

PWA- Clean-up Costs, Lessons Learned

**Revisiting Goiania: Toward a final repository for radioactive waste**

**IAEA Bulletin 1993**

**Rad waste 3,500 cubic meters**

**1270 to 1340 curies in waste**

**<http://www.ead.anl.gov/pub/doc/rdd.pdf>**

**Illustrative Case Study: 1987 Radiological Accident in Goiania, Brazil**

In September 1987, a hospital in Goiania, Brazil, moved to a new location and left its radiation cancer therapy unit behind. Found by scrap metal hunters, it was dismantled and the cesium chloride source containing **1,400 Ci of cesium-137 was removed. Pieces were distributed to family and friends, and several who were intrigued by the glow spread it across their skin.** Eleven days later, alert hospital staff recognized symptoms of acute radiation syndrome in a number of victims.

The ensuing panic caused more than 112,000 people – 10% of the population – to request radiation surveys to determine whether they had been exposed. At a makeshift facility in the city's Olympic Stadium, 250 people were found to be contaminated. 28 had sustained radiation-induced skin injuries (burns), while 50 had ingested cesium, so for them the internal deposition translated to an increased risk of cancer over their lifetime. Tragically, **2 men, 1 woman, and 1 child died from acute radiation exposure to the very high levels of gamma radiation from the breached source.**

In addition to the human toll, **contamination had been tracked over roughly 40 city blocks. Of the 85 homes found to be significantly contaminated, 41 were evacuated and 7 were demolished.** It was also discovered that through **routine travels, within that short time people had cross-contaminated houses nearly 100 miles away. Cleanup generated 3,500 m<sup>3</sup> radioactive waste at a cost of \$20 million.**

The impacts of this incident continued beyond the health and physical damage to profound psychological effects including fear and depression for a large fraction of the city's inhabitants.

**Further, frightened by the specter of radioactive contamination, neighboring provinces isolated Goiania and boycotted its products. The price of their manufactured goods dropped 40% and stayed low for more than a month. Tourism, a primary industry, collapsed and recent population gains were reversed by business regression. Total economic losses were estimated at hundreds of millions of dollars.** A key lesson learned from this incident is the importance of enhancing the broader understanding of radiation.

This fact sheet is intended to help support that objective.

(For additional information see: International Atomic Energy Agency (IAEA), 1988, *The Radiological Accident in Goiania*, Vienna, Austria.)