

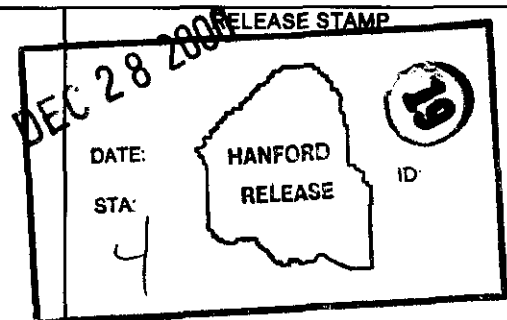
## ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 661043

Proj.  
ECN

|                                                                                                                                                                                                                                                                                                                       |  |                                                                       |  |                                                                     |                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------|--|---------------------------------------------------------------------|------------------------|
| 2. ECN Category (mark one)                                                                                                                                                                                                                                                                                            |  | 3. Originator's Name, Organization, MSIN, and Telephone No.           |  | 4. USQ Required?                                                    | 5. Date                |
| Supplemental <input type="checkbox"/>                                                                                                                                                                                                                                                                                 |  | S. J. Davis / 3N500 / S6-51 / 372-0473                                |  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | 12/19/00               |
| Direct Revision <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                                   |  | 6. Project Title/No./Work Order No.                                   |  | 7. Bldg./Sys./Fac. No.                                              | 8. Approval Designator |
| Change ECN <input type="checkbox"/>                                                                                                                                                                                                                                                                                   |  | HNF-6403, Rev. 0                                                      |  | 225B/C96A/2C                                                        | SQ                     |
| Temporary <input type="checkbox"/>                                                                                                                                                                                                                                                                                    |  | 9. Document Numbers Changed by this ECN (includes sheet no. and rev.) |  | 10. Related ECN No(s).                                              | 11. Related PO No.     |
| Standby <input type="checkbox"/>                                                                                                                                                                                                                                                                                      |  | See Block 13A.                                                        |  | N/A                                                                 | N/A                    |
| Supersedeure <input type="checkbox"/>                                                                                                                                                                                                                                                                                 |  | 12a. Modification Work                                                |  | 12d. Restored to Original Condition (Temp. or Standby ECNs only)    |                        |
| Cancel/Void <input type="checkbox"/>                                                                                                                                                                                                                                                                                  |  | 12b. Work Package No.                                                 |  | 12c. Modification Work Completed                                    |                        |
|                                                                                                                                                                                                                                                                                                                       |  | N/A                                                                   |  | N/A                                                                 |                        |
|                                                                                                                                                                                                                                                                                                                       |  | Design Authority/Cog. Engineer Signature & Date                       |  | Design Authority/Cog. Engineer Signature & Date                     |                        |
| 13a. Description of Change                                                                                                                                                                                                                                                                                            |  |                                                                       |  |                                                                     |                        |
| Revise HNF-6403, Rev. 0 to HNF-6403, Rev. 1 with the following changes.                                                                                                                                                                                                                                               |  |                                                                       |  |                                                                     |                        |
| 13b. Design Baseline Document? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                                                                                                                                                                                                                    |  |                                                                       |  |                                                                     |                        |
| <u>JUSTIFICATION (14.b)</u>                                                                                                                                                                                                                                                                                           |  |                                                                       |  |                                                                     |                        |
| The pool cell radiation alarm has been identified as safety significant. The reclassification is in accordance with changes made in the WESF Basis for Interim Operation, HNF-SD-WM-BIO-002, Rev. 1 and the Safety Equipment List, HNF-SD-WM-SEL-008, Rev. 7B. The basis for this change is documented in ECN 661042. |  |                                                                       |  |                                                                     |                        |
| Approval designator SQ was selected per item T3.5, HNF-PRO-233. Design verification by review per FSP-WESF-001, Section EN-1, and HNF-PRO-1819. Quality level QL2 is assigned in accordance with HNF-PRO-259, Section 2.2.5.a.                                                                                        |  |                                                                       |  |                                                                     |                        |
| USQ WESF-00-086 / USQ WESF-00-090                                                                                                                                                                                                                                                                                     |  |                                                                       |  |                                                                     |                        |
| 14a. Justification (mark one)                                                                                                                                                                                                                                                                                         |  | 14b. Justification Details                                            |  |                                                                     |                        |
| Criteria Change <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                                   |  | See Block 13a.                                                        |  |                                                                     |                        |
| Design Improvement <input type="checkbox"/>                                                                                                                                                                                                                                                                           |  |                                                                       |  |                                                                     |                        |
| Environmental <input type="checkbox"/>                                                                                                                                                                                                                                                                                |  |                                                                       |  |                                                                     |                        |
| Facility Deactivation <input type="checkbox"/>                                                                                                                                                                                                                                                                        |  |                                                                       |  |                                                                     |                        |
| As-Found <input type="checkbox"/>                                                                                                                                                                                                                                                                                     |  |                                                                       |  |                                                                     |                        |
| Facilitate Const. <input type="checkbox"/>                                                                                                                                                                                                                                                                            |  |                                                                       |  |                                                                     |                        |
| Const. Error/Omission <input type="checkbox"/>                                                                                                                                                                                                                                                                        |  |                                                                       |  |                                                                     |                        |
| Design Error/Omission <input type="checkbox"/>                                                                                                                                                                                                                                                                        |  |                                                                       |  |                                                                     |                        |
| 15. Distribution (Include name, MSIN, and no. of copies)                                                                                                                                                                                                                                                              |  |                                                                       |  |                                                                     |                        |
| L. I. Covey S6-51 (release only)                                                                                                                                                                                                                                                                                      |  |                                                                       |  |                                                                     |                        |
| S. J. Davis S6-51 (release only)                                                                                                                                                                                                                                                                                      |  |                                                                       |  |                                                                     |                        |
| M. A. Hill S6-51 (release only)                                                                                                                                                                                                                                                                                       |  |                                                                       |  |                                                                     |                        |



# ENGINEERING CHANGE NOTICE

Page 2 of 2

1. ECN (use no. from pg. 1)

50 12/28/00  
661035-66043

## 16. Design Verification Required

☒ Yes

☐ No

## 17. Cost Impact

### ENGINEERING

Additional ☐ \$ N/A

Savings ☐ \$

### CONSTRUCTION

Additional ☐ \$ N/A

Savings ☐ \$

## 18. Schedule Impact (days)

Improvement ☐ N/A

Delay ☐

## 19. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 13. Enter the affected document number in Block 20.

|                                |                          |                                  |                          |                               |                                     |
|--------------------------------|--------------------------|----------------------------------|--------------------------|-------------------------------|-------------------------------------|
| SDD/DD                         | <input type="checkbox"/> | Seismic/Stress Analysis          | <input type="checkbox"/> | Tank Calibration Manual       | <input type="checkbox"/>            |
| Functional Design Criteria     | <input type="checkbox"/> | Stress/Design Report             | <input type="checkbox"/> | Health Physics Procedure      | <input type="checkbox"/>            |
| Operating Specification        | <input type="checkbox"/> | Interface Control Drawing        | <input type="checkbox"/> | Spares Multiple Unit Listing  | <input type="checkbox"/>            |
| Criticality Specification      | <input type="checkbox"/> | Calibration Procedure            | <input type="checkbox"/> | Test Procedures/Specification | <input type="checkbox"/>            |
| Conceptual Design Report       | <input type="checkbox"/> | Installation Procedure           | <input type="checkbox"/> | Component Index               | <input type="checkbox"/>            |
| Equipment Spec.                | <input type="checkbox"/> | Maintenance Procedure            | <input type="checkbox"/> | ASME Coded Item               | <input type="checkbox"/>            |
| Const. Spec.                   | <input type="checkbox"/> | Engineering Procedure            | <input type="checkbox"/> | Human Factor Consideration    | <input type="checkbox"/>            |
| Procurement Spec.              | <input type="checkbox"/> | Operating Instruction            | <input type="checkbox"/> | Computer Software             | <input type="checkbox"/>            |
| Vendor Information             | <input type="checkbox"/> | Operating Procedure              | <input type="checkbox"/> | Electric Circuit Schedule     | <input type="checkbox"/>            |
| OM Manual                      | <input type="checkbox"/> | Operational Safety Requirement   | <input type="checkbox"/> | ICRS Procedure                | <input type="checkbox"/>            |
| FSAR/SAR                       | <input type="checkbox"/> | IEFD Drawing                     | <input type="checkbox"/> | Process Control Manual/Plan   | <input type="checkbox"/>            |
| Safety Equipment List          | <input type="checkbox"/> | Cell Arrangement Drawing         | <input type="checkbox"/> | Process Flow Chart            | <input type="checkbox"/>            |
| Radiation Work Permit          | <input type="checkbox"/> | Essential Material Specification | <input type="checkbox"/> | Purchase Requisition          | <input type="checkbox"/>            |
| Environmental Impact Statement | <input type="checkbox"/> | Fac. Proc. Samp. Schedule        | <input type="checkbox"/> | Tickler File                  | <input type="checkbox"/>            |
| Environmental Report           | <input type="checkbox"/> | Inspection Plan                  | <input type="checkbox"/> | None                          | <input checked="" type="checkbox"/> |
| Environmental Permit           | <input type="checkbox"/> | Inventory Adjustment Request     | <input type="checkbox"/> |                               | <input type="checkbox"/>            |

## 20. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision

Document Number/Revision

Document Number/Revision

N/A

N/A

N/A

## 21. Approvals

Signature

Date

Signature

Date

Design Authority \_\_\_\_\_

Cog. Eng. S. J. Davis *S. J. Davis* 12-20-01

Cog. Mgr. J. L. Pennock *J. L. Pennock* 12-20-00

QA M. A. Hill *M. A. Hill* 12-28-0000

Safety L. I. Covey *L. I. Covey* 12-14-00

Environ. \_\_\_\_\_

Other Review performed by: \_\_\_\_\_

M. P. Storm *M. P. Storm* 12/20/00

Design Agent \_\_\_\_\_

PE \_\_\_\_\_

QA \_\_\_\_\_

Safety \_\_\_\_\_

Design \_\_\_\_\_

Environ. \_\_\_\_\_

Other \_\_\_\_\_

### DEPARTMENT OF ENERGY

Signature or a Control Number that tracks the Approval Signature

### ADDITIONAL

# **Critical Characteristics of Radiation Detection System Components to be Dedicated for Use in Safety Class/Safety Significant System**

Prepared for the U.S. Department of Energy  
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the  
U.S. Department of Energy under Contract DE-AC06-96RL13200

**Fluor Hanford**

P.O. Box 1000  
Richland, Washington

# Critical Characteristics of Radiation Detection System Components to be Dedicated for Use in Safety Class/Safety Significant System

Division: WM

S. J. Davis  
Fluor Hanford

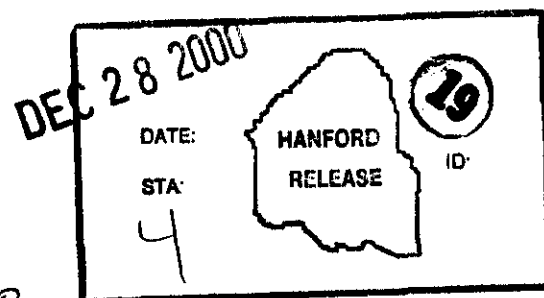
Date Published  
January 2001

Prepared for the U.S. Department of Energy  
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the  
U.S. Department of Energy under Contract DE-AC06-96RL13200

**Fluor Hanford**  
P.O. Box 1000  
Richland, Washington

  
Release Approval  
12-28-00  
Date



Release Stamp

#### **LEGAL DISCLAIMER**

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

This report has been reproduced from the best available copy.

Printed in the United States of America

Total Pages: 7

[illegible]

## **1.0 PURPOSE AND SCOPE**

This document identifies critical characteristics of components to be dedicated for use in Safety Significant (SS) Systems, Structures, or Components (SSCs).

This document identifies the requirements for the components of the common, radiation area, monitor alarm in the WESF pool cell. These are procured as Commercial Grade Items (CGI), with the qualification testing and formal dedication to be performed at the Waste Encapsulation Storage Facility (WESF) for use in safety significant systems. System modifications are to be performed in accordance with the approved design. Components for this change are commercially available and interchangeable with the existing alarm configuration

This document focuses on the operational requirements for alarm, declaration of the safety classification, identification of critical characteristics, and interpretation of requirements for procurement. Critical characteristics are identified herein and must be verified, followed by formal dedication, prior to the components being used in safety related applications.

## **2.0 REFERENCES**

HNF-PRO-268, Rev 7, *Control of Purchased Items and Services*

HNF-SD-BIO-002, Rev 1, "WESF Basis for Interim Operation"

HNF-SD-IOSR-001, Rev 1, "WESF Interim Operational Safety Requirements"

HNF-SD-WM-SEL-008, "WESF Safety Equipment List"

## **3.0 HISTORICAL INFORMATION**

WESF is designed to receive, inspect, decontaminate, and store cesium (Cs) and strontium (Sr) capsules that were produced in past missions at WESF. The capsules were produced in WESF from 1974 to 1985 to reduce the quantity of <sup>137</sup>Cs and <sup>90</sup>Sr in liquid waste stored in underground tanks. The <sup>137</sup>Cs, in the form of cesium chloride, and the <sup>90</sup>Sr, in the form of strontium fluoride, were doubly encapsulated in WESF hot cells and stored underwater in WESF pool cells. Some of the cesium capsules were leased to private enterprises for use as radiation sources. These capsules have been returned to WESF.

## **4.0 SAFETY CLASSIFICATION AND QUALITY LEVEL IDENTIFICATION**

The Area Radiation Monitor (ARM) system for the Pool Cell Area consists of three detectors, with three remote alarm modules, and a common alarm light and horn. This common alarm light and horn provide indication for the facility workers in the Pool Cell Area. Additional indicators are located on panel S-3 and on the WPMCS. Based on the Safety Equipment List, HNF-SD-WM-SEL-008, Rev. 8, the safety classification of the common alarm light and horn is safety significant.

Procurement of the SS alarm light and horn will be as a QL2 commercial grade item (CGI) to comply with the requirements established in HNF-PRO-268, *Control of Purchased Items and Services*. These CGI instruments must be qualified and dedicated for safety significant application.

## **5.0 SEISMIC QUALIFICATION FOR THE ALARM MODIFICATION**

The area of concern is the change in weight and the ability of the existing components to support the dead load.

The modification will be equal to or less than the current loading on the existing anchors. The weight of the alarm assembly is 5.1 pounds. Associated hardware is less than 3 pounds, for a total dead weight of 8.1 pounds. Additional conduit weight is 10 pounds.

Three 1/4-inch anchors are used to support the conduit, alarm unit assembly and hardware.

Each 1/4-inch anchor is designed to support 125 pounds. Total dead load for anchorage is 375 pounds. Total dead load weight for this installation is less than 25 pounds.

The roof loading requirements specified in ROOF-98-028, "Results of the 225B Roof Inspection" indicate a maximum load of 20-psf. The identified change is the same approximate weight as the unit being removed and 25 pounds is no consequence.

Failure of the supports will not create a condition that would damage the capsules and is of no consequence in a seismic event.

## **6.0 CRITICAL CHARACTERISTICS**

### **6.1 OPERATIONAL REQUIREMENTS:**

Pool cell radiation alarms receive alarm signals and provide local visual and audible alarm. (Reference Section 2.3 of WESF Safety Equipment List)

### **6.2 SAFETY FUNCTION OF THE COMPONENTS:**

1. Alarm (Light and Horn) must operate when the set points are exceeded.
2. Alarm must be audible above the background noise.

### **6.3 CONDITIONAL ACCEPTANCE CHARACTERISTICS FOR VERIFICATION BY AVS AT RECEIPT**

1. Label identifying manufacturer and model/part number agrees with the purchase order.
2. No apparent damage has been done to the cable assemblies.
3. QAIP was used to document AVS inspection.

**6.4 FORMAL COMPONENT DEDICATION**

- 1. Acceptance is to be identified on the QAIP.**
- 2. The Radiation Alarm unit must be tested for acceptance. Initiate an alarm from RE-AR-5, RE-AR-17, and RE-AR-18 verifying the light activates and the horn sounds.**
- 3. During the testing performed in step 2, verify that the alarms on Panel S-3 and the WPMCS respond correctly and can be heard above background noise.**

**When the testing is complete, the System Engineer and the Quality Assurance Engineer will evaluate the data and formally complete the dedication by documenting the acceptance of the items by their signatures in the work package.**