	Preparation, Review and Approval of Task Descriptions
EPM-SITE-TEC-023	Preparation of Field Verification Method Procedures
EPM-SITE-ADM-024	Records Turnover
EPM-SITE-ADM-025	Fire Safe Shutdown Impacted Documents
EPM-P257-000-002	Alternate and Fire Safe Shutdown Systems Selection Analysis
EPM-P257-000-003	Selection and Classification of Safe Shutdown Circuits and Cables
EPM-P257-000-004	Analysis and Logic Development of the Emergency Power Distribution System
EPM-P257-000-007	Alternate and Fire Safe Shutdown Analysis by Fire Area
EPM-P257-000-008	INDMS Data Entry and Database Control
EPM-P257-000-010	Combustible Loading Calculations
EPM-P257-000-011	Unit 1 FSSA Database Change Package Preparation

TABLE 5-1
(CONTINUED)

Procedure No.	Title
EPM-P257-000-014	Review of Design Modifications for Appendix R Fire Safe Shutdown Compliance
EPM-P275-000-015	Preparation and Review of Calculations
EPM-P275-000-017	Fire Protection Engineering Evaluation and Analysis Report Generation

TABLE 5-2
POST CONSTRUCTION HARDWARE VALIDATION PROGRAM (PCHVP)
FIRE PROTECTION

Construction Work Category	Final Acceptance Attribute	PCHVP Attribute Validation Method
Penetration Seals	Presence of damage	CPE-IM-FVM-FP-055 (Reference 21)
	Internal conduit seal orientation	CPE-IM-FVM-FP-055
	Presence of complete seal	CPE-IM-FVM-FP-055
	Thread engagement of recessed threaded plugs	CPE-IM-FVM-FP-055
	Size of blockout	CPE-IM-FVM-FP-055
	Seal location	CPE-IM-FVM-FP-055
	Identification of seal type	CPE-IM-FVM-FP-055
	Bonding of boot adhesive	CPE-IM-FVM-FP-055
	Presence of boot on both sides	CPE-IM-FVM-FP-055
	Adequacy of tuck	CPE-IM-FVM-FP-055
Fire Barrier (Thermo-Lag)	Continuity of coverage (joint fill)	CPE-IM-FVM-FP-091 (Reference 22)
	Presence of damage	CPE-IM-FVM-FP-091
	Location	CPE-IM-FVM-FP-091
	Type of mechanical fastener	CPE-IM-FVM-FP-091
	Spacing of mechanical fastener	CPE-IM-FVM-FP-091
	Protruding member coverage	CPE-IM-FVM-FP-091

TABLE 5-2
POST CONSTRUCTION HARDWARE VALIDATION PROGRAM (PCHVP)
FIRE PROTECTION

Construction Work Category	Final Acceptance Attribute	PCHVP Attributes Validation Method
Radiant Energy Shield	Location	CPE-IM-FVM-FP-092 (Reference 23)
	Type of mechanical fastener	CPE-IM-FVM-FP-092
	Spacing of mechanical fastener	CPE-IM-FVM-FP-092
	Presence of damage	CPE-IM-FVM-FP-092
	Continuity of coverage	CPE-IM-FVM-FP-092
Fire Extinguisher	Mounting/location	CPE-IM-FVM-FP-093 (Reference 24)
	Classification	CPE-IM-FVM-FP-093
	Size	CPE-IM-FVM-FP-093
	Type	CPE-IM-FVM-FP-093
	Presence of bracket tag number	CPE-IM-FVM-FP-093
	Anchor bolt diameter	CPE-IM-FVM-FP-093
	Anchor bolt embedment depth	CPE-IM-FVM-FP-093
	Anchor bolt torque	CPE-IM-FVM-FP-093
Fire Protection Halon Equipment	Presence of ID tags	CPE-IM-FVM-FP-094 (Reference 25)
	Manifold anchor bolt torque	CPE-IM-FVM-FP-094
	Manifold configuration	CPE-IM-FVM-FP-094
	Type of cylinder mounting	CPE-IM-FVM-FP-094

TABLE 5-2
POST CONSTRUCTION HARDWARE VALIDATION PROGRAM (PCHVP)
FIRE PROTECTION

Construction Work Category	Final Acceptance Attribute	PCHVP Attributes Validation Method
Fire Protection Halon Equipment	Type of pneumatic actuator panel mounting	CPE-IM-FVM-FP-094
	Actuation device location/type	CPE-IM-FVM-FP-094
Fire Protection Halon Nozzles	Location/spacing	CPE-IM-FVM-FP-094
	Type	CPE-IM-FVM-FP-094
Fire Protection Hose Cabinet	Type of valve	CPE-IM-FVM-FP-094
	Accessibility of valve	CPE-IM-FVM-FP-094
	Presence of orifice plate	CPE-IM-FVM-FP-094
	Orifice plate size	CPE-IM-FVM-FP-094
	Location	CPE-IM-FVM-FP-094
	Type of attachment	CPE-IM-FVM-FP-094
	Hose type and quantity	CPE-IM-FVM-FP-094
	Type of nozzle	CPE-IM-FVM-FP-094
	Type of spanner	CPE-IM-FVM-FP-094
	Actuation device location/type	CPE-IM-FVM-FP-094
Fire Protection Pipe and Fittings	Location/orientation	CPE-IM-FVM-FP-094
	Presence of low point drains/high point vents	CPE-IM-FVM-FP-094
Fire Protection Sprinklers/Nozzles	Spacing	CPE-IM-FVM-FP-094
	Location/orientation	CPE-IM-FVM-FP-094
	Orifice size	CPE-IM-FVM-FP-094

TABLE 5-2
POST CONSTRUCTION HARDWARE VALIDATION PROGRAM (PCHVP)
FIRE PROTECTION

Construction Work Category	Final Acceptance Attribute	PCHVP Attributes Validation Method
Fire Protection Sprinklers and Nozzles (Cont'd)	Temperature rating	CPE-IM-FVM-FP-094
	Alignment of water shield	CPE-IM-FVM-FP-094
Fire Protection Supply Valves	Accessibility	CPE-IM-FVM-FP-094
	Presence of valve position indicator	CPE-IM-FVM-FP-094
	Location/orientation	CPE-IM-FVM-FP-094
	Presence of solenoid valve	CPE-IM-FVM-FP-094
	Presence of pressure switch	CPE-IM-FVM-FP-094
	Actuation device location/type	CPE-IM-FVM-FP-094
Fire Protection Atmospheric Clean-Up Unit	Configuration of piping	CPE-IM-FVM-FP-094
	Configuration of drain	CPE-IM-FVM-FP-094
Fire Protection Hilti Bolts	Final minimum embedment	CPE-IM-FVM-FP-094
	Anchor marking visible denoting length/type (as applicable)	CPE-IM-FVM-FP-094
	Presence of washer	CPE-IM-FVM-FP-094
	Full engagement of nut	CPE-IM-FVM-FP-094
	Anchor properly set	CPE-IM-FVM-FP-094
	Size	CPE-IM-FVM-FP-094
	No bottom out	CPE-IM-FVM-FP-094

TABLE 5-2
POST CONSTRUCTION HARDWARE VALIDATION PROGRAM (PCHVP)
FIRE PROTECTION

Construction Work Category	Final Acceptance Attribute	PCHVP Attributes Validation Method
Fire Protection Structural Steel	Base plate installation	CPE-IM-FVM-FP-094
	Location	CPE-IM-FVM-FP-094
	Size	CPE-IM-FVM-FP-094
	Length	CPE-IM-FVM-FP-094
	Orientation	CPE-IM-FVM-FP-094
	Spacing of bolt holes	CPE-IM-FVM-FP-094

TABLE 5-3

SUMMARY OF AUDITS AND SURVEILLANCES

AUDITS

Audit Number	Auditing Organization	Date of Audit	Audit Report Transmittal	Audit Response Transmittal
A09-1076	Impell QA	Nov. 19 - 21, 1986	Dec. 12, 1986	Jan. 5, 1987
86-11	EPM QA	Dec. 22 - 23, 1986	Dec. 30, 1986	Mar. 3, 1987
A09-1086	Impell QA	Apr. 14 - 16, 1987	Apr. 30, 1987	Jun. 9, 1987
TCP-87-12	TU Electric QA	May 4 - 15, 1987	Jun. 9, 1987	Jul. 2, 1987
ATP-87-20	TU Electric TAP	Jun. 22 - 26, 1987	Jul. 20, 1987	Aug. 3, 1987
A09-1092	Impell QA	Jun. 29 - Jul. 9, 1987	Jul. 16, 1987	Aug. 12, 1987
87-09	EPM QA	Jul. 21 - 23, 1987	Aug. 21, 1987	Sep. 17, 1987
ATP-87-40	TU Electric TAP	Aug. 24 - 28, 1987	Sep. 14, 1987	Sep. 29, 1987
ATP-87-50	TU Electric TAP	Sep. 21 - 25, 1987	Oct. 13, 1987	Oct. 28, 1987
11-1001	Impell QA	Oct. 5 - 6, 1987	Oct. 6, 1987	Dec. 30, 1987
ATP-87-71	TU Electric TAP	Nov. 9 - 13, 1987	Dec. 23, 1987	In Progress

TABLE 5-3
(Continued)

SURVEILLANCES

Surveillance Number	Surveilling Organization	Surveillance Dates	Report Transmittal
S09-1201	Impell QA	Nov. 6, 1986	Nov. 21, 1986
S09-1202	Impell QA	Nov. 7, 1986	Nov. 21, 1986
ES-86-02	TU Electric QA	Dec. 8 - 12, 1986	Dec. 18, 1986
S09-1208	Impell QA	Jan. 21, 1987	Jan. 23, 1987
S09-1209	Impell QA	Jan. 27, 1987	Jan. 29, 1987
S09-1210	Impell QA	Feb. 9, 1987	Feb. 12, 1987
S09-1214	Impell QA	Mar. 23, 1987	Mar. 23, 1987
S09-1216	Impell QA	Apr. 21, 1987	Apr. 25, 1987
S09-1222	Impell QA	Jun. 17, 1987	Jun. 26, 1987
S09-1223	Impell QA	Jun. 24, 1987	Jun. 25, 1987
ES-87-32	TU Electric QA	July 20 - 28, 1987	Aug. 7, 1987
S09-1224	Impell QA	July 27 - 28, 1987	Jul. 28, 1987
S09-1227	Impell QA	Aug. 17, 1987	Aug. 17, 1987
S09-1229	Impell QA	Aug. 27, 1987	Aug. 31, 1987

TABLE 5-3
(Continued)

SURVEILLANCES

Surveillance Number	Surveilling Organization	Surveillance Dates	Report Transmittal
ES-87-34	TU Electric QA	Aug. 10 - 14, 1987	Aug. 19, 1987
ES-87-42	TU Electric QA	Aug. 14 - Sep. 11, 1987	Sep. 28, 1987
ES-87-48	TU Electric QA	Sep. 28 - Oct. 5, 1987	Oct. 21, 1987
S09-1231	Impell QA	Sep. 15 - 16, 1987	Sep. 17, 1987
11-S001	Impell QA	Oct. 15, 1987	Oct. 15, 1987
11-S002	Impell QA	Oct. 21, 1987	Oct. 27, 1987
11-S003	Impell QA	Oct. 27, 1987	Oct. 28, 1987
ES-87-56	TU Electric QA	Nov. 9 - 17, 1987	Nov. 24, 1987
11-S009	Impell QA	Nov. 19, 1987	Nov. 20, 1987
11-S013	Impell QA	Dec. 9, 1987	Dec. 14, 1987
11-S015	Impell QA	Dec. 11 & 14, 1987	Dec. 14, 1987
11-S016	Impell QA	Dec. 15, 1987	Dec. 24, 1987

6.0 REFERENCES

1. TU Electric Letter No. TXX-6500, W.G. Counsil to U.S. Nuclear Regulatory Commission, Comanche Peak Programs, June 25, 1987.

2. TU Electric Letter No.TXX-6631, W.G. Counsil to U.S. Nuclear Regulatory Commission, Comanche Peak Programs, August 20, 1987.

3. Impell Report No. 09-0210-093 for TU Electric, Comanche Peak Steam Electric Station, Units 1 and 2 "CPSES Design Basis Consolidation Program Plan, " Rev. 1, December, 1987.

4. TENERA, L.P. Issue Resolution Report; Electrical/I&C - Fire Protection, IRR DAP-E-EIC-505 Rev. 0, October 4, 1986.

5. CPSES Design Basis Document DBD-ME-001, "Fire Hazards Analysis Design Basis Document" Rev.0, May 20, 1987.

6. CPSES Design Basis Document DBD-ME-002, "Penetration Seals", Rev. 0, September 10, 1987.

7. CPSES Design Basis Document DBD-ME-020, "Fire Safe Shutdown Analysis", Rev. 1, 1987.

8. CPSES Design Basis Document DBD-ME-063, "Fire Barriers", Rev.0.

9. CPSES Design Basis Document DBD-ME-104, "Fire Detection System", Rev.0.

10. CPSES Design Basis Document DBD-ME-225, "Fire Suppression System", Rev.0.

11. TU Electric CPSES, "Generic Issue Report (GIR)" - "Evaluation and Resolution of TERA Fire Protection Issue Resolution Report DAP-E-EIC-505," Rev.0, January 16, 1987.

12. TU Electric Engineering and Construction Procedure EC-9.04, "Post Construction Hardware Validation Program," Rev. 1, July 29, 1987.

13. National Fire Protection Association (NFPA) 13, "Installation of Sprinkler Systems," 1978 and 1985 Editions.

14. National Fire Protection Association (NFPA) 15, "Water Spray Fixed Systems," 1979 Edition.

15. National Fire Protection Association (NFPA) 12A, "Halon 1301 Fire Extinguishing Systems," 1977 and 1980 Editions.

16. National Fire Protection Association (NFPA) 10, "Portable Fire Extinguishers," 1981 Edition.

17. National Fire Protection Association (NFPA) 14, "Standpipe and Hose Systems," 1978 Edition.

18. National Fire Protection Association (NFPA) 20, "Centrifugal Fire Pumps," 1983 Edition.

19. National Fire Protection Association (NFPA) 72D, "Proprietary Protection Signaling System," 1975 Edition.

20. National Fire Protection Association (NFPA) 72E, "Automatic Fire Detectors," 1978 Edition.

21. Comanche Peak Engineering Procedure CPE-IM-FVM-FP-055, "Field Verification Method - Final As-Built Verification of Unit 1 and Common Penetration Seals," Rev.1 , September 22, 1987.

22. Comanche Peak Engineering Procedure CPE-IM-FVM-FP-091, Field Verification Method - Final As-Built Verification of Unit 1 and Common Thermo-Lag," Rev. 1, September 22, 1987.

23. Comanche Peak Engineering Procedure CPE-IM-FVM-FP-092, "Field Verification Method - Final As-Built Verification Unit 1 and Common Radiant Energy Shield/Separation Barrier Material," Rev.1 , September 23, 1987.

24. Comanche Peak Engineering Procedure CPE-IM-FVM-FP-093, "Field Verification Method-Final As-Built Verification of Unit and Common Portable Fire Extinguishers Mechanical Commodities," Rev.1, September 23, 1987.

25. Comanche Peak Engineering Procedure CPE-IM-FVM-FP-094, "Field Verification Method-Final As-Built Verification of Unit 1 and Common Suppression System Mechanical Commodities," Rev.1, September 23, 1987.

26. Section 3.2 CPSES FSAR.

27. Comanche Peak Engineering Procedure CPE-EPM-FVM-FP-073, "Fire Safe Shutdown Device Field Walkdown", Rev. 0.

28. Comanche Peak Response Team Program Plan and Issue-Specific Action Plans, Appendix D, CPRT Sampling Policy, Applications and Guidelines, Revision 1, January 31, 1986, and Appendix E, Resolution of Discrepancies Identified by the CPRT, Revision 3, June 18, 1987.

29. American National Standards Institute N45.2, "Quality Assurance Program Requirements for Nuclear Facilities," 1977 Edition.

30. Impell Fire Protection Project Quality Plan, Rev. 2.

31. Field Verification Method (FVM) CPE-FVM-FP-070, "Instructions for Emergency Lighting Field Verification", Rev. 0, April 13, 1987.

32. Field Verification Method (FVM) CPE-FVM-FP-043, "FHA Fire Protection Features/Deviation Request Walkdown", Rev. 1, February 24, 1987.

33. Field Verification Method (FVM) CPE-FVM-FP-041, "Fire Protection Suppression System Verification Program for Walkdown of As-Built Conditions", Rev. 1, February 24, 1987.

34. Field Verification Method (FVM) CPE-FVM-FP-044, "Instructions for Code Compliance Review of Fire Detection and Alarm Systems", Rev. 1, February 24, 1986.

35. CPSES Commodity/Attribute Matrix, TU Electric PCHV-CAM-001, Rev. 2, October 15, 1987.

36. Field Verification Method (FVM) TNE-FVM-FP-11, "Penetration Seal Verification Program for As-Built and Walkdown Conditions", Rev. 2, October 20, 1986.

37. Field Verification Method (FVM) CPE-SWEC-FVM-EE/ME SC-090, "PCHVP Quality Control Reinspections", Rev. 2, Octo 15, 1987.

38. TU Electric Letter No. TXX-6676, W.G. Counsil to U.S. Nuclear Regulatory Commission, Comanche Peak Programs, September 8, 1987.

39. CPSES Design Basis Document DBD-EE-047, "Lighting System", Rev. 0.

40. Westinghouse Technical Manual, "RCP Motor Lubrication Oil Cooler" August 17, 1982.

41. Impell Project Instruction IMT-FP-49, "Field Verification", Rev. 0, May 5, 1987.

42. TENERA, L.P. Engineering Evaluation Report; Electrical/I&C - Fire Protection, EER DAP-E-EIC-011, Rev. 0, March 27, 1987.

43. Field Verification Method (FVM) CPE-EB-FVM-CS-112, "Instructions for Review of As-Built Conditions of Fire Dampers", Rev. 0.

44. Field Verification Method (FVM) CPE-SWEC-FVM-EE/ME/IC/SC-86, "Post Construction Hardware Validation Program Construction/ Quality Control Reverification," Rev. 2, October 15, 1987.

45. TU Electric Engineering and Construction Procedure ECE 9.04-05, "Post Construction Hardware Validation Program Engineering Evaluations," Rev. 0, August 17, 1987.

APPENDIX A

COMANCHE PEAK RESPONSE TEAM (CPRT) ISSUES

This appendix contains a comprehensive summary of the evaluation, resolution, and corrective and preventive action for all Comanche Peak Response Team (CPRT) issues which are related to fire protection. Specific references to the design criteria, procedures and engineering studies which have resolved the issue are provided.

To report the resolution of the Comanche Peak Response Team (CPRT) issues, an individual subappendix was developed for each issue. Each subappendix includes a definition of the issue; issue resolution; and corrective and preventive action.

Comanche Peak Response Team (CPRT) issues are identified in the Issues Resolution Report (IRR) DAP-E-EIC-505 and Engineering Evaluation Report (EER) DAP-E-EIC-011 and are incorporated in Subappendices A1 through A9.

The preventive action is embodied in the procedures and Design Basis Documents (DBDs) developed and used in the fire protection portion of the Corrective Action Program (CAP). These procedures and Design Basis Documents (DBDs) resolve all Comanche Peak Response Team (CPRT) issues. Implementation of these preventive actions can assure that the design and hardware for CPSES Unit 1 and Common will continue to comply with the licensing commitments throughout the life of the plant as described in Section 5.4.

Comanche Peak Response Team (CPRT) issues contained in Appendix A are listed below:

Issue No.	Issue Title
A1	Fire Exit Routes
A2	Flame Spread Rating of Interior Finishes
A3	Fire Damper Testing
A4	Fire Detection System
A5	Eight Hour Emergency Lighting Units
A6	Fire Protection Systems Interaction
A7	Fire Safe Shutdown/Alternate Shutdown
A8	Work-In-Progress
A9	Hot Shutdown Panel (HSP) Power Loss by Control Room Evacuation Procedure

SUBAPPENDIX A1

FIRE EXIT ROUTES (IRR DAP-E-EIC-505)

1.0 Definition of the Issue

The issue was that the original design did not provide for clearly marking all exit routes.

2.0 Issue Resolution

Exit routes and exit sign locations were evaluated during design validation to assure that all plant exit routes were clearly marked. This evaluation resulted in identification of exit routes and exit sign locations based on the guidance of National Fire Protection Association (NFPA) Standard 101 (Reference 4.1). Design changes have been developed and the hardware modifications are being implemented.

3.0 Corrective and Preventive Action

- No additional issues were identified during the review and resolution of this issue.
- This issue was determined not to be reportable under the provisions of 10CFR50.55(e).

3.1 Corrective Action

The exit sign locations were validated in accordance with the design criteria specified in the Design Basis Documents (DBDs) (References 4.3 and 4.4). Drawing reviews and engineering walkdowns (Reference 4.2) were performed to assure that all plant exit routes were clearly marked. Where required, additional locations were identified for the installation of exit signs.

3.2 Preventive Action

The design criteria for exit sign locations have been established and documented in the Design Basis Documents (DBDs) (Reference 4.3 and 4.4).

4.0 References

4.1 National Fire Protection Association (NFPA) 101, "Life Safety Code", 1986 Edition.

4.2 Field Verification Method (FVM) CPE-FVM-FP-052, "Instruction for Review of Exit Sign Placement", Rev. 0, January 13, 1987.

4.3 CPSES Design Basis Document DBD-ME-001, "Fire Hazards Analysis", Rev. 0, May 20, 1987.

4.4 CPSES Design Basis Document DBD-EE-047, "Lighting System", Rev. 0.

SUBAPPENDIX A2

FLAME SPREAD RATING OF INTERIOR FINISHES (IRR DAP-E-EIC-505)

1.0 Definition of the Issue

The issue was that several installation/procurement specifications did not contain criteria for the flame spread rating of interior finish materials (e.g. ceiling tiles, paneling, wall coverings).

2.0 Issue Resolution

During the design validation, Impell reviewed all installation/procurement specifications (References 4.3 through 4.15) pertaining to the use of interior finish materials. Impell revised these specifications to include flame spread ratings that are in accordance with the design criteria specified in the Design Basis Document (DBD) (Reference 4.1). Impell performed engineering walkdowns (Reference 4.2) to validate that the types of interior finish material utilized in CPSES Unit 1 and Common were consistent with the specifications and validated that their flame spread ratings comply with the revised specifications.

3.0 Corrective and Preventive Action

- No additional issues were identified during the review and resolution of this issue.
- This issue was determined not to be reportable under the provisions of 10CFR50.55(e).

3.1 Corrective Action

Specifications were reviewed and revised as necessary to comply with the flame spreading ratings of the interior finish material specified in the Design Basis Document (DBD) (References 4.1). Engineering walkdowns (Reference 4.2) were performed to identify the types of interior finish material and to validate that their flame spread ratings were in compliance with the specifications.

3.2 Preventive Action

The design criteria for the flame spread rating of interior finish materials have been documented in the Design Basis Document (DBD) (Reference 4.1). The validated installation/procurement specifications (References 4.3 through 4.15) require the use of interior finish materials with a flame spread rating of 25 or less.

4.0 References

4.1 CPSES Design Basis Document DBD-ME-001, "Fire Hazards Analysis", Rev. 0, May 20, 1987.

4.2 Field Verification Method (FVM) CPE-FVM-FP-049, "Instructions for Review of Interior Finish Materials", Rev. 0, January 2, 1987.

4.3 CPSES Specification 2323-AS-12, "Roofing and Insulation", Rev. 0.

4.4 CPSES Specification 2323-AS-16, "Caulking and Sealants", Rev. 0.

4.5 CPSES Specification 2323-AS-26, "Vinyl Wall Covering", Rev. 0.

4.6 CPSES Specification 2323-AS-28, "Metal Pan Type Ceilings", Rev. 0.

4.7 CPSES Specification 2323-AS-29, "Ceramic Tile Work", Rev. 0.

4.8 CPSES Specification 2323-AS-31, "Protective Coatings", Rev. 4.

4.9 CPSES Specification 2323-AS-32, "Acoustical Treatment", Rev. 0.

4.10 CPSES Specification 2323-AS-33, "Resilient Flooring", Rev. 0.

4.11 CPSES Specification 2323-AS-35, "Plastering", Rev. 0.

4.12 CPSES Specification 2323-AS-36, "Gypsum Dry Wall", Rev. 0.

4.13 CPSES Specification 2323-AS-43, "Special Coatings", Rev. 0.

4.14 CPSES Specification 2323-AS-57, "Lowered Ceilings", Rev. 0.

4.15 CPSES Specification 2323-AS-60, "Seamless PVC Flooring", Rev. 0.

SUBAPPENDIX A3

FIRE DAMPER TESTING (IRR DAP-E-EIC-505)

1.0 Definition of the Issue

The issue was that the original fire dampers may not have fully closed under design air flow conditions.

2.0 Issue Resolution

The fire dampers used at CPSES are being replaced with fire dampers which have been certified by the vendor to close under design air flow conditions which envelope those at CPSES.

3.0 Corrective and Preventive Action

- No additional issues were identified during the review and resolution of this issue.
- This issue was determined to be reportable under the provisions of 10CFR50.55(e). It was reported as Significant Deficiency Analysis Report (SDAR) CP-84-04 in letter number TXX-4257 dated August 13, 1984 from TU Electric to the NRC.

3.1 Corrective Action

The original fire dampers are being replaced with fire dampers which are certified by the vendor to close under design air flow conditions which envelope those at CPSES.

3.2 Preventive Action

The design criteria for fire dampers have been documented in the Design Basis Document (DBD) (Reference 4.1) and the procurement specification (Reference 4.2) has been revised to require the use of certified fire dampers.

4.0 References

4.1 CPSES Design Basis Document DBD-ME-063, "Fire Barriers", Rev. 0, August 12, 1987.

4.2 Comanche Peak Steam Electric Station Specification 2323-MS-84, "HVAC Dampers", Rev. 3.

SUBAPPENDIX A4

FIRE DETECTION SYSTEM (IRR DAP-E-EIC-505)

1.0 Definition of the Issue

The issue was that the primary and secondary power supplies for the fire detection system main control panel were routed through a common power feed. A single failure could have resulted in a loss of power to this panel.

2.0 Issue Resolution

Impell resolved this issue by identifying a design change such that a single failure could not result in a loss of power to this panel. This design change is being implemented.

3.0 Corrective and Preventive Action

- No additional issues were identified during the review and resolution of this issue.
- This issue was determined to not be reportable under the provisions of 10CFR50.55(e).

3.1 Corrective Action

A detailed engineering study was performed which determined that a design change was needed to assure that a single failure could not result in a loss of power to the fire detection system main control panel. The fire detection system with this design change was validated to assure that the design complies with the requirements of NFPA Standard 72D (Reference 4.1) as specified in the Design Basis Document (DBD) (Reference 4.2).

3.2 Preventive Action

The Design Basis Document (DBD) (Reference 4.2) incorporates the requirements of NFPA Standard 72D (Reference 4.1) which provides requirements for the use of independent power supplies.

4.0 References

4.1 National Fire Protection Association (NFPA) 72D, "Proprietary Protection Signaling System", 1975 Edition.

4.2 CPSES Design Basis Document DBD-ME-104, "Fire Detection System", Rev. 0.

SUBAPPENDIX A5

EIGHT HOUR EMERGENCY LIGHTING UNITS (IRR DAP-E-EIC-505)

1.0 Definition of the Issue

The issue was that sufficient eight hour emergency lighting units were not provided in all CPSES Unit 1 and Common areas that require lighting for access/egress routes and local operation of equipment to achieve and maintain safe shutdown of the reactor in the event of a postulated fire coincident with the loss of off-site power.

2.0 Issue Resolution

Impell resolved this issue by reviewing the Fire Safe Shutdown Analysis (FSSA) to identify equipment that may require local operation in the event of a postulated fire coincident with a loss of off-site power in order to achieve and maintain safe shutdown of the reactor. Impell then performed engineering walkdowns (Reference 4.1) to identify those locations where eight hour emergency lighting units are required to provide adequate lighting for operation of the above equipment and for access/egress routes thereto. Impell then identified design changes to provide additional eight hour emergency lighting units where required. These design changes are being implemented.

3.0 Corrective and Preventive Action

- No additional issues were identified during the review and resolution of this issue.
- This issue was determined not to be reportable under the provisions of 10CFR50.55(e).

3.1 Corrective Action

Impell performed engineering walkdowns (Reference 4.1) which determined that a design change was required for additional eight hour emergency lighting units. The emergency lighting, with this design change, was validated to comply with the design criteria as specified in the Design Basis Document (DBD) (Reference 4.2). These design changes are being implemented.

3.2 Preventive Action

The Design Basis Document (DBD) (Reference 4.2) incorporates the design criteria which provides the requirements for the eight hour emergency lighting units.

4.0 References

4.1 Field Verification Method (FVM) CPE-FVM-FP-070, "Instructions for Emergency Lighting Field Verification", Rev. 0, April 13, 1987.

4.2 CPSES Design Basis Document DBD-ME-001, "Fire Hazards Analysis", Rev. 0, May 20 1987.

SUBAPPENDIX A6

FIRE PROTECTION SYSTEMS INTERACTION (IRR DAP-E-EIC-505)

1.0 Definition of the Issue

The issues were as follows:

1.1 Seismic Qualification of Deluge Valves

1.1.A The issue was that diesel generator operability could be affected by inadvertent operation of the diesel generator fuel oil day tank room fire suppression system due to a seismically induced failure of the deluge valve.

1.1.B The issue was that diesel generator operability could be affected by inadvertent operation of the diesel generator room fire suppression system due to a seismically induced failure of the fusible link type sprinkler heads.

1.2 Diesel Generator Room Spray Shields

The issue was that diesel generator operability could be affected by inadvertent operation of the fire suppression system resulting in damage to equipment from the effects of water sprays.

1.3 Seismic Supporting of Fire Water Piping in Diesel Generator Rooms

The issue was that diesel generator operability could be affected by damage due to seismically induced failure of fire suppression system piping in the diesel generator rooms.

2.0 Issue Resolution

2.1 Seismic Qualification of Deluge Valves

2.1.A The resolution of this issue is addressed in the Systems Interaction Program (SIP) Project Status Report (PSR) (Supplement A of the Mechanical PSR).

2.1.B The type of suppression system installed precludes seismically induced inadvertent operation due to the fact that seismically qualified sprinkler heads are installed.

2.2 Diesel Generator Room Spray Shields

Impell resolved this issue by conducting engineering walkdowns and evaluations in accordance with fire protection engineering procedures (References 4.1 and 4.2). These engineering walkdowns and evaluations identified potential paths of water entrance into diesel generator

equipment. Potential paths of water entrance into diesel generator equipment from vertical directions have been eliminated by developing design modifications such as sealing conduit openings or installing drip shields on equipment. Potential paths of water entrance into equipment from horizontal directions have been eliminated by developing design modifications to reposition sprinkler heads so that water sprays will not directly impinge on vertical equipment surfaces with potential paths for horizontal water entrance. Therefore, inadvertent operation of suppression systems will not affect diesel generator operability. The design modifications are being implemented.

2.3 Seismic Supporting of Fire Water Piping in Diesel Generator Rooms

The resolution of this issue is addressed in the Systems Interaction Program (SIP) Project Status Report (PSR) (Supplement A of the Mechanical PSR).

3.0 Corrective and Preventive Action

- No additional issues were identified during the review and resolution of these issues.
- These issues were determined not to be reportable under the provisions of 10CFR50.55(e).

3.1 Corrective Action

A complete review of the suppression system installation in the diesel generator rooms was conducted in accordance with design procedures (References 4.1 and 4.3) to assure that the diesel generator operability was not affected by inadvertent fire suppression system operation. A review of test report documentation (Reference 4.5) was conducted to assure that the sprinkler heads utilized in the diesel generator room are seismically qualified.

3.2 Preventive Action

The design criteria to address the inadvertent actuation of fire suppression system have been documented in the Design Basis Document (DBD) (Reference 4.4).

4.0 References

4.1 IMT-FP-36, "Inadvertent Actuation Evaluation", Rev. 2.

4.2 Field Verification Method (FVM) CPE-FVM-FP-045, "Instructions for Review of Inadvertent Actuation and Flooding and Its Effect on Safety Related Equipment", Rev. 0.

4.3 IMT-AD-15-1, "Preparation and Review of Design Basis Documents", Rev. 2.

4.4 CPSES Design Basis Document DBD-ME-225, "Fire Suppression System", Rev. 0.

4.5 Southwest Research Institute (SwRI) Project No. 02-4929-001, January 9, 1978.

SUBAPPENDIX A7

FIRE SAFE SHUTDOWN/ALTERNATE SHUTDOWN (IRR DAP-E-EIC-505)

1.0 Definition of the Issue

The issues were as follows:

1.1 Safe Shutdown Diagnostic Instrumentation

The issue was that the original CPSES Unit 1 and Common Fire Protection Program Review (FPPR) did not sufficiently document the basis for selection of fire safe shutdown system diagnostic instrumentation.

1.2 Fire Protection Alternative Shutdown

The issue was that insufficient documentation existed to demonstrate that alternate fire safe shutdown (i.e., outside the Control Room) can be achieved and maintained coincident with a loss of off-site power.

1.3 Minimum Shutdown Margin Analysis Not Available

The issue was that insufficient documentation existed to demonstrate that reactor minimum safe shutdown margin can be achieved and maintained with the borated water supplied from the Refueling Water Storage Tank.

1.4 Shutdown Without Pressurizer Heater Analysis Not Available

The issue was that insufficient documentation existed to demonstrate that reactor safe shutdown can be achieved and maintained without pressurizer heaters.

1.5 Post Fire Shutdown Procedures Not Developed

The issue was that post-fire safe shutdown procedures were not developed at the time of the review, and therefore could not be reviewed against the design criteria.

1.6 6.9KV Feeder Breaker Circuits Not Evaluated for Fire Damage

The issue was that insufficient documentation existed to demonstrate that fire safe shutdown can be achieved coincident with postulated fire damage to the 6.9 KV feeder breaker control circuits.

1.7 Safe Shutdown Components Not Adequately Identified

The issue was that insufficient documentation existed in the original Fire Protection Program Review (FPPR) to demonstrate the selection criteria and identification of fire safe shutdown components.

1.8 Associated Circuits Review Inadequate in CPSES Unit 1 and Common Fire Protection Program Review (FPPR)

The issue was that insufficient documentation existed to demonstrate complete consideration of associated circuits in the original CPSES Unit 1 and Common Fire Protection Program Review (FPPR).

1.9 Safe Shutdown Circuits Not Consistent with CPSES Unit 1 and Common Fire Protection Program Review (FPPR)

The issue was that, in some cases, the original CPSES Unit 1 and Common Fire Protection Program Review (FPPR) did not address all electrical circuits.

1.10 Fire Area Analysis Lacks Substantiation

The issue was that insufficient documentation existed to provide a correlation between a fire area and the safe shutdown components relied upon to safely shutdown the reactor in the event of a postulated fire in that fire area.

2.0 Issue Resolution

The issues were resolved as follows:

2.1 Safe Shutdown Diagnostic Instrumentation

EPM resolved this issue by developing design criteria for the selection of fire safe shutdown system diagnostic instrumentation. These design criteria were incorporated into the Design Basis Document (DBD) (Reference 4.1) and Fire Safe Shutdown Analysis (FSSA) design procedures (References 4.12 through 4.16). EPM performed a calculation to demonstrate the capability of CPSES to achieve and maintain safe shutdown of the reactor in the event of a postulated fire, including the consideration for adequate fire safe shutdown system diagnostic instrumentation.

The methodology this calculation employed to assure that safe shutdown instrumentation is available to achieve and maintain safe shutdown is as follows. Safe shutdown process variables (e.g., flow, temperature and pressure) were identified in accordance with the design criteria specified in the Design Basis Document (DBD) (Reference 4.1) to assure that operators are able to monitor and control the fire safe shutdown process variables. The results of this calculation document that the required diagnostic instrumentation is available for the operator(s) to monitor and control systems required to achieve and maintain reactor safe shutdown in the event of a postulated fire.

2.2 Fire Protection Alternative Shutdown

Engineering evaluations (References 4.2 and 4.3) conducted by the NSSS vendor and the Fire Safe Shutdown Analysis (FSSA) developed by EPM in accordance with the design criteria specified in the Design Basis Document

(DBD) (Reference 4.1) demonstrate and document that alternate fire safe shutdown can be achieved and maintained coincident with a loss of off-site power.

2.3 Minimum Shutdown Margin Analysis Not Available

This issue was resolved by engineering analyses performed by the NSSS vendor (Reference 4.2) which demonstrate and document that reactor minimum safe shutdown margin can be achieved and maintained by boration using the water supply from from the Refueling Water Storage Tank. EPM incorporated the results of these analyses in the Design Basis Document (DBD) (Reference 4.1).

2.4 Shutdown Without Pressurizer Heater Analysis Not Available

This issue was resolved by engineering analyses performed by the NSSS vendor (Reference 4.2) which demonstrate and document that reactor safe shutdown can be achieved and maintained without pressurizer heaters. EPM incorporated the results of these analyses in the Design Basis Document (DBD) (Reference 4.1).

2.5 Post-Fire Shutdown Procedures Not Developed

This issue was resolved by developing the necessary post-fire safe shutdown procedures (References 4.4 through 4.10) in accordance with the design criteria specified in the Design Basis Document (DBD) (Reference 4.1).

2.6 6.9KV Feeder Breaker Circuits Not Evaluated For Fire Damage

EPM resolved this issue by performing the Fire Safe Shutdown Analysis (FSSA) in accordance with the design procedures (References 4.12 through 4.16) utilizing the design criteria specified in the Design Basis Document (DBD) (Reference 4.1). The Fire Safe Shutdown Analysis (FSSA) took into account postulated fire damage to the 6.9 KV feeder breaker control circuits. The Fire Safe Shutdown Analysis (FSSA) demonstrated and documented that fire safe shutdown can be achieved coincident with the above postulated fire damage.

2.7 Safe Shutdown Components Not Adequately Identified

EPM developed design procedures (References 4.12 through 4.14) which govern the design validation and documentation of the Fire Safe Shutdown Analysis (FSSA) in accordance with the established design and fire safe shutdown component selection criteria contained in the Design Basis Document (DBD) (Reference 4.1). The Fire Safe Shutdown Analysis (FSSA) includes identification of fire safe shutdown components. The Fire Safe Shutdown Analysis (FSSA) supersedes the original CPSES Unit 1 and Common Fire Protection Program Review (FPPR).

2.8 Associated Circuits Review Inadequate in CPSES Unit 1 and Common Fire Protection Program Review (FPPR)

EPM resolved this issue by developing the Fire Safe Shutdown Analysis (FSSA) in accordance with the design criteria specified in the Design Basis Documents (DBDs) (References 4.1 and 4.11) and utilizing the design procedures (References 4.12, 4.13 and 4.14). The Fire Safe Shutdown Analysis (FSSA) demonstrates and documents that associated circuits will not prevent achieving and maintaining safe shutdown of the reactor in the event of a postulated fire. The Fire Safe Shutdown Analysis (FSSA) supersedes the original CPSES Unit 1 and Common Fire Protection Project Report (FPPR).

2.9 Safe Shutdown Circuits Not Consistent With CPSES Unit 1 and Common Fire Protection Program Review (FPPR)

EPM resolved this issue by developing a Fire Safe Shutdown Analysis (FSSA) in accordance with the design criteria specified in the Design Basis Document (DBD) (Reference 4.1) and utilizing the design procedures (References 4.12, 4.13 and 4.14). The Fire Safe Shutdown Analysis (FSSA) identifies and documents all electrical circuits necessary to achieve and maintain safe shutdown of the reactor in the event of a postulated fire. The Fire Safe Shutdown Analysis (FSSA) supersedes the original CPSES Unit 1 and Common Fire Protection Program Review (FPPR).

2.10 Fire Area Analysis Lacks Substantiation

EPM resolved this issue by developing a Fire Safe Shutdown Analysis (FSSA) in accordance with the design criteria specified in the Design Basis Document (DBD) (Reference 4.1) and utilizing the design procedure (Reference 4.15). The Fire Safe Shutdown Analysis (FSSA) demonstrates and documents the correlation between each fire area and the safe shutdown components relied upon to safely shutdown the reactor in the event of a postulated fire in the subject fire area.

3.0 Corrective and Preventive Action

- No additional issues were identified during the review and resolution of this issue.
- This issue was determined not to be reportable under the provisions of 10CFR50.55(e).

3.1 Corrective Action

The Fire Safe Shutdown Analysis (FSSA) has been developed in accordance with the design criteria specified in the Design Basis Documents (DBDs) (Reference 4.1 and 4.11) and utilizing the design procedures (References 4.12 through 4.18). The Fire Safe Shutdown Analysis (FSSA) is complete and provides validated documentation of the ability of CPSES Unit 1 and Common to achieve and maintain safe shutdown of the reactor in the event of a postulated fire. The Fire Safe Shutdown Analysis (FSSA) supersedes the original CPSES Unit 1 and Common Fire Protection Program Review (FPPR).

3.2 Preventive Action

Design Basis Documents (DBDs) (References 4.1 and 4.11) have been developed which incorporate design criteria for safe shutdown of the reactor in the event of a postulated fire. In addition, design and design control procedures (References 4.12 through 4.18) have been developed which implement the design criteria, require proper documentation and provide controls to maintain the documentation current with the validated design.

4.0 References

4.1 CPSES Design Basis Document (DBD) DBD-ME-020, "Fire Safe Shutdown Analysis", Rev. 1.

4.2 Westinghouse Report WCAP-11331, CPSES "Thermal/Hydraulic Analysis of Fire Safe Shutdown Scenario", October 30, 1986.

4.3 Westinghouse Report "Operational Guidance for Fire Safe Shutdown Scenario", October 31, 1986.

4.4 CPSES Procedure ABN-803A, "Response to Fire in the Control Room or Cable Spreading Room", Rev. 0.

4.5 CPSES Procedure ABN-804A, "Response to Fire in the Safeguards Building", Rev. 0.

4.6 CPSES Procedure ABN-805A, "Response to Fire in the Auxiliary Building or the Fuel Building", Rev. 0.

4.7 CPSES Procedure ABN-806A, "Response to Fire in the Electrical and Control Building", Rev. 0.

4.8 CPSES Procedure ABN-807A, "Response to Fire in the Containment Building", Rev. 0.

4.9 CPSES Procedure ABN-808A, "Response to Fire in the Service Water Intake Structure", Rev. 0.

4.10 CPSES Procedure ABN-809A, "Response to Fire in the Turbine Building", Rev. 0.

4.11 CPSES Design Basis Document DBD-EE-051, "Motor Protection", Rev. 0.

4.12 EPM Project Procedure EPM-P257-000-002, "Fire Safe Shutdown Systems Selection and Analysis", Rev. 4.

4.13 EPM Project Procedure EPM-P257-000-003, "Selection and Classification of Safe Shutdown Circuits and Cables", Rev. 3.

4.14 EPM Project Procedure EPM-P257-000-004, "Analysis and Logic Development of the Emergency Power Distribution System", Rev. 3.

4.15 EPM Project Procedure EPM-P257-000-007, "Alternate and Fire Safe Shutdown Analysis by Fire Area", Rev. 3.

4.16 EPM Project Procedure EPM-P257-000-008, "INDMS Data Entry and Database Control", Rev. 1.

4.17 EPM Project Procedure EPM-P257-000-011, "FSSA Database Change Package Preparation", Rev. 3.

4.18 EPM Project Procedure EPM-P257-000-014, "Review of Design Modifications for Appendix R Fire Safe Shutdown Compliance", Rev. 3.

SUBAPPENDIX A8

WORK-IN-PROGRESS (IRR DAP-E-EIC-505)

1.0 Definition of the Issue

The issue was that certain fire protection activities were not yet completed at the time of the Comanche Peak Response Team (CPRT) review.

These activities were:

- Completion of the Fire Safe Shutdown Analysis (FSSA)
- Fire Hazards Analysis (FHA) update
- Fire Protection Deviation Report update
- Review of SSER 12
- Documentation of emergency lighting and communications compliance
- Fire damper deficiency resolution
- Completion of the associated circuit analysis
- Design new fire protection water supply
- Sprinkler system upgrade and pipe replacement
- Breaker coordination studies update

2.0 Issue Resolution

Impell/EPM resolved this issue by completing the activities listed above as part of the fire protection portion of the Corrective Action Program (CAP). The CAP validates that the fire protection design complies with the CPSES licensing commitments and that the as-built fire protection systems, structures and components comply with the validated design.

3.0 Corrective and Preventive Action

- No additional issues were identified during the review and resolution of this issue.
- This issue was determined not to be reportable under the provisions of 10CFR50.55(e).

3.1 Corrective Action

The activities listed above are addressed by the fire protection portion of the Corrective Action Program (CAP) to assure that the fire protection design complies with licensing commitments and that the as-built systems, structures and components comply with the validated design.

3.2 Preventive Action

No preventive action is required.

4.0 References

None.

SUBAPPENDIX A9

HOT SHUTDOWN PANEL (HSP) POWER LOSS BY CONTROL ROOM EVACUATION PROCEDURE (EER-DAP-E-EIC-011)

1.0 Definition of the Issue

The issue was that a procedure outlined in the original CPSES Unit 1 and Common Fire Protection Program Review (FPPR) required the operator to deenergize the power to the Auxiliary Feedwater controller at the Hot Shutdown Panel (HSP) at a time when the controller is required for plant shutdown.

2.0 Issue Resolution

EPM resolved this issue by developing a Fire Safe Shutdown Analysis (FSSA) in accordance with the design procedures (References 4.4. through 4.10) utilizing the design criteria specified in the Design Basis Document (DBD) (Reference 4.1) and the operating procedure (Reference 4.2). Power to the Auxiliary Feedwater Controller was determined not to be needed as local manual control is sufficient to control Auxiliary Feedwater to the steam generators.

3.0 Corrective and Preventive Action

- No additional issues were identified during the review and resolution of this issue.
- This issue was determined not to be reportable under the provisions of 10CFR50.55(e).

3.1 Corrective Action

The Fire Safe Shutdown Analysis (FSSA) has been developed in accordance with the design criteria specified in the Design Basis Documents (DBDs) (Reference 4.1 and 4.3) and utilizing the design procedures (References 4.4 through 4.10). The Fire Safe Shutdown Analysis (FSSA) is complete and provides validated documentation of the ability of CPSES Unit 1 and Common to achieve and maintain safe shutdown of the reactor in the event of a postulated fire. The Fire Safe Shutdown Analysis (FSSA) supersedes the original CPSES Unit 1 and Common Fire Protecton Program Review (FPPR).

3.2 Preventive Action

Design Basis Documents (DBDs) (References 4.1 and 4.3) have been developed which incorporate design criteria for safe shutdown of the reactor in the event of a postulated fire. In addition, design and design control procedures (References 4.4 through 4.10) have been developed which implement the design criteria, require proper documentation and provide controls to maintain the documentation current with the validated design.

4.0 References

4.1 CPSES Design Basis Document (DBD) DBD-ME-020, "Fire Safe Shutdown Analysis", Rev. 1.

4.2 CPSES Procedure ABN-803A, "Response to Fire in the Control Room or Cable Spreading Room", Rev. 0.

4.3 CPSES Design Basis Document DBD-EE-051, "Motor Protection", Rev. 0.

4.4 EPM Project Procedure EPM-P-257-000-002, "Fire Safe Shutdown Systems Selection and Analysis", Rev. 4.

4.5 EPM Project Procedure EPM-P257-000-003, "Selection and Classification of Safe Shutdown Circuits and Cables", Rev. 3.

4.6 EPM Project Procedure EPM-P257-000-004, "Analysis and Logic Development of the Emergency Power Distribution System", Rev. 3.

4.7 EPM Project Procedure EPM-P257-000-007, "Alternate and Fire Safe Shutdown Analysis by Fire Area", Rev. 3.

4.8 EPM Project Procedure EPM-P257-000-008, "INDMS Data Entry and Database Control", Rev. 1.

4.9 EPM Project Procedure EPM-P257-000-011, "FSSA Database Change Package Preparation", Rev. 3.

4.10 EPM Project Procedure EPM-P257-000-014, "Review of Design Modifications for Appendix R Fire Safe Shutdown Compliance", Rev. 3.