

**PSEG Site  
ESP Application  
Part 5, Emergency Plan**

**SECTION 12**

**RADIOLOGICAL EXPOSURE CONTROL**

**1.0     Onsite Exposure Guidelines**

Site evacuation criteria, protective action recommendation guidance, emergency worker exposure limits, and decontamination guidance to be used by the emergency coordinator function, Radiation Protection Supervision, and radiation protection personnel during an emergency are provided in emergency plan implementing procedures.

The specific goal within the radiation protection program is the positive control of personnel exposure to radiation and radioactive material.

**1.1     Onsite Emergency Radiation Protection Program**

The radiation protection program provides the following emergency capabilities:

- 1) 24 hour-per-day dose determination recording and record retention capability;
- 2) Contamination control;
- 3) Onsite and offsite decontamination of site personnel;
- 4) Respiratory protection; and
- 5) Life saving dose risk assessment.

24-hour-per-day dose determination capability for doses received by emergency personnel, including the provisions for distribution of dosimeters and the maintenance of dose records will be implemented. If the nature of the incident is such that additional personnel will be arriving onsite, the Radiation Protection department will prepare additional dosimetry and ensure it is available and ready for use. If it becomes necessary to evacuate during an emergency condition, necessary dosimetry equipment, both internal and external, may be relocated to lower dose rate areas in order to provide the means for exposure evaluation.

**1.2     Contamination Control**

Decontamination of vehicles is performed in accordance with the Emergency Plan Implementing Procedure for vehicle survey. Decontamination of personnel is performed as outlined in the Emergency Plan Implementing Procedure and/or Station Radiation Protection Procedures. (Table 12-2 provides general guidance.) The limit of acceptable surface contamination levels (Table 12-1) are used as a guide for the release of equipment. Release of station personnel is performed utilizing normal station operational limits as incorporated into Emergency Plan Implementing Procedures. These values may be increased at the discretion of the Radiological Assessment Coordinator or the Emergency Duty Officer.

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Once evacuated from the Owner Controlled Area, non-emergency workers that are PSEG employees, also known as non-essential personnel, will normally be treated as the general public concerning decontamination processes. Monitoring of personnel or vehicles will be performed by offsite officials at an appropriate reception center.

If thought appropriate by the emergency coordinator, personnel may be evacuated to or asked to report to the EOF, which serves as an offsite assembly area. The EOF has facilities for personnel monitoring and decontamination.

Bottled drinking water and food supplies are shipped to the site from outside vendors. Onsite drinking facilities having the local ground water as their source would be considered contaminated until sampled. Access control to the controlled areas of the station is maintained. Personnel assigned to this area monitor personnel coming in and out of the controlled access areas.

Criteria for permitting return of areas and items to normal use are established. Restoration levels and personnel exposures do not exceed 10CFR20 limits. Disposal of decontamination waste is in accordance with routine Radiation Protection Procedures.

**1.3      Decontamination of Site Personnel**

Procedures for decontaminating relocated onsite personnel, including provisions for extra clothing and decontaminants suitable for the type of contamination expected are established. In all cases, first aid efforts take precedence over decontamination efforts unless the contamination itself is life threatening. Relocated onsite personnel can be decontaminated at the control point or at the Emergency Operations Facility. Extra clothing and decontaminants are housed onsite.

**1.4      Internal Exposure Control**

The Radiation Protection Department is responsible for ensuring that internal and external radiation exposure at the worksite is kept as low as reasonable achievable (ALARA). Title 10CFR20.1201 sets limits on the sum of internal and external dose, which a nuclear worker may receive. Respiratory protection shall be used in a manner that keeps total dose (the sum of internal and external dose) ALARA.

To limit expected and potential respiratory contamination from radioactive dust, aerosols, or gases, engineering controls such as work procedures, setting local containments (like tents or glove bags), and ventilation or filtration measures may be recommended by the Radiation Protection Department.

In an emergency, there are situations in which prompt actions need to be taken before engineering controls can be set up and before airborne contamination levels can be measured or evaluated. In all of the above cases, personnel are required to wear respiratory protective devices to assure that inhalation of radioactive contaminants is held to a minimum.

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**1.5      Performance of Life Saving/Corrective Actions and Dose Risk Assessment**

Procedures have been established, which address radiological exposure control. Any planned exposure greater than regulatory limits is considered an emergency exposure requiring authorization. Twenty-five rem is established as the upper limit for performance of actions to save station equipment required to mitigate the emergency. The upper limit for life saving actions is 75 rem.

Life saving activities applies to the following:

- 1)    Removal of injured persons;
- 2)    Undertaking corrective actions;
- 3)    Performing assessment actions;
- 4)    Providing first aid;
- 5)    Performing personnel decontamination;
- 6)    Providing ambulance service; and
- 7)    Providing medical treatment services.

Emergency exposure requires the approval of the Emergency Duty Officer (EDO). If the EDO is not available, the Shift Manager (SM) with the advice of the Shift Radiation Protection Technician makes the authorization decision. The Emergency Plan Implementing Procedure on emergency exposure authorization is used. It describes both oral and written exposure authorization methods to ensure timely reentry as required for emergency actions.

The following guidance for lifesaving and emergency mitigating actions is used.

- 1)    Life Saving Actions
  - a.    Rescue personnel should be volunteers or professional rescue personnel (e.g., firemen who volunteer by choice of employment).
  - b.    Rescue personnel should be broadly familiar with the consequences of exposure.
  - c.    Declared pregnant women shall not take part in these actions.
  - d.    Other things being equal, volunteers above the age of 45 should be selected.
  - e.    Planned External Dose Equivalent (EDE) shall not exceed 75 rem.
  - f.    Hands and forearms may receive additional doses of up to 200 rem.

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- g. Internal exposure shall be minimized by the use of the best available respiratory protection, and contamination controlled by the use of available protective clothing.
  - h. Exposure under these conditions shall be limited to once in a lifetime.
  - i. Persons receiving exposures, as indicated above, should avoid procreation for a few months.
- 2) Emergency Mitigating Actions
  - a. Persons performing the planned actions should be volunteers broadly familiar with exposure consequences.
  - b. Declared pregnant women shall not take part in these actions.
  - c. Planned EDE dose shall not exceed 25 rem.

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**TABLE 12-1  
ACCEPTABLE SURFACE CONTAMINATION LEVELS** (Notes 1 & 2)

**“LOOSE CONTAMINATION”**

$\leq 1000 \text{ dpm}/100\text{cm}^2$   
Gross Beta/Gamma

$\leq 20 \text{ dpm}/100\text{cm}^2$   
Gross Alpha

**“COMBINED (LOOSE & FIXED) CONTAMINATION”**

$\leq 5000 \text{ dpm}/100\text{cm}^2$   
Gross Beta/Gamma

$\leq 100 \text{ dpm}/100\text{cm}^2$   
Gross Alpha

**NOTES:**

- (1) Reference - INPO 85-0047, Guidelines for Radiation Protection at Nuclear Power Stations.
- (2) Reference RP-AA-500, Radioactive Material (RAM) Control, (Section 2.3).

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**TABLE 12-2  
PERSONNEL DECONTAMINATION METHODS**

**NOTE:**

This table is adapted from U.S. HEW, "Radiological Health Handbook", Washington, D.C., 1970.

Begin with the first listed method and then proceed, step-by-step, to the more severe method as necessary.

<b><u>Method</u></b>	<b><u>Surface</u></b>	<b><u>Technique</u></b>
Mild soap & water	Skin & hair	Wash 2-3 min. Do not scrub with a brush.
Lava soap, soft brush & water	Skin	Use light pressure with heavy lather. Use care not to scratch or erode the skin.
Tide or other detergent	Hair	Wash hair, rinse thoroughly and repeat.
Flushing	Eyes, ears, nose, & mouth	Roll back the eyelid, flush with large amounts of water. Use Isotonic irrigants if available.
Flushing	Wounds	Wash wound with large amounts of water & spread edges to stimulate bleeding, if not profuse <sup>(1)</sup> .

**NOTE:**

( 1 ) If bleeding is profuse:

- Stop bleeding first
- Clean edges of wound
- Bandage

If any contamination remains, it may be removed by normal cleaning methods as noted above.