

**Attachment**

**Report of Change and Summary of 50.54(q) Analysis  
Emergency Plan Implementing Procedure 5.7.13, Revision 19**

**Change Description**

Revision 19 of Emergency Implementing Procedure (EPIP) 5.7.13, Personnel Monitoring and Decontamination, is a total re-write to meet new format and performance guidance provided by Cooper Nuclear Station's (CNS) procedure writer's guide. This EPIP provides instructions for decontamination of station personnel during emergency conditions utilizing normal decontamination facilities or alternate areas if necessary.

The revisions included section/step sequence changes, changing notes containing actions into procedure steps, deleting redundant steps/duplicate information, and rewriting steps to improve human performance. The EPIP was also reclassified from Reference Use to Information Use.

In addition, Section 1 was revised to describe entry conditions; and in Section 2, a caution statement was added to address the conditions of significant gross contamination that could rapidly cause tissue damage to personnel and instruction added for frisking speeds.

**Change Summary of Analysis (10 CFR 50.54(q) evaluation)**

Licensing Basis Affected by Change:

CNS Emergency Plan, Section 6.6.2, provides an overview of provisions made to assist personnel who are injured, contaminated, or who may have received high radiation doses.

How Change Complies with Regulations and Previous Commitments:

10 CFR 50.47(b)(8) requires that adequate emergency facilities and equipment to support the emergency response are provided and maintained.

10 CFR 50.47(b)(11) requires that a means for controlling radiological exposures, in an emergency, are established for emergency workers and include exposure guidelines consistent with Environmental Protection Agency Emergency Worker and Lifesaving Activity Protective Action Guides.

10 CFR 50, Appendix E, Section IV.E.3, requires that adequate provisions are made and described for emergency facilities and equipment including facilities and supplies at the site for decontamination of onsite individuals.

The change continues to comply with the above requirements and regulatory commitments continue to be maintained.

Affected Emergency Planning Functions/Impact on Effectiveness of Emergency Planning Functions:

10 CFR 50.47(b)(8); Function - Adequate facilities are maintained to support emergency response.

10 CFR 50.47(b)(11); Function - The resources for controlling radiological exposures for emergency workers are established.

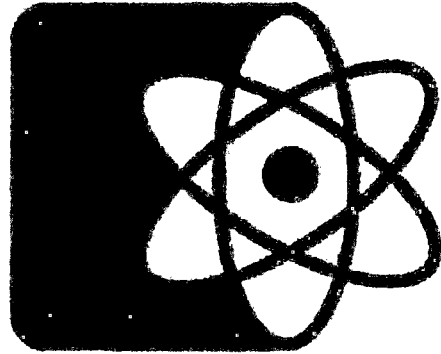
This change restructured the EPIP for more efficient implementation. The change did not affect the meaning or intent of descriptions, facilities/equipment, or the process for decontamination. The change continues to meet the above planning standards and does not constitute a decrease in effectiveness of the Emergency Plan.

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**Emergency Plan Implementing Procedure 5.7.13, Revision 19**

# COOPER NUCLEAR STATION



## **Operations Manual**

### **Emergency Preparedness**

#### **EMERGENCY PLAN IMPLEMENTING PROCEDURE**

##### **5.7.13**

#### **PERSONNEL MONITORING AND DECONTAMINATION**

**Level of Use: INFORMATION**

**Quality: QAPD RELATED**

**Effective Date: 2/14/18**

**Approval Authority: ITR-RDM**

**Procedure Owner: EP MANAGER**

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## 1. ENTRY CONDITIONS<sup>1</sup>

### 1.1 EAL declared per SM/ED.

#### 1.1.1 Release of radionuclides in-progress.

### 1.2 Station personnel contaminated.

#### 1.2.1 Decontamination is required utilizing normal decon facilities or alternate areas, if necessary.

## 2. INSTRUCTIONS

### 2.1 **PREPARE/SETUP** decontamination sites (if normal decontamination facility not available).

### 2.2 RP **PERFORM** following:

**NOTE** – During declared emergencies, higher than normal contamination limits apply. Refer to Attachment 1 for limits.

#### 2.2.1 **ESTABLISH** contamination controls in decontamination area.

#### 2.2.2 **PERFORM** monitoring of personnel in low background area.

#### 2.2.3 **PERFORM** following to avoid spread of contamination:

##### 2.2.3.1 **PROVIDE** clean controlled pathway out of decontamination area.

##### 2.2.3.2 **PROVIDE** controlled exit point for decontaminated personnel after monitoring.

#### 2.2.4 **PROVIDE** water supply to area with hoses, as required.

#### 2.2.5 **SELECT** decontamination location where runoff is routed to Radwaste Drain System or may be otherwise collected.

#### 2.2.6 **ASSEMBLE** individuals in need of decontamination.

2.2.7 IF on-site decon areas are unavailable and temporary off-site decontamination facilities improvised, THEN FOLLOW guidelines below:

2.2.7.1 **SELECT** area where contaminated drains can be collected (i.e., swimming pool, low point in paved parking lot, or a hole covered with plastic).

2.2.7.2 **ESTABLISH** controls in decontamination area.

2.2.7.3 IF local water supply unavailable, THEN ARRANGE for water truck.

2.2.7.4 **PROVIDE** entry and exit control point arranged to minimize spread of contamination.

### 2.3 DECONTAMINATION SITES

2.3.1 Decontamination supplies maintained at following decontamination sites:

2.3.1.1 On-Site Decontamination Room (east of Respirator Fit Test Room, 918').

2.3.1.2 Decontamination supplies per EPIP 5.7.21 in CNS Communications Building.

### 2.4 DECONTAMINATION OF PERSONNEL

**NOTE** – Medical attention to serious injuries takes priority over removal of contamination or radiation control.

2.4.1 **ENSURE** contaminated personnel are appropriately dressed to avoid further spread of contamination while in transit to decontamination area.

2.4.2 **RP WEAR** protective clothing, as necessary, during decontamination activities.

2.4.3 **ENSURE** methods to prevent spread of contamination are used.

**NOTE 1** – Normal site methods of decontamination of personnel can be substituted for steps in this procedure with approval of Chem/RP Coordinator.

**NOTE 2** – Beta/Gamma (B/y) surveys should be performed with E-140/RM-14 frisker or equivalent with HP-260/HP-210 probe or equivalent.

**CAUTION** – Depending on contamination levels of personnel, it may be necessary to perform quicker frisk of entire body to remove gross contamination and necessary to survey with ion-chamber with beta window.

2.4.4 RP **USE** standard pancake GM detector, preferably, with long handled probe.

2.4.4.1 Slowly **SURVEY** suspected area at rate of ~ 2" per second with detector to surface distance of 1/4" to 1/2".

2.4.4.2 **SURVEY** entire body for contamination.

2.4.4.3 **RECORD** results on Attachments 2 and 3.

2.4.4.4 **DETERMINE** if personnel decontamination is necessary.

a. **REFER** to Attachment 1.

**NOTE** – Radioiodine contamination of personnel is probable concern in radiological emergency. Same decontamination techniques are utilized for removal of all radioisotopes, even radioiodine contamination.

2.4.4.5 Personnel with highest levels of contamination should receive priority in decontamination process.



**NOTE 1** – Following methods of decon are listed in order of severity and possible hazard to skin. Steps should be attempted in this order when possible.

**NOTE 2** – Continued washing will defat and/or erode and irritate skin. Do not brush or scrub an area with enough force to abrade or break skin.

#### 2.4.5 DECONTAMINATION OF SKIN AND HANDS

##### 2.4.5.1 Soap and water.

- a. **WASH** 2 to 3 minutes.
- b. **LIMIT** washing to no more than three or four times.

**NOTE** – Use care not to erode skin. Hand cream can be applied to prevent chapping, after RP has performed frisk of contaminated areas.

##### 2.4.5.2 Pumice soap, soft brush, and water.

- a. **USE** light pressure with heavy lather.
- b. **WASH** for ~ 2 minutes, three times.
- c. **RINSE** with water.

##### 2.4.5.3 Detergent.

- a. **MAKE** into paste.
- b. **USE** additional water in mild scrubbing action.
- c. **RINSE** with water.

**NOTE** – If frisking wet hair, surveyor should be aware beta radiation from contamination may be shielded by moisture content.

#### 2.4.6 DECONTAMINATION OF HAIR

2.4.6.1 **WASH** several times with shampoo (be careful not to spread contamination to other parts of body).

#### 2.4.6.2 **RINSE.**

2.4.6.1 IF contamination cannot be removed in this manner, THEN **CONSIDER** more extreme methods like following:

- Cutting hair.
- Shaving head.
- Applying skin decon methods to scalp.

#### 2.4.7 DECONTAMINATION OF EYES, EARS, NOSE, AND MOUTH

2.4.8 **FLUSH** with large amounts of water.

2.4.8.1 **FLUSH** with isotonic irritants (0.9% sodium chloride solution), if available.

#### 2.4.9 DECONTAMINATION OF WOUNDS

2.4.9.1 IF wound is not bleeding severely, THEN **PERFORM** following:

- a. **SPREAD** edges of wound to stimulate bleeding.
- b. **WASH** wound with septisol.
- c. **RINSE** with large amounts of water.
- d. **BANDAGE** wound.
- e. **DECONTAMINATE** remaining affected area with septisol or normal soap and water methods.

**CAUTION** – In cases of severe bleeding, stopping bleeding takes priority over decontamination.

2.4.9.2 IF wound bleeding severely,  
THEN **PERFORM** following:

- a. **STOP** bleeding.
- b. **WASH** edges of wound with septisol.
- c. **RINSE** with water.
- d. **BANDAGE** wound.
- e. **DECONTAMINATE** remaining affected area with septisol or by normal soap and water methods.

### 3. PERSONAL EFFECTS DECONTAMINATION

3.1 **REFER** to Attachment 1.

3.2 **DETERMINE** if decontamination of personal effects is necessary.

3.3 IF decontamination of personal effects is deemed necessary,  
THEN **PROCEED** as discussed below:

#### 3.3.1 DECONTAMINATION OF SHOES

3.3.1.1 IF contaminant is particulate matter,  
THEN **ATTEMPT** using masking or duct tape to remove it.

- a. **PRESS** sticky side of tape to area of contaminated shoe.
- b. **REMOVE** and **REPEAT** until no reduction in radiation level is observed or shoe is free of contamination.

3.3.1.2 IF contamination cannot be removed with tape,  
THEN **SCRAPE** leather soles with following:

- Wire brush.
- Emery paper.

3.3.1.3 IF contamination cannot be removed with tape,  
THEN **SCRUB** rubber soles with decon soap.

- a. **USE** wire or stiff bristle brush.
- b. **WIPE** off.
- c. **RINSE** off.
- d. **DRY** off.
- e. **RESURVEY**.
- f. **REPEAT**, if necessary.

3.3.1.4 **WASH** wire brushes with clean soapy water to prevent spread of contamination.

3.3.1.5 **PERFORM** following for shoes that cannot be deconned:

- a. **CONFISCATE.**
- b. **PLACE** in plastic bag.
- c. **LABEL** Rad. Mat.
- d. **DISPOSITION** per Chem/RP Coordinator discretion.

3.3.1.6 **PERFORM** following for personal clothing:

- a. **CONFISCATE.**
- b. **PLACE** in plastic bag.
- c. **LABEL** Rad. Mat.
- d. **DISPOSITION** per Chem/RP Coordinator discretion.

3.3.1.7 **ISSUE** temporary clothing.

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**ATTACHMENT 1      EMERGENCY CONTAMINATION LIMITS**

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ATTACHMENT 1    EMERGENCY CONTAMINATION LIMITS

**NOTE** – If contamination levels are less than those provided below, decon procedures do not have to be implemented.

	SMEARABLE		FIXED
	BETA/GAMMA	ALPHA	BETA/GAMMA
	EMERGENCY	EMERGENCY	EMERGENCY
Personnel	N/A	N/A	0.5 mrem/hr
Personal Effects/Equipment/ Area (1)	2200 dpm/100 cm <sup>2</sup>	220 dpm/100 cm <sup>2</sup>	1.0 mrem/hr

- (1) If equipment contamination levels are approaching limits above, do not utilize equipment unless its use is critical to emergency response activities.

ATTACHMENT 2 SURVEY REPORT - PERSONNEL DECONTAMINATION

SHEET \_\_\_\_ OF \_\_\_\_

NAME: \_\_\_\_\_ DLR BADGE NUMBER: \_\_\_\_\_ DATE: \_\_\_\_\_

AREA: \_\_\_\_\_ JOB LOCATION: \_\_\_\_\_ JOB WHEN CONTAMINATED: \_\_\_\_\_

TIME: \_\_\_\_\_ DATE: \_\_\_\_\_ INSTRUMENT: \_\_\_\_\_ MEASUREMENT: \_\_\_\_\_

SURVEY BY: \_\_\_\_\_

SKIN CONDITION BEFORE CONTAMINATION: \_\_\_\_\_

DESCRIPTION (BODY PART)	BEFORE		AFTER	
	BETA/GAMMA (mrem/hr)	ALPHA (cpm)	BETA/GAMMA (mrem/hr)	ALPHA (cpm)

SURVEY NUMBER: \_\_\_\_\_ (1, 2, etc.)

DECONTAMINATION SOLUTIONS USED: \_\_\_\_\_

SKIN CONDITION AFTER DECONTAMINATION: \_\_\_\_\_

COMMENTS AND RECOMMENDATIONS: \_\_\_\_\_

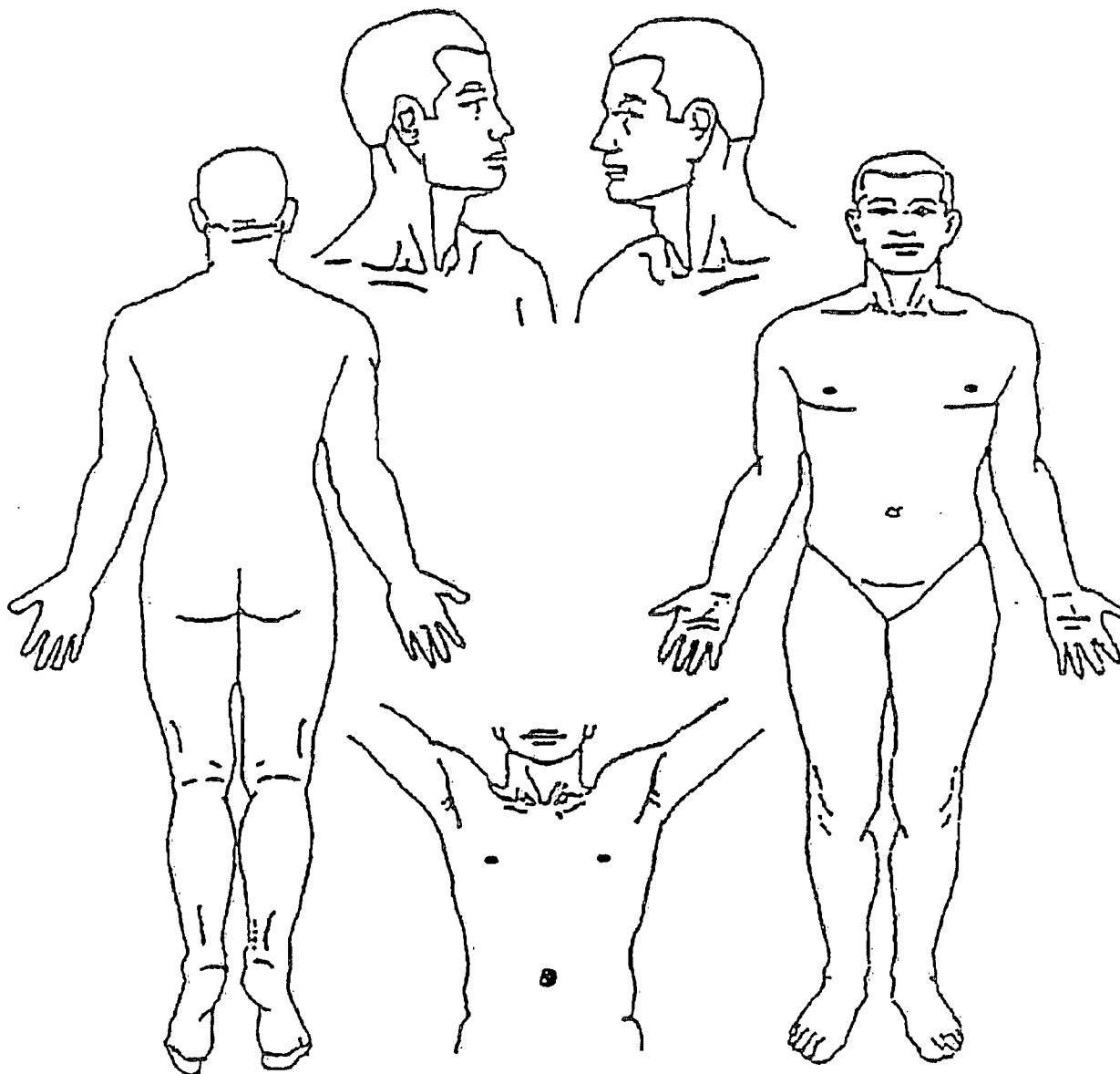
REVIEWED BY: \_\_\_\_\_

**ROUTE** completed form to EP Coordinator after termination of event.®<sup>1</sup>

ATTACHMENT 3 SURVEY REPORT - PERSONNEL DECONTAMINATION BODY MAP

NAME: \_\_\_\_\_ TIME: \_\_\_\_\_ DATE: \_\_\_\_\_

INDICATE WOUNDS AND/OR CONTAMINATED AREAS:



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**ROUTE** completed form to EP Coordinator after termination of event.®<sup>1</sup>



## 1. DECONTAMINATION OF EQUIPMENT

### 1.1 METHODS OF DECONTAMINATION

1.1.1 Depending upon type and location (i.e., on-site vs. off-site) of equipment to be decontaminated, a summary of decontamination methods are described below:

#### 1.1.2 MANUAL CLEANING

- Includes wiping, scrubbing, mopping, etc.
- Effective method of removing low or moderate levels of contamination on non-porous or nearly non-porous surfaces.
- Water or variety of detergents, solvents, chelating agents, and other chemicals can be used.
- Presents minimal airborne and surface contamination control problems.

#### 1.1.3 MECHANICAL CLEANING

1.1.3.1 Includes decon methods such as:

- Vacuuming.
- High-pressure steam and water cleaning.
- Soaking.
- Ultrasonic.

1.1.3.2 Associated with decon of highly contaminated equipment but also has application with lower levels of contamination.

1.1.3.3 Vacuuming, (wet or dry) is generally effective in removing loose particulate contamination.

- a. Frequently used as initial decon step preparatory to manual cleaning.
- b. Properly filtered to prevent spread of contamination to surrounding areas.
- c. Reduce hazard of airborne contamination.
- d. Care taken to ensure concentration of radioactive material in vacuum system does not create unusually high radiation exposure rates to personnel.

1.1.3.4 Jet cleaning - high-pressure steam and water used alone or mixed with chemicals and detergents are effective in attaining high decon factors.

1. Commercial systems using jet cleaning principle are available.
  - a) Equipment of this type is ideally suited for remote operation and for cleaning large surface areas.
2. High-pressure jet cleaning has disadvantage of spreading contamination over large area or causing loose surface contamination to go airborne and is more effective when used in cave or cell designed especially for this purpose.

- b. Soaking and spraying are used extensively for decon of small and moderate size material and equipment.
  - 1. Both methods make use of chemical solutions and can require support features such as catch tanks, liquid recycle ability, and filtered ventilation systems.
  - 2. Spraying has advantage of combining mechanical as well as chemical action; however, in some cases shape of object being cleaned prevents effective cleaning action on all surfaces.
  - 3. Soaking provides good access to surfaces but does not provide mechanical action.
- c. Ultrasonic cleaning combines advantage of chemical action and mechanical energy for cleaning.
  - 1. Best suited for small components and offers advantage of remote operation and rapid decon of objects with irregular shapes and crevices.

1.1.3.5 Grinding and abrasive action - Cleaning procedures employing grinding or abrasive action are effective means of decon metal and concrete surfaces, provided alteration of surface area of object being cleaned can be tolerated.

- a. Grinding of surfaces to remove contamination is usually limited to small objects or isolated spots of contamination where surface is reasonably smooth.
  - 1. Grinding normally produces a high decon factor and is economical.
  - 2. Variety of commercial grinders may be used.
  - 3. Grinding inherently leaves residual contamination on surface of object being cleaned and therefore usually requires final cleaning by some other method (vacuuming, wiping, etc.).

4. Disadvantage of grinding, it usually generates high airborne concentrations and spreads surface contamination.
- b. Abrasive blasting has number of advantages over grinding, such as:
  1. Rapid.
  2. Provides high decon efficiency.
  3. Effective on irregular shaped surfaces.
  4. Used for large areas.
  5. Makes use of large variety of abrasives (sand, shells, glass beads, metals, etc.) with velocity, shape, and size of abrasive influencing surface-removal characteristics.
- c. Disadvantages of abrasive blasting are:
  - Generates high airborne contamination.
  - Spreads surface contamination.
- d. Minimize spreading of contamination by following:
  - Wet blasting techniques.
  - Vacuum systems.
  - Filtered enclosures.
- e. Destructive decontamination procedures include physical removal of contaminated parts or sections.
  1. Little or no effort is made to clean contaminated parts before disposal.
  2. Containment and other radiological controls associated with destructive cleaning are dependent on contamination levels, nature of contaminant, and physical characteristics of parts being removed.

1. WASTE DISPOSAL

1.1 IF normal decontamination facility or radwaste drains not available,  
THEN **COLLECT** contaminated fluids in 55 gallon drums or similar  
containers.

1.2 **PLACE** contaminated disposable supplies in plastic bags.

1.3 **KEEP** contaminated equipment until decontaminated or processed as  
radwaste.

## 1. PURPOSE

- 1.1 Provides instruction for decontamination of station personnel during emergency conditions utilizing normal decontamination facilities or alternate areas, if required.

## 2. DISCUSSION

- 2.1 Personnel decontamination objectives to:

- Reduce radiation exposure.
- Minimize absorption of radionuclides into body.
- Prevent spread of contamination.

- 2.2 Personnel and clothing free of significant contamination before release from Emergency Response Facility.

- 2.2.1 If contaminated, personnel proceed to decontamination facility.

- 2.3 Potential for contamination will be assessed by evaluating known plant conditions during emergency including amount and direction of any radioactive release and personnel monitoring.

- 2.4 Need to improvise decontamination facilities may develop during an emergency if large numbers of people become contaminated or have to be immediately evacuated from site prior to monitoring and decon.

## 3. RECORDS

- 3.1 Attachments 2 and 3 from actual events forwarded to EP Coordinator within 5 working days of their completion (quality record upon completion).@<sup>1</sup>

## 4. REFERENCES

### 4.1 CODES AND STANDARDS

- 4.1.1 NPPD Emergency Plan for CNS.
  - 4.1.2 NUREG 0654/FEMA-REP-1, Revision 1, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants.

4.2 PROCEDURES

- 4.2.1 Emergency Plan Implementing Procedure 5.7.21, Maintaining Emergency Preparedness - Emergency Exercises, Drills, Tests, and Evaluations.

4.3 MISCELLANEOUS

- 4.3.1 ©<sup>1</sup> QA Audit, QA-86-06. Annotated in Attachments 2 and 3 and Attachment 6, Step 3.1.

4.4 NRC COMMITMENTS

- 4.4.1 ©<sup>1</sup> 811217-01, Response to IR 81-13, Commitments #7, #9, and #29, "Cooper Nuclear Station Emergency Preparedness Appraisal", Develop Functional Procedures for Personnel Decontamination. Commitment affects entire procedure.