





D-5 4/18/97

**UNREVIEWED SAFETY QUESTION (USQ)  
SCREENING AND EVALUATION**

1. Identification Number: ECN-634394

**USQ SCREENING**

Page 3 of 8

2. Title: WHC-SD-CP-SDD-009, "Definition and Means of Maintaining the Emergency Notification and Evacuation System Portion of the PFP Safety Envelope"

**INSTRUCTIONS:** Respond to each question and provide justification for each response. A restatement of the question does not constitute a satisfactory justification or basis. An adequate justification provides sufficient explanation such that an independent reviewer could reach the same conclusion based on the information provided [DOE 5480.21, 10.e.11].

**DESCRIPTION**

This USQ screening is for a revision to the document WHC-SD-CP-SDD-009, "Definition and Means of Maintaining the Emergency Notification and Evacuation System Portion of the PFP Safety Envelope." The revision consists of updating references, changing the safety class designation from "Safety Class 3" to "Safety Significant" in accordance with WHC-CM-4-46, Safety Analysis Manual, Chapter 9.0, Safety Structures, Systems, and Components, and deleting Appendices C and D, which contain drawing list information that is redundant to that found in Appendices A and B. The document number prefix will also change from WHC to HNF, i.e. HNF-SD-CP-SDD-009.

**QUESTIONS**

1. Does the proposed change or occurrence represent a change to the facility or procedures as described in the Authorization Basis?  
[ ] N/A [X] No [ ] Yes/Maybe

**basis:** WHC-SD-CP-OSR-010, Section C, contains the Safety Significant Safety Envelope Feature "8. Equipment provided for safe evacuation of facility personnel in case of emergency." WHC-SD-CP-SAR-021, Section 5.4.10, "Safety Communication and Alarm Systems," describes the systems relied upon for emergency evacuation of personnel. "The PFP complex communications and alarms systems consist of the following:

- Plant (commercial) telephone system, including crash system phones
- Internal private automatic exchange (PAX) telephone and public address system
- Emergency audible (siren) alarm system
- Emergency lighting
- Fire alarm/notification system
- CAM system
- CAS."

The fire alarm system, CAM system, and CAS are addressed by other System Description Documents, with the remaining systems above addressed by this document, WHC-SD-CP-SDD-009. The proposed changes to WHC-SD-CP-SDD-009 described above does not represent a change to the facility or affect the statement in WHC-SD-CP-OSR-010, Appendix C.

2. Does the proposed change or occurrence represent conditions that have not been analyzed in the Authorization Basis?  
[ ] N/A [X] No [ ] Yes/Maybe

**basis:** Accidents analyzed in WHC-SD-CP-SAR-021, Chapter 9, do not specifically address the emergency notification and evacuation systems. Generally, they are installed to warn and protect personnel. The changes described above do not affect that function and therefore do not represent an unanalyzed condition.

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3. Does the proposed change represent a test or experiment NOT described in the Authorization Basis that may affect the safe operation of the facility?  
 N/A     No     Yes/Maybe

BASIS: There are no tests or experiments associated with this change to the document. This question is not applicable.

4. Does the proposed change or occurrence represent a change to the Technical Safety Requirements or a reduction in the margin of safety defined in the Technical Safety Requirements?  
 N/A     No     Yes/Maybe

BASIS: No new or revised OSR is required. There are no LCOs associated with these systems. WHC-SD-CP-OSR-010, Appendix C, identifies these systems as a Safety Significant Safety Envelope Feature, which is controlled through this SDD, WHC-SD-CP-SDD-009. The changes to this SDD described above do not require a change to WHC-SD-CP-OSR-010, Appendix C.

USQE #1 L. E. Edvalson  
 (Print Name)

USQE #2 G. A. Glover  
 (Print Name)

L. E. Edvalson  
 Signature

Date: 4/14/97

G. A. Glover  
 Signature

Date: 4/18/97

If there is a YES/MAYBE response to questions 1, 2, 3, or 4, then a USQ Evaluation must be completed. The following guidance should be considered when completing this screening. This guidance should not be considered all-inclusive; additional factors may need to be considered depending on the nature of the proposed change.

- Does the proposed change:
- 1) Modify, add, or delete a safety class function of a structure, system or component stated in the authorization basis?
  - 2) Alter the design of a structure, system or component as described in the authorization basis?
  - 3) Modify, add, or delete the description of operation, operating environment, or analyses of any system or component described in the authorization basis?
  - 4) Modify, add, delete or conflict with any of the design bases stated in the authorization basis?
  - 5) Conflict with the principle or general design criteria stated in the authorization basis?
  - 6) Modify, add, or delete any plant design features described in the authorization basis?
  - 7) Modify, add, or delete a flow diagram or facility drawing provided in the authorization basis?
  - 8) Create the potential for new system or component interactions (e.g., seismic, electrical breaker coordination)?

# DEFINITION AND MEANS OF MAINTAINING THE EMERGENCY NOTIFICATION AND EVACUATION SYSTEM PORTION OF THE PLUTONIUM FINISHING PLANT SAFETY ENVELOPE

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Abstract: The Emergency Evacuation and Notification System provides information to the PFP Building Emergency Director to assist in determining appropriate emergency response, notifies personnel of the required response, and assists in their response. The report identifies the equipment in the Safety Envelope (SE) for this System and the Administrative, Maintenance, and Surveillance Procedures used to maintain the SE Equipment.

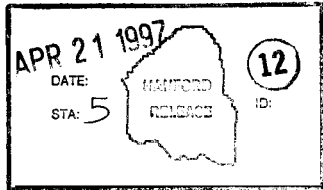
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Release Approval

4/21/97  
Date



Approved for Public Release



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## 1.0 PURPOSE

The purpose of this document is to provide the definition and means of maintaining the safety envelope (SE) for the Emergency Notification and Evacuation System (ENES). Together with the appendices, it provides:

1. The system requirements for determining system operability. (Section 3.0)
2. Evaluations of equipment to determine the safety boundary for the system. (Section 4.0)
3. List of system drawings which are annotated to show the SE boundaries. (Appendix A)
4. Identification of the SE equipment by reference to systems and drawings. (Appendix B)
5. Requirements for the individual SE equipment. (Section 4.0)
6. A list of the operational and surveillance procedures necessary to operate and maintain the system equipment within the SE. (Sections 5.0 and 6.0)

A field evaluation of the emergency lighting system is currently being performed. After the evaluation is complete, emergency lighting will be moved to a new System Design Document.

The Private Automatic Exchange (PAX) phones and PAX switchers are outside the safety envelope defined in WHC-SD-CP-OSR-010, Section 5.4.10, "Safety Communication and Alarm Systems," Section 5.4.10.1, "Major Components and Operating Characteristics," and Section 5.4.10.1.12, "PAX System." The safety envelope is maintained by the PAX override microphone system and this system will function as a backup to the evacuation alarms during an emergency.

## 2.0 BACKGROUND

Plutonium Finishing Plant (PFP) Final Safety Analysis Report (FSAR) WHC-SD-SAR-021, Rev 0, September 1995, Chapter 9.0, postulates a number of abnormal operations and accidents which may require PFP personnel to evacuate the facility or take cover. In addition, the Building Emergency Plan for Plutonium Finishing Plant Complex, WHC-IP-0263-PFP, identifies six generalized potential emergency situations which may require an evacuation or take cover response. The situations and responses, summarized in WHC-IP-0263-PFP, are as follows:

- 1) Potential evacuation response
  - a) Release of hazardous material (radioactive or nonradioactive) at this or another facility impacting this facility

- b) Loss of utilities
  - c) Protective response to emergencies affecting ability to inhabit the facility (i.e., bomb threat)
- 2) Potential take cover response
- a) Release of hazardous material outside of a facility
  - b) Attack by hostile factions
  - c) Protective response to emergencies affecting the facility or personnel

The set of equipment at PFP that is designed to provide information to the Building Emergency Director (BED) to determine the appropriate emergency response, notify personnel of the required emergency action, and assist in their response is referred to in this document as the ENES. The table for emergency notification and evacuation system SE equipment is listed in Appendix B.

The equipment in this system consists of the evacuation sirens; the PAX override microphones, speakers, and amplifiers; the battery operated emergency lighting; and the ceiling mounted incandescent emergency lighting. Specifically, the equipment included in the ENES are from the following systems:

- 1) Plant crash system phones
- 2) Internal PAX override microphone, speaker, and amplifier system
- 3) Evacuation sirens
- 4) Emergency lighting

Because this equipment failure could result in significant harm to facility workers due to industrial hazards, it is classified as Safety Significant in the FSAR.

The fire, criticality, and radiation alarms are not considered part of the SE for the ENES. They are, however, part of the PFP SE and are addressed in the SE documents covering fire protection, criticality detectors and alarms, effluent stack monitors and samplers, and room continuous air monitors.

### 3.0 SYSTEM REQUIREMENTS

The decision to activate the evacuation or take cover alarm is made by the PFP BED for PFP facility emergencies. Area or site wide emergencies may also require PFP personnel to take emergency action. Once the decision is made to notify personnel of the required emergency action (e.g., evacuation or take cover), there are various means available within the PFP facility to do so. The ENES therefore, is required to perform the following three functions:

- 1) Communication of information to determine nature of emergency condition.
- 2) Provide notification to PFP personnel of action to be taken as a backup communication source to the emergency sirens (i.e., evacuation, take cover, criticality).
- 3) Emergency illumination to assist personnel in taking emergency action.

#### 4.0 SAFETY ENVELOPE EQUIPMENT

##### 4.1 SELECTION OF SAFETY ENVELOPE EQUIPMENT

The equipment in the ENES SE can be grouped by the three basic functions it performs.

###### 4.1.1 Communication Equipment

There are two PAX override microphones added to Room 104 and the foyer, Room 100, in 234-5Z Building and Room 25 in 270-Z Building. Also, phone lines - Line 1 and Line 2, can be used for PAX overrides. The phones in Room 321A - 234-5Z Building, the Micon Station - 234-5ZA Building, Room 500 - 291Z Building, and Room 602 - 2736-ZB Building all have Line 1 and Line 2 capability. The system will provide the PFP facility with PAX announcement capabilities, if the phones are left off the hook. The PAX override microphone system is safety significant equipment.

###### 4.1.2 Notification Equipment

The primary system used to notify PFP facility personnel to evacuate or takeover is the evacuation sirens. The PAX override microphone, speaker, and amplifier system will function as a supplement to the evacuation sirens in an emergency at PFP. The PAX override microphone, speaker, and amplifier system will be used to backup the evacuation system in the event of an emergency. The crash alarm system, a feature of the plant telephone system, is used to notify the PFP BED for site or area emergencies.

The evacuation siren system consists of more than 31 sirens and a siren controller. There are approximately 28, 125VDC powered sirens in various PFP facility buildings. These sirens are powered from 125VDC Emergency Panel PD via Panel DC (about 27 sirens) and Panel DD (1 siren). These panels are located in rooms 265 and 266 of 234-5Z Building, respectively. Control power for Panel PD is via 125 VDC switchgear batteries. The switchgear batteries are charged by parallel battery chargers tied to the emergency bus. There are two 120VAC sirens in 270-Z Building, which are powered by normal power via Panel A and have their own UPS. Panel A is located in Corridor 7, Column E19 of the 234-5Z Building.

There are three 480VAC sirens, one in the ventilation plenum and one on the roof of the 234-5Z Building, and one on the roof of the 2736-ZB Building. The sirens are powered from emergency power backup.

There is a siren controller for all the DC and AC powered sirens. It controls the tone of the siren to indicate which emergency action to take: a steady tone is the signal for facility evacuation, a wavering tone - take cover. There are siren control switches in eight plant locations: 234-5Z, Corridors 6, 5, 14a, and Room 321A; 236-Z, Room 45; 2701-Z; 2701-ZA; and 2736-ZB, Room 607. The siren controller is powered directly from emergency 125VDC Panel PD.

Evacuation and take cover alarms can also be initiated using the crash alarm system. This is a feature of the plant phone system which allows a message to be given over selected phones throughout the facility by dialing one number. This system is primarily used for area or site emergencies. The crash phones in the PFP facility are in the 234-5Z Building, Rooms 104, 107, and 321 and 270-Z Building, Room 62 and are identified by yellow stickers on the handset. Instructions received via the crash alarm system are then relayed to other PFP personnel by sirens, PAX override microphone, speaker, and amplifier system, or verbal instructions.

#### **4.1.3 Illumination Equipment**

Battery pack emergency lights are provided for designated evacuation routes in accordance with the life safety code, NFPA 101. These lights are maintained in accordance with NFPA 101 requirements. Based on facility staff input, the emergency lighting system in the plant has known deficiencies in illumination levels and power sources. After completion of a field evaluation of the emergency lighting system, an engineering study will be prepared.

### **4.2 JUSTIFICATION FOR EXCLUSION OF EQUIPMENT FROM SAFETY ENVELOPE**

Specific components not included in the safety envelope and the reasoning behind their exclusion is discussed below.

#### **4.2.1 PFP PAX Communication System**

The PFP PAX communication system (consisting of the PAX phones and PAX switchers), is not included in the safety envelope because the PAX phone system has deficiencies which limits it from preventing or mitigating exposure to PFP personnel and the PAX phone system is not needed to evacuate personnel at PFP. The PAX public communication system's main function is to supplement the evacuation sirens in an emergency at PFP and serves as a backup to the evacuation system in the event of an emergency. These functions of the PAX phone communication system are very important

to PFP plant personnel evacuating safely in an emergency. The PAX override microphone, speaker, and amplifier system will perform these functions.

The PAX override microphone, speaker, and amplifier capability on a particular channel shall have priority over any subsequent automatically initiated signal on that channel. The PFP Override microphone, speaker, and amplifier capability meets these requirements and will be the backup evacuation system in the event of an emergency at PFP. Based on the above conditions, the PAX override microphone, speaker, and amplifier system will be safety significant equipment and this will justify exclusion of the PAX phones and PAX switchers from the safety envelope.

#### 4.2.2 Back up Lighting

Back up lighting at PFP is not required by the life safety code, NFPA 101. The additional lighting is provided due to the complexity of PFP. The battery operated units are stand alone units, each powered by its own individual battery. Additional back up lights receive power from Emergency Lighting Panels DA and DD in Room 266 - 234-5Z Building and Panel DF in Room 500 - 291-Z Building.

### 5.0 SAFETY ENVELOPE PROCEDURES

There are no SE procedures for the ENES. However, there are administrative and facility preventive maintenance procedures which address some of the equipment in this system.

#### 5.1 OPERATING PROCEDURES

There is an administrative procedure which defines the responsibilities, duties, and responses for PFP facility emergencies. This procedure is the Building Emergency Plan for Plutonium Finishing Plant Complex, WHC-IP-0263-PFP. This procedure identifies what and how to signal for an evacuation or take cover emergency. Fluor Daniel Hanford Emergency Management Procedures, DOE-0223, Vol. 1,2,3, *Emergency Plan Implementing Procedures, Richland Operations Office* addresses area and site wide emergencies which may require a response from PFP personnel.

#### 5.2 MAINTENANCE PROCEDURES

##### 5.2.1 Evacuation Sirens

222049 provides the instructions for a quarterly inspection and functional test of the PFP Evacuation and Take Cover Alarm Panel and Relays. However, it does not test the audible siren alarm. This is accomplished by a monthly surveillance described in section 6.0.

Instructions for operability testing the emergency battery, which provides 125VDC power to the DC powered sirens and the siren controller in the event of a loss of all AC power, is procedure 2Z22163, "Switchgear Control Battery Maintenance."

Instructions for annual functional testing of the TOPAZ UPS for the two 120VAC 778 sirens in 270-Z are given by 2Z22049, Annual Test of the Evacuation Siren UPS - 270-Z.

### 5.2.2 Emergency lights

Instructions for the monthly and annual testing of the battery operated emergency lights are in procedure ZSR-12N-001 for the following buildings: 236-Z, 234-5Z (frontside, backside, & RMC) 2701-ZD, 2736-ZB, 2736-Z, and 270-Z.

Fire Protection Program Manual, WHC-CM-4-41, Section 6.4, Building Emergency Lights, requires monthly and annual operational testing of emergency lights.

## 6.0 SAFETY ENVELOPE SURVEILLANCE REQUIREMENTS

There are no SE surveillance requirements for the ENES. However, there are administrative procedures for emergency planning and response which require the periodic testing of some of equipment in this system. Surveillance testing is specified for the following:

Emergency Drills: Plutonium Finishing Plant Administration, HNF-CM-5-8, Section 5.1, requires an emergency drill and exercise program be implemented at PFP. As part of the program, the following emergency drills need to be conducted annually:

- a. fire
- b. evacuation
- c. take cover
- d. bomb threat
- e. contamination spread
- f. loss of utilities
- g. security
- h. hazardous material
- i. criticality
- j. seismic
- k. process upset

Sirens: DOE/RL-94-02, *Hanford Emergency Response Plan*, Section 10.3, "Maintenance and Testing of Alarm and Communication Systems," requires quarterly testing of building evacuation and take cover alarms. This testing requirement is implemented at PFP by maintenance procedure 2Z22049 in conjunction with the audible monthly testing.

DOE/RL-94-02 requires monthly audible testing of both the evacuation (steady tone) and take cover (wavering tone) alarm. Both alarms are audibly tested at PFP by facility operations personnel on the first Thursday of each month.

Crash alarm system: DOE/RL-94-02, Section 10.3, requires periodic testing of the crash alarm feature of the plant telephone system. These tests include site wide and area tests to be conducted monthly. The Emergency Preparedness staff conducts these tests with the building wardens or BEDs responding to the crash alarm tests in each facility.

Emergency Lights: Fire Protection Program Manual requires monthly and annual testing of battery operated and emergency generator operated emergency lighting. The maintenance procedures referenced in section 5.2.5 of this report implement the monthly and yearly testing for the battery operated lights at PFP. Maintenance procedures are being developed to test 125VDC incandescent ceiling mounted emergency lighting.

## 7.0 REFERENCES

- 1) PFP FSAR, WHC-SD-SAR-021, REV. 0, 9/95
- 2) WHC-IP-0263-PPF REV. 3, Building Emergency Plan for Plutonium Finishing Plant Complex
- 3) HNF-CM-5-8, Plutonium Finishing Plant Administration
- 4) WHC-CM-4-41, Fire Protection Program Manual; Section 6.4 Building Emergency Lights
- 5) DOE-0223, Vol. 1,2,3, *Emergency Plan Implementing Procedures, Richland Operations Office*, effective April 1, 1997.
- 6) DOE/RL 94-02, *Hanford Emergency Response Plan*

Appendix A - SAFETY ENVELOPE SYSTEMS DATA SHEET
APPLICABLE OSR (CH 11): None
APPLICABLE FSAR ANALYSES: 9.0 ACCIDENT SAFETY ANALYSES 9.1 ABNORMAL OPERATIONS 9.2 ABNORMAL OPERATIONS/ACCIDENTS
APPLICABLE PLANT/PROCESS DESIGN/ OPERATION DESCRIPTION(S) (FSAR CHAPTER/ SECTION): PFP FSAR, WHC-SD-SAR-021, REV. 0: Chapter 5.0/5.4.10 Safety Communications and Alarms
SAFETY SYSTEM DRAWINGS: H-2-70181, Sht 1-4: Evacuation Siren
IMPLEMENTING PROCEDURES/COMPLIANCE VERIFICATION
OPERATING (ZO-series): N/A
LABORATORY (LO-, LA- series): N/A
HEALTH PHYSICS (WHC-IP-0718 series): N/A
OPERATING SPECIFICATION(S) (OSD-Z-184-series): N/A
ADMINISTRATIVE: HNF-CM-5-8 PFP Administration, Sections 5.1 and 5.3 WHC-IP-0263-PFP Building Emergency Plan for Plutonium Finishing Plant Complex DOE/RL-94-02 Hanford Emergency Response Plan
SURVEILLANCE: 2222049 Annual Test of the Evacuation Siren UPS - 270 Z. 2222163 Switchgear Control Battery Maintenance (Maintenance Bi-Monthly, Semi Annual, and Annual)

Appendix A - SAFETY ENVELOPE SYSTEMS DATA SHEET

OTHER:

Preventive Maintenance Procedures:

2Z22049 Evacuation and Take Cover Alarm Panel and Relay Test

2Z20163 Switchgear Control Battery (Bi-Monthly)

For Emergency Lighting:

ZSR-12N-001 236-Z, 234-5Z (frontside, backside, & RMC)  
2701-ZD, 2736-ZB, 2736-Z, and 270-Z

DEFINITION AND MEANS OF MAINTAINING THE EMERGENCY  
 NOTIFICATION AND EVACUATION SYSTEM PORTION OF THE  
 PFP SAFETY ENVELOPE

Appendix B - EMERGENCY NOTIFICATION AND EVACUATION SYSTEM			
Safety Significant			
SAFETY ENVELOPE SYSTEM EQUIPMENT			
EQUIPMENT TYPE	FUNCTIONAL DESCRIPTION	SYSTEM	ESSENTIAL DRAWING NUMBER
Evacuation Sirens	Provide audible signal to notify PFP facility personnel to evacuate or take cover	Evacuation Sirens	H-2-70181
Siren Controller	provides ability to control siren tone: steady tone- evacuate; wavering tone- take cover	Evacuation Sirens	H-2-70181
Emergency Lights, Battery Operated; Emergency Lights, Incandescent, Ceiling Mounted	provide illumination for designated evacuation routes in the PFP facility buildings to assist personnel in taking appropriate emergency response if normal lighting is not available (e.g., during loss of normal power)	Emergency lighting	See Appendix A

## DISTRIBUTION SHEET

To PLUTONIUM FINISHING PLANT (PFP) FACILITY	From PFP ENGINEERING	Page 1 of 1 <hr/> Date 4/15/97
Project Title/Work Order DEFINITION AND MEANS OF MAINTAINING THE EMERGENCY NOTIFICATION AND EVACUATION SYSTEM PORTION OF THE PLUTONIUM FINISHING PLANT SAFETY ENVELOPE		EDT No. <hr/> ECN No. 634394

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L. E. EDVALSON	T5-48	X			
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D. D. JOHNSON	T4-20	X			
R. D. KECK	T4-20	X			
J. P. KING	T5-51	X			
C. M. KRONVALL	T5-15	X			
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