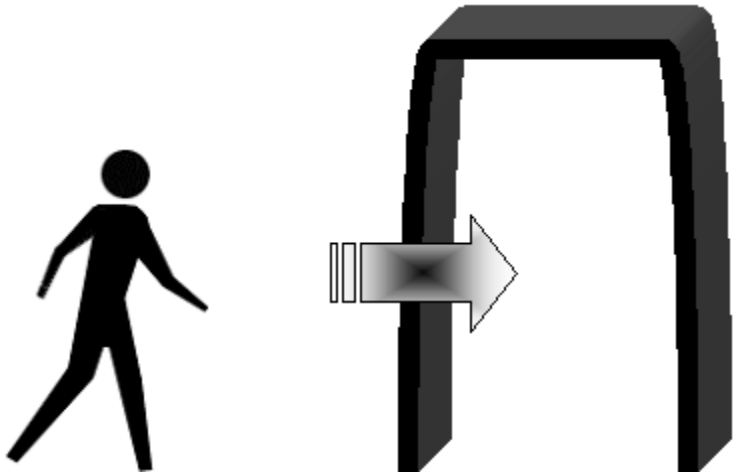
# Contamination Monitoring Standard For A Portal Monitor Used For Radiological Emergency Response



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# CONTAMINATION MONITORING STANDARD FOR A PORTAL MONITOR USED FOR EMERGENCY RESPONSE

The Federal Emergency Management Agency (FEMA), along with the Nuclear Regulatory Commission (NRC) is charged with the responsibility under Public Law 96-295 (1980) to promulgate National Standards for State and local governments and NRC licensees of commercial nuclear power plants to develop off-site radiological emergency plans and preparedness and for FEMA and NRC to use in evaluating the adequacy of off-site radiological emergency preparedness. FEMA published an interim Portal Monitor Standard in the Federal Register in September 1992. The Standard set forth in this document is published as FEMA's Contamination Monitoring Standard for portal monitors used by State and local Governments in response to commercial nuclear power plant accidents.

## PURPOSE

Individuals who have been, or potentially have been, exposed to (1) an airborne plume containing radioactive material from an accident at a commercial nuclear power plant or (2) contaminated surfaces resulting from material deposited from the passing plume during the emergency phase shall be directed to a radiation monitoring center to be monitored with a radiation detection instrument to determine whether decontamination is warranted. This Standard is for a portal monitor used for emergency detection of contamination on an individual (adult or child) under such emergency conditions. The objective of this Standard is to provide reasonable assurance that the risk of skin cancer and other significant radiation effects to the skin of individuals exposed to radioactive contamination on the skin and clothing does not exceed guidelines established by the Environmental Protection Agency (EPA 400-R-92-001). Although the primary reason for monitoring and decontamination of individuals is to reduce the risk of radiation effects to the skin, including skin cancer, these actions also reduce the risk of cancer to internal organs that could result from inadvertent ingestion of the contamination on skin or clothing or from inhalation of contaminated material resuspended into the air from clothing. This Standard does not apply to an individual or worker, as defined in 10 CFR 19.3(c), that could be exposed to contamination under controlled conditions such as in a work-place environment.

## STANDARD

A portal monitor (stand-alone whole-body personal contamination monitor) used to monitor individuals exposed or potentially exposed to a plume of radioactive material must have the capability to detect one microcurie (μCi) of radionuclides that emit beta and gamma radiation (radionuclides such as those that may be released following a reactor accident) in the form of surface contamination with a widespread non-uniform distribution over an individual.

## DETERMINATION OF COMPLIANCE WITH THE STANDARD BY THE MANUFACTURER

One or more cesium-137 source(s) with a total activity not exceeding one μCi shall be used for determining compliance with this Standard. Detectability of this amount of radioactivity shall be demonstrated with the Cs-137 source(s) located at several points along a vertical line centered between the two side columns of the portal monitor between 0.5 and 5½ feet above the base upon which the individual stands when being monitored.

To avoid unnecessary conservatism in determining compliance by a portal monitor that detects both beta and gamma radiation, the Cs137 source(s) may be sealed in a manner such that both beta and gamma radiations are emitted. Cesium-137 was selected for determining compliance of the portal monitor with the Standard because of its widespread availability, long half-life, and common use as a standard reference source of beta and gamma radiation. This is also a recommended choice because beta radiation is the major contributor to skin dose from contamination on the skin, and the average beta radiation energy from Cs-137 is near the average beta radiation energy for radionuclides typically assumed to be in a release from a major commercial nuclear power reactor accident. The document "Background Information on FEMA-REP-21: Contamination Monitoring Standard for a Portal Monitor Used for Emergency Response" provides a detailed discussion of the scientific basis and rationale supporting selection of the numerical value of this Standard.

## CONCLUSION

An individual who is evaluated for contamination using a portal monitor that meets the above Standard of Detectability, and is found to **not** have contamination above the Standard **will have no significant** risk of detrimental health effects from radiation exposure from contamination on the skin and clothing. During the **early phase** of the emergency, this level of detection **will be adequate** for the screening **of evacuees and emergency workers** for radioactive contamination.