RELATED TERMS

- Cesium-137 Release
- Goiânia, Brazil
- Recovery

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Radiological Incident Response: Decontamination of Buildings and Public Sites

SUMMARY

Emergency managers should develop decontamination plans and disposal procedures for buildings and large venues following a release of radioactive materials.

DESCRIPTION

On September 13, 1987, two men stole an orphaned radiotherapy unit source from an abandoned clinic in downtown Goiânia, Brazil. The unit consisted of approximately 20 grams (1,375 curies) of Cesium-137 (Cs-137) in the form of cesium chloride salt. The men were not familiar with the international radiation symbol and did not know that the source was radioactive. They dismantled the unit and sold it to a junkyard as scrap metal. In the process, they ruptured the container and released the cesium, contaminating themselves, family members, and the environment. A number of people became fascinated by the radioactive powder that glowed blue and rubbed it on their skin.

Goiânia is the capital of the Brazilian state of Goias. The city is located 1,000 miles from Rio de Janeiro and 600 miles from Sao Paulo. It had approximately 1 million inhabitants at the time of the incident. The incident occurred in one of the poorest sections of the city, where adult literacy was limited.

On September 29th, the junkyard owner's wife grew concerned about her sick relatives and took a bag of the powder to the local hospital by bus, contaminating additional people and facilities in the process. A local physician recognized the symptoms of acute radiation syndrome and alerted the Comissão Nacional de Energia Nuclear (National Nuclear Energy Commission (CNEN)). After realizing the severity of the incident, CNEN requested help from the International Atomic Energy Agency (IAEA).

Goiania's decontamination took six months and involved 550 cleanup workers and experts from ten countries. Forty-five different public places, including public squares, city gardens, shops, and bars, had to be decontaminated. Contaminated soil had to be dug up and removed, and the surfaces covered with layers of clean soil. Sewer pipes, trees, and segments of roads that could not be cleaned had to be destroyed.

The most resource-intensive activity was the decontamination of 85 houses. Cleanup workers had to select an uncontaminated area outside a house, cover the surface with plastic sheeting, and manually transfer all the movable items from the building to the selected area for monitoring. Uncontaminated items were wrapped in plastic, while contaminated objects were decontaminated or disposed of as waste. The decision to decontaminate or dispose of items depended on the ease of decontamination, as well as the item's value.

Vacuum cleaners with high efficiency filters were used to clean all the surfaces inside the houses. Walls, windows, and floors were washed, while painted surfaces were usually stripped. The roofs were vacuumed, cleaned inside, and washed outside with pressurized water jets. The roofs of two houses had to be completely removed because decontamination had been unsuccessful.

Seven houses were demolished as a result of their high level of contamination. Exposure rates were especially high in and around the house where the Cs-137 source capsule had been opened. Heavy machinery was employed to demolish the contaminated houses and remove large amounts of topsoil. Much of the work at these locations was done during rainstorms. As a result, a large quantity of contaminated mud also had to be removed and disposed of. A concrete or clean soil pad was then deposited on the sites.

Emergency managers should develop decontamination plans for buildings and large venues following a release of radioactive materials. These plans should detail decontamination and disposal procedures for several types of structures and sites.

Post-Demolition Picture of the House Where the Source Capsule Was First Opened (From: IAEA Report, *The Radiological Accident in Goiânia*. September 16, 1988.)

CITATION

International Atomic Energy Agency. *The Radiological Accident in Goiânia*. 16 Sep 1988. https://www.llis.gov/member/secure/detail.cfm?content_id=12310

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