ATTACHMENTS 1 THROUGH 4 TO THIS LETTER CONTAIN SENSITIVE INFORMATION SUBMITTED UNDER 10 CFR 2.390(d)(1).

Progress Energy

JAN 1 0 2007

SERIAL: HNP-07-006

United States Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, DC 20555

SHEARON HARRIS NUCLEAR POWER PLANT
DOCKET NO. 50-400/LICENSE NO. NPF-63
SUBMITTAL OF INFORMATION IN SUPPORT OF
NFPA 805 PILOT OBERSERVATION REVIEWS

Ladies and Gentlemen:

Carolina Power & Light Company, doing business as Progress Energy Carolinas, Inc (PEC), is providing copies of documents to the NRC to assist in the NFPA 805 Pilot Observation reviews. Specifically, Fire PRA documents related to review of Task 7.1, Plant Partitioning, Task 7.6, Ignition Frequencies, and Task 7.2, Component Selection is provided as Attachments 1 through 8 to this letter. Documents provided are subject to future updates as the pilot initiative progresses.

No new regulatory commitments are contained in this submittal.

PEC requests that the documents included as Attachments 1 through 4 to this letter be withheld from public disclosure in accordance with 10 CFR 2.390(d)(1) since the documents contain information deemed sensitive concerning HNP's physical protection based on screening in accordance with NRC Regulatory Issue Summary 2005-26, *Control of Sensitive Unclassified Non-Safeguards Information Related to Nuclear Power Plants* and the guidance contained in NRC SECY-04-0191, *Withholding Sensitive Unclassified Information Concerning Nuclear Power Reactors from Public Disclosure.*

If you have any questions regarding this submittal, please contact me at (919) 362-3137.

Sincerely,

David H. Corlett
Supervisor, Licensing/Regulatory Programs
Harris Nuclear Plant

DHC/mgw

ATTACHMENTS 1 THROUGH 4 TO THIS LETTER CONTAINS SENSITIVE UNCLASSIFIED (NONSAFEGUARDS) INFORMATION REQUESTED TO BE WITHHELD FROM PUBLIC DISCLOSURE IN ACCORDANCE WITH 10 CFR 2.390(d)(1).

Progress Energy Carolinas, Inc.
Harris Nuclear Plant
P. O. Box 165
New Hill, NC 27562

A001
A006

NRC Document Control Desk
SERIAL: HNP-07-006

Attachments:
1. Harris Fire PRA-Fire Frequency Calculation (HNP-F/PSA-0071) – **Security Related Information**
2. Sample Fire Ignition Source Walkdown Sheet (1-A-SWGRA) – **Security Related Information**
3. HNP Fire PRA Components Selection Documents – **Security Related Information**
4. Multiple Spurious Component Combinations – **Security Related Information**
5. Project Instruction PI-FPIP-NGG-0200, Fire PRA Walkdown Instructions
6. Project Instruction PI-FPIP-NGG-0201, Fire PRA Plant Boundary Definition and Partitioning
7. Project Instruction FPIP-0206, Fire PRA Fire Ignition Frequency
8. Project Instruction FPIP-0202, Fire PRA Component Selection

c: Mr. P. B. O'Bryan (NRC Senior Resident Inspector, HNP) w/o Attachments
Mr. C. P. Patel (NRC Project Manager, HNP) w/o Attachments
Dr. W. D. Travers (NRC Regional Administrator, Region II) w/o Attachments
Mr. S. D. Weerakkody (NRR)

Attachment 5

Project Instruction PI-FPIP-NGG-0200
Fire PRA Walkdown Instructions

Progress Energy	I Information Use

PROJECT INSTRUCTION

PI-FPIP-NGG-0200
FIRE PRA
WALKDOWN INSTRUCTIONS

Revision 1

Davis-Zapata, Ricardo 2006.11.27 09:31:29 -05'00'	Miskiewicz, David N 2006.11.27 09:37:53 -05'00'	Ertman, Jeffery 2006.11.27 09:44:15 -05'00'
Prepared by	Reviewed by	Approved by

NGG Nuclear Generation Group

TABLE OF CONTENTS

1.0 PURPOSE

This document provides general information and guidance for the conduct of the walkdowns to support Fire Probabilistic Safety Assessment (PSA). These requirements are applicable to the Robinson Nuclear Plant (RNP), Brunswick Nuclear Plant (BNP), Harris Nuclear Plant (HNP), and Crystal River 3 (CR3).

2.0 REFERENCES

2.1 EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities: Volume 2; Detailed Methodology. Electric Power Research Institute (EPRI), Palo Alto, CA, and U.S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research (RES), Rockville, MD: 2005, EPRI TR-1011989 and NUREG/CR-6850

2.2 NGG Fire Protection Program Improvement Initiatives, Attachment 2, NFPA 805 Transition Project Technical Details

3.0 DEFINITIONS

3.1 Electronic Signature

The process by which an individual includes his signature on a document utilizing the Progress Energy's Electronic Signature process.

3.2 Terms

3.2.1 May

Denotes permission, not a requirement or a recommendation

3.2.2 Shall

Denotes a requirement or a mandatory activity

3.2.3 Should

Denotes an expected action unless there is justifiable reason not to perform the action.

3.3 Fire Compartment

A Fire Compartment is a location used for development of fire PRA associated with a plant that is bounded by features for which there is reasonable confidence that such boundaries are capable of preventing spread of fire.

3.4 Ignition Source

An ignition source is a piece of equipment or activity that can cause a fire. Ignition sources are categorized by the types provided in PI-FPRA-NGG-0002.

3.5 Target Set

A grouping of equipment (including cables) that are impacted by a fire generated by a specified fire scenario. Depending on the scenario, the target set can range from all the equipment in a fire area to only equipment within the zone of influence.

3.6 Fire Scenario

A fire scenario is defined by the sequences of events and potential consequences of a fire. The scenarios start with the ignition source and ends with the target set. The scenario can include factors such as suppression and manual actions.

3.7 Zone of Influence

The area surrounding an ignition source in which equipment impact is postulated due to the fire.

4.0 RESPONSIBILITIES

4.1 Site Fire Protection Initiatives Project Coordinator

4.1.1 Ensuring that work performed under their supervision is performed in accordance with this instruction.

4.1.2 Ensure that personnel assigned to prepare and review Project documents, under their direct control, have the required training and/or experience to perform the role to which they are assigned.

4.2 Site Fire Protection Program Manager

4.2.1 Ensuring that work performed under their supervision is performed in accordance with this instruction.

4.3 Fire Protection Engineers

4.3.1 Understanding the requirements of this instruction and perform work in accordance with this instruction.

4.4 Safe Shutdown Engineers

4.4.1 Understanding the requirements of this instruction and perform work in accordance with this instruction.

4.5 PRA Engineers

4.5.1 Understanding the requirements of this instruction and perform work in accordance with this instruction.

4.6 Single Point of Contact (SPOC)

4.6.1 A SPOC is assigned by either the CES Fire Protection Initiatives Project Manager or Site Fire Protection Initiatives Project Coordinator (as necessary) to be the Owner of a project document.

4.6.2 Obtaining and resolving comments on project documents.

4.6.3 Ensuring that the project document is filed in the appropriate project file.

5.0 PREREQUISITES

5.1 Personnel assigned to prepare or review documents for this Project shall have the necessary level of education and/or experience to perform the role to which they are assigned.

6.0 PRECAUTIONS AND LIMITATIONS

Precautions and limitations associated with this task are identified in the specific instructions.

7.0 SPECIAL TOOLS AND EQUIPMENT

7.1 A camera may be useful for documenting and validating the walkdowns.

7.2 Other equipment may be required based on the plant and/or areas being visited.

8.0 ACCEPTANCE CRITERIA

N/A

9.0 INSTRUCTIONS

9.1 Pre-Walkdown Actions

The steps in this section are to be completed in full before conducting the actual walkdown.

9.1.1 Understand the purpose of the walkdown.

Walkdowns in support of the Fire PSA can have several objectives:

- Verify fire compartment definition and boundaries are valid and are as expected (as documented in pre-walkdown reports and drawings)
- Ensure fire detection features exist as documented. Also ensure that analysis credit can be taken for fire detection function(s) in each compartment
- Ensure fire suppression features exist as documented. Also ensure that analysis credit can be taken for suppression function(s) in each compartment and for suppression of fire sources
- Identify and document all potential fire ignition sources within each compartment

- Identify and document all safe shutdown equipment within each compartment (for analysis purpose and thoroughness, all equipment within the compartment should be documented)

- Identify or validate target sets

- Document any other noteworthy features of the compartment (i.e. housekeeping, transient combustibles, occupancy, drainage, ventilation)

- Note the "occupancy" of the fire compartment. This means how often other individuals are observed in the fire area. This would include security tours, but cannot include any fire watches in place due to fire deficiencies

- Validation of previous walkdowns

9.1.2 Read and understand applicable sections of EPRI TR-1011989/NUREG-6850

EPRI TR-1011989/NUREG-6850 is the methodology for conducting a Fire PSA. Individuals conducting walkdowns need to be familiar with the sections associated with walkdown activities (i.e. compartment boundary characteristics, ignition and fuel sources types and number).

For example: When viewing a motor control center with electrical cabinets and breakers, each cabinet and breaker should be counted and its type noted.

Knowledge and understanding of the methodology is necessary for individuals conducting the walkdowns.

9.1.3 Obtain and review walkdown checklists and area drawings.

Walkdown checklists need to be prepared for each fire compartment. These checklists are tools to help ensure consistent methodology is used in documenting and validating features associated with the fire compartments. The checklists will include compartment features such as boundaries and fire detection/suppression features, as well as detailed lists of equipment located in the compartment. The checklists are to be carefully prepared, followed, and documented. Additional information found during the walkdowns that was not listed needs to be collected and documented during or following the walkdowns. These checklists will become official documents of record for the Fire PSA.

Detailed compartment characteristics are to be listed or referenced on each set of walkdown sheets. These details include compartment location (building/floor), boundaries (fire rated walls/doors/vents), and fire detection and suppression features. If this information is already on the walkdown sheets it should be reviewed. If it is not listed, it needs to be added. Available drawings should be reviewed so that individuals conducting the walkdowns become familiar with the compartment, its features, and its layout.

9.1.4 Review and understand access (availability and restrictions)

Access to several parts of the plant is restricted for various reasons (security, safety, radiation). Access availability needs to be discussed with plant personnel prior to conducting any walkdowns. Individuals conducting the walkdowns need to find out and understand any restrictions or limitations with regard to access to the associated fire compartment/walkdown area(s).

All walkdowns in the RCA will need to be coordinated with HP. Personnel conducting the walkdowns will need to be added to the appropriated RWP to obtain access. A review of the radiological conditions and survey maps will also be required.

A review of multiple walkdowns needs to be done to attempt to minimize effort. For example: If entry to RCA is required for a walkdown of room A and room B, both walkdowns may be possible with one entry into the RCA.

9.1.5 Safety

Safety is the number one priority for all site activities. Discuss and review conditions expected in each compartment during the walkdown and ensure proper safety precautions are taken. Ensure individuals conducting the walkdowns have the appropriated PPE (as a minimum, each person should be equipped with a hardhat, safety glasses, hearing protection, and a flashlight).

9.1.6 Obtain a camera and the permission to use it

Photographs will be valuable tools in this analysis. The possession and use of cameras is restricted on site. Talk to plant personnel and go through the appropriate channels to obtain a camera and the permission (written if possible) to use it.

9.2 Walkdowns Actions

The checklists are designed to ensure the walkdowns are completed with consistency and thoroughness. During the walkdowns, follow and clearly document each step as it is completed. Take additional notes as necessary. If the as found conditions (boundary, detection, suppression, equipment) differ at all from the as expected conditions, write down the discrepancy with as much detail as possible. The walkdowns must be documented in enough detail to allow an independent party to come to the same conclusions.

The checklist will detail the steps needed to complete the walkdown, but the following actions are vital to each one:

The final step of each walkdown should include a review to ensure that all items on the checklist are complete. Once complete, individuals should sign and date the walkdown checklist.

9.3 Post Walkdown Actions

Compile applicable checklists, notes, sketches, and pictures related to each compartment. Also ensure any photos taken get downloaded from the camera and either printed, or somehow filed with the appropriate compartment files. Once all documents are collected, begin entering relevant data into electronic format (spreadsheet/database).

9.4 Walkdown Verification/Validation

When performing a walkdown verification or validation, a copy of the original walkdown information should be obtained from the electronic format.

Validation walkdowns should be conducted using the same guidance as in 9.2, but should be expedited since the information will already be documented. The responsible individual performing the validation should be different than the individual responsible for completing the original walkdown.

Walkdown discrepancies should be noted with enough information to allow resolution.

9.5 Walkdown Documentation

9.5.1 The documentation of this task should be integrated with the documentation for the applicable task. (i.e. - Fire Ignition Frequencies, Fire Scoping, Detailed Fire Modeling)

9.5.2 Completed walkdown information should be signed by the responsible individuals for both the original and validation participants, such that they can be referenced by the PRA calculations, and entered into the FSSPMD database as appropriate.

10.0 RECORDS

Complete all Pre-Walkdown Actions ________________/ completed by date	
Fire Area/Compartment:	
Bldg:	Elev.
Area Description:	
<u>Fire Area Boundaries:</u>	
<u>Occupancy:</u>	
For details about fire detection and suppression see: E-5525: Safe Shutdown Analysis in Case of Fire Attachment D: Safe Shutdown / Fire Hazards Analysis by Fire Areas	
<u>Adjacent compartments:</u>	
Walkdown Completed by: print name ________________/ sign date	 print name ________________/ sign date

Fire Compartment:	
Location:	
Elevation:	
Description:	

Ignition Source/ Equipment Number	Description	Comment	Bin	X	verify

comments:

Ignition Source Scoping / Fire Scenario Checklist

Compartment ID: ____________________

Scenario ID: ____________________

Ignition Source ID(s): ____________________

____

____

Reference data

- ☐ Compartment Data ______________________________
- ☐ HGL ______________________________
- ☐ ZOI (V) ______________________________
- ☐ ZOI (H) ______________________________
- ☐ Sketch ______________________________
- ☐ Target (nearest) ______________________________
- ☐ Targets (other) ______________________________
- ☐ ______________________________
- ☐ ______________________________

- ☐ Screened (no SSA/PRA impacts) ____________________
- ☐ Screened (no external targets) ____________________
- ☐ Not Screened (ZOI targets identified) ____________________
- ☐ Not Screened (detailed modeling required) ____________________

____________________ ____________________

Prepared By Reviewed By

Attachment 1 – Example Walkdown Forms

Compartment _______________

HGL _______________

Source Info

Source ID	Nearest Target	Target Description	Distance	Source Info ZIO(V)	ZOI(H)	HRR	Screen	Self	Scenario	F_Model
Bin:	Notes/ Other Targets description & distances									

Sketch ID

Source ID	Nearest Target	Target Description	Distance	ZIO(V)	ZOI(H)	HRR	Screen	Self	Scenario	F_Model
Bin:	Notes/ Other Targets description & distances									

Sketch ID

Source ID	Nearest Target	Target Description	Distance	ZIO(V)	ZOI(H)	HRR	Screen	Self	Scenario	F_Model
Bin:	Notes/ Other Targets description & distances									

Sketch ID

Prepared By: ________________________

Reviewed By: ________________________

Ignition Source Scoping / Fire Scenario

Physical Configuration

Compartment ID: ____________________

Scenario ID: ____________________

Ignition Source ID(s): ____________________

Floor Elevation ____________________ Ceiling Height ____________________

ZOI (Height): ____________________ ZOI (Radial) ____________________

Prepared By

Reviewed By

Attachment 6

Project Instruction PI-FPIP-NGG-0201
Fire PRA Plant Boundary Definition and Partitioning

Progress Energy

PROJECT INSTRUCTION

PI-FPIP-NGG-0201

FIRE PRA

Plant Boundary Definition and Partitioning

Revision 0

Miskiewicz, David N 2006.06.20 08:32:09 -04'00'	Spotts, Andrew Reviewed By 2006.06.20 09:01:13 -04'00'	Ertman, Jeffery 2006.07.15 14:37:43 -04'00'
Prepared by	Reviewed by	Approved by

NGG Nuclear Generation Group

TABLE OF CONTENTS

1.0 PURPOSE

This procedure provides requirements for the partitioning of a plant into Fire PRA Compartments. These requirements are applicable to the Robinson Nuclear Plant (RNP), Brunswick Nuclear Plant (BNP), Harris Nuclear Plant (HNP), and Crystal River 3 (CR3).

2.0 REFERENCES

2.1 Developmental

2.1.1 PRO-NGGC-0201, NGG Standard Procedure Writer's Guide

2.2 Implementing

2.2.1 *EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities: Volume 2; Detailed Methodology.* Electric Power Research Institute (EPRI), Palo Alto, CA, and U.S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research (RES), Rockville, MD: 2005, EPRI TR-1011989 and NUREG/CR-6850

2.2.2 NGG Fire Protection Program Improvement Initiatives, Attachment 2, NFPA 805 Transition Project Technical Details

3.0 DEFINITIONS

3.1 Terms

3.1.1 Shall

The use of the term 'shall' denotes a requirement or a mandatory activity

3.1.2 Should

The use of the term 'should' denotes an expected action unless there is justifiable reason not to perform the action.

3.2 Fire Compartment

Within this document, the use of the terms Fire Compartment, Fire PRA Compartment, and compartment are all intended to be equivalent. A Fire Compartment is a location associated with a plant that is bounded by features for which there is reasonable confidence that such boundaries are capable of preventing the spread of fire.

4.0 RESPONSIBILITIES

4.1 PRA Engineer

4.1.1 Review the physical features of the plant and develop Fire PRA Compartments as described in this Project Instruction.

4.1.2 Prepare task report to document the conduct and results of this task.

5.0 PREREQUISITES

5.1 The plant Fire Areas and Zones that are used in the deterministic Fire Safe Shutdown Analysis should be completed and approved prior to beginning work on this task.

6.0 PRECAUTIONS AND LIMITATIONS

There are no specific precautions or limitations for this task.

7.0 SPECIAL TOOLS AND EQUIPMENT

N/A

8.0 ACCEPTANCE CRITERIA

N/A

9.0 INSTRUCTIONS

9.1 Overview

The overall process of developing the plant Fire PRA Compartments are described in a guidance document developed jointly by EPRI and NRC [1]. The specific guidance, requirements, and criteria provided therein are not repeated in this document. Instead, this document provides instructions only for those elements of the task for which the EPRI/NRC document is silent.

The process involves first establishing the global plant boundaries to be considered in the Fire PRA. The global boundary is generally defined in terms of plant buildings. These building are then sub-divided consistent with the guidance provided into smaller Fire PRA Compartments.

9.2 Global Plant Boundary

The scope of the overall plant Fire PRA with respect to the physical layout of the plant needs to be defined.

9.2.1 Develop a listing of the buildings associated with the plant site. Note that the scope of these building may include locations that are not 'technically' a building. For example, the transformer area and the switchyard. The intent is to ensure that those locations where a postulated fire could cause or require a plant trip/shutdown are included in the analysis.

9.2.2 The listing described in 9.2.1 should include all buildings that are within the plant 'protected area'.

9.2.3 Review the scope of buildings and structures and identify those that can be screened from the scope of the analysis. Those buildings and structures that satisfy all of the following requirements can be screened.

- A postulated fire induced loss of the entire building or structure shall not result in a plant trip.

- A postulated fire induced loss of the entire building or structure shall not result in or require a plant shutdown. The plant procedural requirements for shutdown given a fire should also be considered.

- The building or structure shall not contain any equipment or cables associated with the scope of components credited in the Fire PRA. The objective is to ensure that a postulated fire that does result in a plant trip or shutdown did not disable any of the plant capability to mitigating the potential consequences of such a trip or shutdown.

9.3 Defining Fire PRA Compartments

The scope of plant building and structures that remain unscreened after step 9.2 can be sub-divided into smaller spaces to facilitate the completion of the Fire PRA. The initial scope of these sub-divisions is the 'Appendix R' Fire Areas. These Fire Areas can then be further sub-divided based on the 'Appendix R' Fire Zones. Although these fire zones may not be bounded by physical features (wall) and/or credit non-fire rated walls, their suitability must supported by a qualitative assessment. Note that the fire risk associated with postulated fires that breech the boundary of a Fire Compartment is evaluated separated in the Multi-Compartment Analysis (MCA).

For each boundary between compartments, a characterization of the boundary should be provided.

9.3.1 For each unscreened building and structure, list of the scope of Fire Areas and the sub-tier Fire Zones, as applicable.

9.3.2 For each Fire Zone, define a Fire PRA Compartment using the same location ID. For those cases where a Fire Area was not sub-divided into zones, the compartment ID should use the Fire Area ID.

9.3.3 For each compartment, determine whether area-wide suppression and/or detection are provided. Also note if only partial coverage is provided.

9.3.4 For each Fire Compartment (referred to as 'exposing' compartment), list the adjacent Fire Compartments (referred to as 'exposed' compartment) based on shared boundaries.

9.3.5 For each 'exposing'/'exposed' compartment pair, determine the relative orientation of the shared boundary or compartments. The intended of this step is to distinguish the potential fire propagation paths – horizontal versus vertical upwards versus vertical downward. Suggested location coding is as follows:

- H – the 'exposed' compartment is located horizontally from the 'exposing' compartment. This means that the boundary is a vertical wall or feature.

- A – the 'exposed' compartment is located above the 'exposing' compartment. This means that the boundary is a horizontal floor or ceiling.

- B - the 'exposed' compartment is located below the 'exposing' compartment. This means that the boundary is a horizontal floor or ceiling

9.3.6 For each 'exposing'/'exposed' compartment pair, provide a brief description of the boundary. Specifically note whether the boundary is fire rated and its time rating. Also note whether there are Generic Letter 86-10 evaluations and Exemptions/Deviations that are applicable and provide an associated document retrieval number.

9.4 Task Documentation

9.4.1 The data should be entered into the appropriate FIRE PRA database.

9.4.2 The documentation of this task should be integrated with the documentation for Fire Ignition Frequency development.

9.4.3 The report shall identify the global plant boundaries that were considered.

9.4.4 Buildings and structures within the global plant boundary that were screening and the basis for that screening shall be provided.

9.4.5 The scope of Fire Compartments to be considered in the Fire PRA shall be listed and the nature of the boundaries that define these compartments shall be documented.

10.0 RECORDS

N/A

Attachment 7

Project Instruction FPIP-0206
Fire PRA Fire Ignition Frequency

Progress Energy

PROJECT INSTRUCTION

FPIP-0206

FIRE PRA

Fire Ignition Frequency

Revision 0

Miskiewicz, David N 2006.09.18 07:45:26 -04'00'	Spotts, Andrew 2006.09.18 09:03:21 -04'00'	Ertman, Jeffery 2006.09.21 11:08:02 -04'00'
Prepared by	Reviewed by	Approved by

NGG Nuclear Generation Group

TABLE OF CONTENTS

1.0 PURPOSE

This procedure provides requirements for estimating the fire-ignition frequencies associated with fire ignition sources. These requirements are applicable to the Robinson Nuclear Plant (RNP), Brunswick Nuclear Plant (BNP), Harris Nuclear Plant (HNP), and Crystal River 3 (CR3).

2.0 REFERENCES

2.1 Developmental

2.1.1 PRO-NGGC-0201, NGG Standard Procedure Writer's Guide
2.1.2 FPIP-0100, Fire Protection Initiatives Project, Project Controls

2.2 Implementing

2.2.1 *EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities: Volume 2; Detailed Methodology*. Electric Power Research Institute (EPRI), Palo Alto, CA, and U.S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research (RES), Rockville, MD: 2005, EPRI TR-1011989 and NUREG/CR-6850

2.2.2 NGG Fire Protection Program Improvement Initiatives, Attachment 2, NFPA 805 Transition Project Technical Details

2.2.3 PI-FPIP-NGG-0201, Plant Boundary Definition and Partitioning

2.2.4 PI-FPIP-NGG-0200, Walkdown Instructions

3.0 DEFINITIONS

3.1 Terms

3.1.1 Shall

The use of the term 'shall' denotes a requirement or a mandatory activity

3.1.2 Should

The use of the term 'should' denotes an expected action unless there is justifiable reason not to perform the action.

3.2 Fire Compartment

Within this document, the use of the terms Fire Compartment, Fire PRA Compartment, and compartment are all intended to be equivalent. A Fire Compartment is a location associated with a plant that is bounded by features for which there is reasonable confidence that such boundaries are capable of preventing the spread of fire.

3.3 Fire Ignition Frequency

The fire ignition frequency is the occurrence rate of a challenging fire involving a specific component (e.g., generic frequency value) or a specific compartment (calculated value).

3.4 Ignition Source

Within this document, an ignition source is a piece of equipment or activity that can cause a fire. Fire ignition frequencies are determined for each compartment based on the ignition source types provided in Table 6-1 of Reference 2.2.1.

3.5 Weighting Factor

A weighting factor may be based on location (only applicable to multi-unit sites) or quantity of the ignition source type.

4.0 RESPONSIBILITIES

4.1 PRA Engineer

4.1.1 Identify and bin fire ignition sources by compartment using walkdowns and other plant resources as necessary.
4.1.2 Develop Fire Ignition Frequencies for each fire ignition source and compartment.
4.1.3 Prepare task report to document the conduct and results of this task.

4.2 Fire Protection Engineer

4.2.1 Assist with walkdowns and identification of ignition sources as necessary.
4.2.2 Provide insight and documentation to support engineering judgment decisions (i.e. compartment weighting factor inputs).

5.0 PREREQUISITES

5.1 The task requiring the plant to be divided into Fire PRA Compartments should be completed prior to beginning work on this task.

6.0 PRECAUTIONS AND LIMITATIONS

There are no specific precautions or limitations for this task.

7.0 SPECIAL TOOLS AND EQUIPMENT

N/A

8.0 ACCEPTANCE CRITERIA

N/A

9.0 INSTRUCTIONS

9.1 Overview

The overall process of developing the plant Fire PRA Compartments is described in a guidance document developed jointly by EPRI and NRC referred to a NUREG/CR-6850 [Reference 2.2.1]. This document provides basic instructions consistent with that guidance, but does not attempt to replicate the level of detail provided in the NUREG.

The fire ignition frequency values are calculated by partitioning generic industry values among the individual plant Fire Compartments. Generic fire ignition frequency values are provided for 37 groupings of potential fire sources. The fundamental calculation methodology is similar to that described in the EPRI FIVE Methodology and the EPRI Fire PRA Implementation Guide with three key changes. These changes are:

- Partitioning of pumps/motors and electrical cabinets (including switchgears) based on plant location has been replaced with partitioning across the entire plant.
- Transient fire frequency is based on three weighting factors (maintenance, occupancy, storage) that are assigned for each fire compartment instead of a uniform distribution.
- The generic industry values may require updating using a Bayesian process if plant specific experience data includes any significant fire events.

9.2 Fixed Ignition Source Binning/Counting

For each compartment, a review of the fixed ignition sources should be conduced (via plant drawings and/or walkdown), the ignition sources should be assigned to the appropriate bin, the number of ignition source types per compartment should be counted.

9.2.1 It is recommended that all equipment counts, and especially electrical cabinet counts, be verified by plant walkdown when practical.

9.2.2 Catastrophic high energy arcing faults (Bin 16) are only in switchgear rated 1000V and above.

9.2.3 Electrical cabinets (Bin 15) represent such items as switchgears, motor control centers, DC distribution panels, relay cabinets, control and switch panels (excluding panels that are part of machinery), fire protection panels, etc. Since electrical cabinets in a vary significantly in size, configuration, and voltage, the following rules should be used for counting electrical cabinets:

- Simple wall-mounted panels housing less than four switches may be excluded from the counting process,
- Well-sealed electrical cabinets that house circuits below 440V should be excluded from the counting process,
- All free-standing electrical cabinets should be counted by their vertical segments, and
- To expedite the process, an average number of vertical segments may be used for such cabinets as motor control centers and DC distribution panels.

9.2.4 Each fixed ignition source should be binned to one of the ignition source types provided in Table 6-1 of Reference 2.2.1.

ID	Ignition Source Type Bin	Generic Frequency, λ_{IS}	Location ID [a]
1	Batteries	7.5E-04	BR
2	Reactor Coolant Pump	6.1E-03	COP
3	Transients and Hotwork	2.0E-03	COP
4	Main Control Board	2.5E-03	CR
5	Cable Fires caused by welding and cutting (Cntrl/Aux/Rx Building)	1.6E-03	CAR
6	Transient fires caused by welding and cutting (Cntrl/Aux/Rx Building)	9.7E-03	CAR
7	Transients (Cntrl/Aux/Rx Building)	3.9E-03	CAR
8	Diesel Generators	2.1E-02	DGR
9	Air Compressors	2.4E-03	XX
10	Battery Chargers	1.8E-03	XX
11	Cable Fires caused by welding and cutting (Plant-Wide)	2.0E-03	XX
12	Cable Run	4.4E-03	XX
13	Dryers	2.6E-03	XX
14	Electric Motors	4.6E-03	XX
15	Electrical Cabinets	4.5E-02	XX
16	High Energy Arcing Faults	1.5E-03	XX
17	Hydrogen Tanks	1.7E-03	XX
18	Junction Boxes	0.0E+00	XX
19	Misc. Hydrogen Fires	2.5E-03	XX
20	Off-gas/H2 Recombiner (BWR)	4.4E-02	XX
21	Pumps	2.1E-02	XX
22	RPS MG Sets	1.6E-03	XX

ID	Ignition Source Type Bin	Generic Frequency, λ_{IS}	Location ID [a]
23a	Transformers (oil filled)	9.9E-03	XX
23b	Transformers (dry)	9.9E-03	XX
24	Transient fires caused by welding and cutting (Plant-Wide)	4.9E-03	XX
25	Transients (Plant-Wide)	9.9E-03	XX
26	Ventilation Subsystems	7.4E-03	XX
27	Transformer – Catastrophic	6.0E-03	TY
28	Transformer – Non Catastrophic	1.2E-02	TY
29	Yard Transformers (others)	2.2E-03	TY
30	Boiler	1.1E-03	TB
31	Cable Fires caused by welding and cutting (Turbine Building)	1.6E-03	TB
32	Main Feedwater Pumps	1.3E-02	TB
33	Turbine Generator Excitor	3.9E-03	TB
34	Turbine Generator Hydrogen	6.5E-03	TB
35	Turbine Generator Oil	9.5E-03	TB
36	Transient fires caused by welding and cutting (Turbine Building)	8.2E-03	TB
37	Transients (Turbine Building)	8.5E-03	TB

[a] See Section 9.3.5 for the Location corresponding to each Location ID.

9.3 Weighting Factors

9.3.1 The ignition source weighting factor is the fraction of the ignition source type present in the compartment relative to the total count for a given ignition source type or bin.

9.3.2 For countable items, the ignition source weighting factor is simply the number in the compartment divided by the total number for the plant

9.3.3 For transients, the ignition source weighting factor is influenced by occupancy level, storage of flammable materials, and type and frequency of maintenance activities in a compartment, all of which can affect the likelihood of fire ignition involving a transient combustible or activity. These influencing factors are assigned in accordance with Table 6-3 of Reference 2.2.1 and employ a rating level as follows:

Rating Level	Influence Factor, n
No	0
Low	1
Medium	3
High	10
Very High	50

9.3.4 Location weighting factors are used to account for locations and/or equipment shared among the units for multi-unit sites and are, therefore, only applicable to multi-unit sites. For single unit sites, the location weighting factor is 1.0.

9.3.5 Location weighting factors for multi-unit sites are established based the applicable plant location in accordance with Table 6-2 of Reference 2.2.1. The following set of generic plant locations is used in defining ignition source bins:

ID	Location, L
BR	Battery Room
COP	Containment (PWR)
CR	Control Room
CAR	Control/Auxiliary/Reactor Building
DGR	Diesel Generator Room
XX	Plant-Wide Components
TY	Transformer Yard
TB	Turbine Building

For a single unit site, the list can be simplified to match the given bins

ID	Location, L
TB	Turbine Building
COP	Containment (PWR)
CAR	Control/Auxiliary/Reactor Building
XX	Plant-Wide Components

The above listed locations are also used in the determination of ignition source weighting factors for transient fires as described in Section 9.5.2.

9.4 Plant Specific Bayesian Update

9.4.1 Generic fire frequencies have been developed for different locations within the plant. See Section 9.2.4 for a list of the locations and mean frequencies of occurrence per year. These frequencies are based on industry data and have taken into account plant to plant variability. That is to say they were produced using a two-stage Bayesian update, but they remain generic frequencies. These frequencies need to take into account plant specific experience so that the frequencies accurately reflect the experience of the plant for which the fire PRA is being updated or developed. The final desired product is not a generic fire model based on generic data, but one that truly reflects the nuances and experience of the plant in question. Specializing the fire initiating event frequencies is one of key ways to do that.

At this point in developing fire ignition frequencies, plant specific fire events need to be collected so that it can be determined if the generic frequencies need to be specialized, i.e. Bayesian updated, to take into account plant experience. Two questions need to be answered:

1) Are there any unusual fire occurrence patterns at the plant?

2) Is the development of plant specific fire frequencies warranted given the answer to question 1).

Plant fire events need to be collected to answer 1). They can be obtained from fire brigades, the Appendix R group, operations or maintenance. The details of these events need to be ascertained and then compared against the events found in the EPRI Fire Events Database (FEDB).

If the answer to question 1) is that the plant has not experienced any fire patterns, then a Bayesian update of the generic frequencies is not necessary. That is because the mean frequencies are already so low that the exercise in performing the update will have a negligible effect on changing the frequencies.

On the other hand, if the plant has experienced patterns of fire that stem from a common cause, these fires need to be investigated. If that common cause has been addressed and plant changes have taken place to address them, then generic frequencies are warranted. This is because the outlying characteristic of the plant has been changed so now the plant is best reflected by the industry average.

If the plant's events are already in the FEDB, then, due to the nature of Bayesian statistics, the events for the plant that are already in the database can be ignored except for one case. If that fire or set of fires represent a pattern of fires due to a common or recurring cause, then the generic frequency for the applicable location(s) needs to be updated with the events *not* already in the FEDB.

9.4.2 Several pieces of data are required in order to update a generic frequency. First, the attributes of the generic frequency must be known. Table C-3 of Appendix C for Chapter 6 of NUREG/CR-6850 lists the mean value, 5%, 50%, 95% and standard deviation for each of the generic fire frequencies. It is recommended that the distribution type be assumed to be lognormal. Hence, given that the distribution is lognormal, and at least two other attributes about the distribution are known, there is enough information to describe the distribution so that most Bayesian updating software available can perform the update process. Next, the number of fires needs to be determined and the years of experience must be collected. Together this set of data is sufficient to perform the Bayesian updating of the generic frequency.

9.5 Fire Ignition Frequency Calculation

9.5.1 The basic equation for calculating the fire ignition frequency, λ, for a given ignition source (IS) in a specific compartment (J) is as follows:

$$\lambda_{IS,J} = \lambda_{IS} \cdot W_L \cdot W_{IS}$$

where:

W_L = Location (L) weighting factor per Table 6-2 [Ref. 2.2.1]

W_{IS} = Ignition Source (IS) weighting factor

which, for countable (X) items,

= X_{IS} Compartment / X_{IS} Total

9.5.2 W_{IS} for transients is determined as follow:

for general transients (Bins 3, 7, 25, & 37),

$$W_{IS} = W_{GT} = (n_m + n_o + n_s) / N_{GT}$$

for transients caused by welding and cutting (Bins 6, 24, & 36),

$$W_{IS} = W_{WC} = n_m / N_{WC}$$

for cable fires caused by welding and cutting (Bins 5, 11, & 31),

$$W_{IS} = W_{CF} = n_m \cdot W_{cable} / N_{CF}$$

where:

n_m = Maintenance influence factor rating for J of L

n_o = Occupancy influence factor rating for J of L

n_s = Storage influence factor rating for J of L

N_{GT} = $\sum(n_m + n_o + n_s)$ summed over <u>all</u> compartments of L

N_{WC} = $\sum n_m$ summed over <u>all</u> compartments of L

N_{CF} = $\sum n_m \cdot W_{cable}$ summed over <u>all</u> compartments of L

where: W_{cable} = Ratio of quantity of cables in compartment (J) over the total quantity in the location (L)

9.5.2 The equation for determining the total fire ignition frequency for a given compartment based on all applicable ignition sources is as follows:

$$\lambda_J = \sum \lambda_{IS} \cdot W_L \cdot W_{IS}$$

9.6 Task Documentation

9.6.1 The documentation of this task should be integrated with the documentation for the Plant Boundary Definition and Partitioning task, and the walkdown task.

9.6.2 The report shall document the fire ignition frequencies for each ignition source and compartment.

9.7 Deliverables

9.7.1 An Ignition Frequency Calculation

10.0 RECORDS

N/A

Attachment 8

Project Instruction FPIP-0202
Fire PRA Component Selection

Progress Energy

PROJECT INSTRUCTION

FPIP-0202

FIRE PRA

Component Selection

Revision 0

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NGG Nuclear Generation Group

TABLE OF CONTENTS

1.0 PURPOSE

This procedure provides requirements and guidance for the selection of plant equipment to be treated in the Fire PRA. The guidance and requirements are applicable to the Robinson Nuclear Plant (RNP), Brunswick Nuclear Plant (BNP), Harris Nuclear Plant (HNP), and Crystal River 3 (CR3).

2.0 REFERENCES

2.1 Developmental

2.1.1 PRO-NGGC-0201, NGG Standard Procedure Writer's Guide
2.1.2 FPIP-0100, Fire Protection initiatives Project-Project Controls

2.2 Implementing

2.2.1 *EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities: Volume 2; Detailed Methodology*. Electric Power Research Institute (EPRI), Palo Alto, CA, and U.S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research (RES), Rockville, MD: 2005, EPRI TR-1011989 and NUREG/CR-6850

2.2.2 NGG Fire Protection Program Improvement Initiatives, Attachment 2, NFPA 805 Transition Project Technical Details

2.2.3 NEI 04-06, Rev.1, Guidance for Self-Assessment of Circuit Failure Issues

2.2.4 NEI 00-01, Rev.1, Guidance for Post-Fire Safe Shutdown Circuit Anaylsis

3.0 DEFINITIONS

3.1 Shall

The use of the term 'shall' denotes a requirement or a mandatory activity

3.2 Should

The use of the term 'should' denotes an expected action unless there is justifiable reason not to perform the action.

3.3 Fire Compartment

Within this document, the use of the terms Fire Compartment, Fire PRA Compartment, and compartment are all intended to be equivalent. A Fire Compartment is a location associated with a plant that is bounded by features for which there is reasonable confidence that such boundaries are capable of preventing the spread of fire.

4.0 RESPONSIBILITIES

4.1 Fire Protection/SSA Engineer

4.1.1 Provide the approved safe shutdown equipment list and spurious actuation studies

4.1.2 Support the PRA engineer with component select tasks as needed

4.2 PRA Engineer

4.2.1 Review the scope of plant system equipment, and associated function(s), treated in the internal events PRA model for inclusion in the Fire PRA.
4.2.2 Review the scope of plant system equipment, and associated function(s), treated in the post fire safe shutdown analysis for inclusion in the Fire PRA.
4.2.3 Review the scope of plant instruments not already considered in the items above for inclusion in the Fire PRA.
4.2.4 Review of the results of Multiple Spurious actuations studies and the related sequences for consistency with the plant PRA and Fire PRA models.

5.0 PREREQUISITES

5.1 The Fire PRA Component selection is the first step towards the development of the actual Fire PRA model. This model is developed from the internal events PRA model. As a consequence, an approved version (revision) of the internal events PRA model shall be selected as the basis for the Fire PRA.

5.2 The Fire Safe Shutdown Program Manager database for plant equipment shall be completed prior to finalizing this task. The intent here is to ensure that the full scope of plant equipment credited for post fire safe shutdown analysis is considered in development of the Fire PRA.

5.3 The results of any expert panel assessment, multiple-spurious actuation study, or NEI 04-06 assessment should be completed and incorporated into this task. The results of these tasks may identify unique fire induced sequences that would not be adequately treated based on the logic in the internal events PRA model.

6.0 PRECAUTIONS AND LIMITATIONS

There are no specific precautions or limitations for this task.

7.0 SPECIAL TOOLS AND EQUIPMENT

N/A

8.0 ACCEPTANCE CRITERIA

N/A

9.0 INSTRUCTIONS

9.1 Overview

The overall process of performing the Fire PRA Component Selection Task is described in NUREG/CR-6850 [1]. The specific guidance, requirements, and criteria provided therein should be applied together with the requirements of this Project Instruction.

The development of a Fire PRA model begins with the existing plant internal events PRA model. The scope of equipment considered and treated in the PRA model must then be reconciled with the scope of plant equipment treated in the deterministic post fire safe shutdown analysis. Through this process, a portion of the issue related to treatment of fire induced core damage sequences can be addressed. The balance of the issue related to fire induced core damage sequences is addressed though other activities associated with the treatment of multiple fire induced spurious actuation.

Another key element of this scope of work involves the treatment of plant instrumentation. This scope of instruments consists of those relied upon in the Human Reliability Analysis (HRA) for credited operator actions and those additional instruments whose fire induced failure could lead to incorrect or otherwise undesired operator actions.

The resulting Fire PRA Component list is then used in subsequent tasks to complete the development of the Fire PRA.

9.2 Obtain Current Equipment lists

The starting point for Fire PRA Component Selection is the currently identified equipment included in the Safe Shutdown Analysis and the Internal Events PRA.

9.2.1 Obtain a copy of the post fire (SSEL) and note the revision or version identifier of the list or source document. Ensure that this listing has sufficient detail to ascertain the intended function(s) of each component (active versus passive, open versus close, start versus stop, Hi/Lo interface, flow diversion, etc).

9.2.2 Obtain a list of basic events from the Internal Events PRA. Basic events which do not map to equipment can generally be screened. This includes initiators, HFEs, common cause, maintenance, flags, etc. The remaining basic events should be "mapped" to a component tag. This mapping is typically developed as part of the online risk models (EOOS), but may exist elsewhere. If it does not exist it must be developed.

Note: for the remainder of this document, the term basic event implies a component with a specific failure mode.

9.2.3 Obtain the HRA analysis from the PRA, and identify instruments which may be relied upon for event success but may not be explicitly modeled in the PRA.

9.3 Deterministic Safe Shutdown Analysis Equipment List

The full scope of the plant equipment considered in the post fire safe shutdown equipment list shall be reviewed and individually dispositioned for applicability in the Fire PRA. Care must be taken to compare component IDs <u>and</u> failure modes.

For each component on the SSEL, determine whether mapping of that component to the plant PRA model is necessary. A component on the SSEL should be mapped to the PRA model if that component's fire induced failure would disable or otherwise adversely affect the plant's capability to mitigate the potential consequences of that fire event. A disposition should be provided for each component reviewed as follows:

NA – not modeled and not required to be modeled in PRA (w/notes)
OK – modeled in the PRA (add Basic Event and PRA tag ID if different)

AD – needs to be added to PRA
(add BE/TAG info when complete)

The scope of the SSEL may include plant equipment that are not material the Fire PRA study. For each item on the SSEL determined to be not applicable to the Fire PRA, a justification shall be provided. This may occur due various reasons. Examples Include:

- The component is on the SSEL to satisfy the deterministic regulatory requirement to achieve cold shutdown conditions. This safe endstate for the Fire PRA is based on the internal events PRA success criteria. This criteria and associated safe endstate is typically safe and stable hot standby (shutdown) conditions. As a consequence, there may be certain equipment on the SSEL that are not needed, or whose fire induced failure is not material to the CDF calculation.

- The component provides only an indication function and is not associated with any credited operator action and is not likely to cause the operator to performed unwanted or un-needed actions that have undesired affects – such as tripping a otherwise unaffected running pump.

- The component may be passive and be included for boundary definition only (manual valves or check valves). Typical PRA methods for treating as pre-initiators and flow diversions can be used to screen.

- Fire dampers can also be screened from this analysis if they do not impact the PRA success criteria, since PRAs typically only require HVAC to a few areas in the plant for accident mitigation. Dampers can also be addressed during fire scenario development and multi-compartment analyses.

For each item on the SSEL determined to be in the scope of the Fire PRA, identify the applicable failure modes to be considered. Identify the model changes needed. For example, a particular basic event may exist only in that sub-structure associated with Steam Generator tube rupture and would not be considered in the Fire PRA as a credible fire induced initiating event. In such instances, it may be necessary to edit the plant PRA model to properly treat the consequences of the postulated fire event. The model changes can be made in Task 5 (Fire-Induced Risk Model).

9.3.1 The completion of this task shall result in an annotated version of the SSEL where each entry has a disposition justified per 9.3.1. In the event one or more SSEL items cannot be adequately mapped, then PRA model changes may be required as described in Section 9.4.

9.4 Internal Events PRA Model Equipment List

The Fire PRA Model is based on the internal events PRA model. The internal events PRA model typically treats the full plant capability. However, in order to apply this same completeness to the Fire PRA would require the identification of cables and their spatial location for all associated components. In order to achieve an equitable balance between analysis completeness and overall analysis development cost, the initial scope of plant equipment to be credited in the analysis will be dependent on the availability of data.

The data to be used in the Fire PRA will be obtained from two sources.

- The deterministic post fire safe shutdown equipment list (SSEL) and associated cables.

- The scope of 'non-Appendix R' equipment and cables deemed to have high potential risk importance. For this final set of components, the associated set of cables as well as all spatial location information must be developed as part of the Fire PRA development effort.

The performance of the steps in this Section can be completed in an iterative manner with the steps in Section 9.2.

9.4.1 The revision or version of the internal events PRA model to be used as the base model for the Fire PRA development shall be identified and documented.

9.4.2 Starting with the list obtained in 9.2.2., identify passive/mechanical equipment, such as manual valves which do not have circuits to be traced. Apply disposition code of "**P**" for documentation purposes.

9.4.3 Identify Equipment is uniquely associated with an initiating event that cannot occur or be caused by a postulated fire event. Examples of these include Large Break LOCA and Steam Generator Tube Rupture.. Apply disposition code of "**U**" for documentation purposes.

9.4.4 For the remaining components, identify the normal and desired positions for the basic events. This information should be easily correlated to the failure mode identified by the basic event.

9.4.5 Identify the basic events which are already considered by SSEL. Apply disposition code of "**Y**" for documentation purposes.

9.4.6 For the remaining components, determine (or obtain from other documents) the risk significance (based on the internal events) if they are failed (RAW).

Note: This list can be provided as is to the SSA engineer for cable routing consideration, and support for basic event disposition.

9.4.7 For each component determine the need to include the component for fire protection (NFPA-805) credit. If credited, circuit routing may be required. Disposition should be documented. The following codes can be used:

- **P** - Passive/mechanical equipment does not need to be evaluated.

- **U** – Equipment is uniquely associated with an initiating event that cannot occur or be caused by a postulated fire event. Examples of these include Large Break LOCA and Steam Generator Tube Rupture.

- **Y** – Already included in SSEL (identify tag id if different)

- **L** - Low importance (RAW) equipment may not need to be credited (assume it fails given the fire). Spurious action should be considered.

- **A** – equipment should be credited and have circuits routed.

9.5 Unique Fire Induced Core Damage Sequences

The development of the Fire PRA Model may identify instances where the consequence of a postulated fire induced equipment failure is not treated in the base internal events PRA model. This is most likely to occur when multiple spurious actuation events are considered. The exclusion of such treatment in the internal events PRA model is because the negligible probability of these events occurring due to random failures. In these cases, a modification of the PRA model shall be prepared so that the resultant analysis properly treats the fire induced consequence.

One of the objectives of the Fire PRA Model development task is to maintain an overall framework wherein the entire plant risk assessment is embodied in a single integrated model. Therefore, if a PRA model change is required as described in this Section, that change must also be incorporated into the internal events PRA Model. As such, any changes that are needed must also consider the existing administrative procedures and controls associated with internal events PRA model edits.

9.5.1 Review the scope of 'un-mapped' SSEL items from Section 9.3 and determine whether the addition of one or more model basic events and associated logic structure is required.

9.5.2 The identification of potentially unique fire induced core damage sequences may also occur as a result of the Expert Panel reviews and/or NEI 04-06 related self-assessments related to the multiple spurious actuation issue. A review of these shall be performed to determine whether additional changes to the Fire PRA Model are required.

9.5.3 The addition of any PRA Model basic events that occurs as a result of the Section 9.5 steps shall also be reviewed in accordance with Section 9.4 of this procedure.

9.6 Instrumentation

The development of the Fire PRA includes the treatment of plant instrumentation in a fashion not previously described or required in prior industry guidance documents. The treatment of plant instrumentation is intended to address potential consequences of fire induced failure.

- The postulated fire induced failure of plant instrumentation may result in the loss of a credited 'input' that provides the cue to initiate an operator action. The loss of such an instrument could potentially invalidate the associated Human Reliability Analysis (HRA) and the resultant Human Error Probability (HEP) used in the plant PRA.

- The postulated fire induced failure of plant instrumentation may result in the generation of erroneous signals and/or spurious alarms that may lead to mal-operation of the plant equipment in response to procedure directed operator actions.

The objective of this step is to identify those plant instruments that are important to the performance of plant equipment and to ensure that they are considered in the development of the plant Fire PRA model.

9.6.1 Review the scope of human actions to be 'credited' in the Fire PRA Model. For each of the actions, identify the instrument(s) relied upon for providing the operator cue.

9.6.2 Perform a review of the plant alarm response procedures. Identify those instances where the occurrence of a single 'spurious' alarm signal, by itself, would result in an immediate operator response to terminate a key system's or component's operation that would otherwise be desirable to continue operation.

9.6.3 For each identified occurrence of the condition described in Section 9.6.2, identify the specific instrument and associated instrument LOOP components. Also identify or characterize the consequence of the failure, or spurious signal, from that instrument. If an existing PRA model basic event can be used to properly treat the failure consequence, then identify the basic event(s). If a model change or new basic events are required, then provide a disposition indicating such. This latter information is necessary to support the Task 5 development of the Fire PRA model.

9.6.4 For each instrument (or instrument LOOP) identified, ensure that the equipment is added to the scope of the Fire PRA. While a specific Fire PRA Equipment list is not required, some means to ensure that those components credited in the Fire PRA have their associated cables identified in Task 3 shall be provided.

9.7 Documentation of Data Mapping

The development of the Fire PRA involves the collection of large volumes of data that are logically related. These logical data relationships are relied upon in the application of various electronic search and sorted routines to support the completion of the analysis.

The SSEL is maintained in the FSSPMD. Each component should have a disposition code for application to the PRA. Equipment added as a result of PRA review in section 9.4 will be added to the list and coded to indicate that they are not part of the formal SSEL.

The PRA database contains a list of the modeled basic events. Each basic event will have a component reference and a disposition for applicability to fire analysis. This data will be maintained as part of the formal PRA documentation/models.

9.8 Deliverables

9.8.1 A candidate list of the components and functions to be added to the PRA.

9.8.2 A candidate list of the PRA components and functions for cable/circuit routing.

10.0 RECORDS

N/A