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DO NOT TOUCH: RADIOACTIVE WASTE

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Photos by Protásio Nêne and Wilson Pedrosa/Agência Estado (color and B&W).

The 13.4 tons of radioactive waste from an accident with a Cesium-137 capsule, which contaminated 249 people in 1987, are sitting since then in an open warehouse, built for temporary 180-day storage.

The accident, classified as the second largest in history after Chernobyl, occurred in the Brazilian Central-west, in the state capital of Goiás, Goiânia. It happened in September 1987, when a Cesium-137 capsule was found in the ruins of a recently torn-down hospital, and sold to a garbage dump. The contaminated material was spread through the entire town, until 15 days later the first victim was reported.

After four years, Goiania continues to incite the curiosity of scientists and press worldwide. What calls attention now is the complete lack of interest by local and federal authorities towards creating a permanent solution for the 13.4 tons of radioactive waste resulting from the accident.

The temporary deposit lies in a 21,600 square-meter area in the district of Abadia, 20 kilometers from Goiania. It was built out in the open, to last a mere six months. Up to now, however, only those walls keep the pieces of wall, furniture, pots and pans, toys, animals, and clothes of the Cesium-137 victims.

Another Two or Three Years

A few decrees, laws, negotiations, and vetoes later, one more agreement was signed last August, between the state and federal governments, ensuring the immediate release of \$450,000 dollars for the construction of a definitive deposit for the waste.

Bids have already been opened for the construction of metal containers to repack the waste, now stored in 4,137 barrels, 1,342 metal boxes, and 12 containers. The government also began environmental impact studies of the storage area.

The final cost of the project is as yet unknown. The National nuclear energy commission, Cnen, has mentioned several figures, which range from \$20 to \$50 million dollars. Carlos Alberto Andrade, who represents the Italian Casagrande group, interested in participating in the storage project, said that the initial estimate was \$30 million dollars. This money would be donated to Brazil from Italy. The two values are quite different from those presented by a commission of Brazilian specialists, who estimated the construction, three years ago, in a mere \$4 million dollars.

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The actual construction is to begin next March, to last another year afterwards. The relocation and urbanization of the waste is predicted to take another six months, which means it will be locked and sealed only two or three years from now. Cnen said it will continue to measure the radioactive levels in the environment on a daily basis, to ensure its normality.

To the population involved in this long drama, the news of the permanent deposit brings new doubts. After hearing for two hours the explanations of Cnen executive-director, Anselmo Paschoal, representatives of the local inhabitants considered the project to be "too ambitious, and still unfit to deal with the immediate needs of the population."

The head mason of the Great Masonry store of the State of Goiás, journalist Sebastião Elias Campos, thinks the project is "impossible under Brazil's present economic and technological conditions." To him, the mysteries surrounding the problem must be removed, and the waste dealt with in a more practical manner.

Inadequate Placement

Cnen said that of the 1,342 metal boxes, 403 have registered radiation rates equivalent to that of common garbage, and may be simply placed in a larger container, while others, containing organic matter (animals removed from the contaminated sites) would receive special treatment - their decomposition processes provoke the corrosion of the containers.

Despite Cnen's apparent tranquility, there are problems. The present deposit site is considered inadequate, due to the high concentration of people in the neighboring areas, and the existence of a brook nearby increases soil permeability and rainfall. Because of this, the waste should have been removed elsewhere, and not simply let lie.

Besides, the way in which the rejected material was conditioned may cause problems. The only containers to be properly aligned with concrete and sealed with plastic were the ones with the blue Cesium-137 powder, and the objects directly exposed to it.

The other boxes and containers were not properly sealed and leaks may still occur because of it. Cnen technicians who worked with the material during and after the accident, fear the problem may be "pushed ahead" for several years, because Brazil does not have sufficient installations to relocate the waste.

A great deal of low radioactive waste was wrapped in plastic sheeting, then placed directly inside the boxes and barrels. It was promised to the International Atomic Energy Agency (IAEA) they would eventually be packed according to international norms. With the exception of 50 boxes transferred to the deposit at the National Nuclear Research Center, in São Paulo, none of the boxes have been touched.

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Several of the boxes and barrels covered with plastic are now also covered with rust. Exposed to the weather, the plastic sheeting ripped, making it easier for the action of water and rust. In this case, the radioactive material is separated from the environment by a thin plastic cover, and not by innumerable barriers, as told by Cnen.

In the hurry to get rid of the material, without unnecessarily exposing the personnel dealing with the accident, much non-radioactive waste was stored together with the contaminated material. It is important to note, however, that the activity level in all of the contaminated material remained practically unaltered, since the half-life of the Cesium-137 is 30 years.

Norms and Responsibilities

Sheer luck was the only thing that kept new accidents like Abadia from occurring in Brazil. In Goiania itself, the police was contacted to locate close to three dozen plastic sheets used to protect the waste containers. The sheeting had been sold by deposit guards.

On the most important road in Brazil, Via Dutra, a 450 kilometer highway linking the largest urban centers in this South American giant, Rio de Janeiro and São Paulo, two Cobalt-60 sources were found, lying side by side in barrels on the ground.

In Campinas, a town 100 kilometers northeast of São Paulo, another ten capsules of radium 226 have been reported missing from a hospital since 1987.

The lack of training for people who manipulate the radioactive material further aggravates risks, said engineer Marco Antonio Pestana Mariani, from Uner Brokers, a storage and transportation of high risk materials consulting firm.

Mariani said there are no incentives to train people for emergencies, and that the companies who deal with radioactive waste are content to store them in closed areas, with little concern for the actual security of their system. "If there is a fire in any of these storage areas, for example, no one is worried about the residual water, which ends up as contaminated as the site itself," he said.

Another serious risk, according to Mariani, is the lack of specific transportation routes of the radioactive material. "The population is unreasonably exposed to accidents," he said, "Any accident with even a small radioactive source during, say, rush hour, may eventually hold catastrophic consequences."

Lawless

Recent discoveries of radioactive sources lost in different parts of the country do not result from inadequate fiscalization on the part of Cnen, said Cnen president, José Luiz de Santana Carvalho. The problem, according to Santana, is in the absence of appropriate legislation, which would force the commission to inspect the 1,393 radioactive sources spread-out in Brazil, and the dozens of smaller non-registered ones.

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These sources lose their purpose once they bypass their half-life, and are then stored at the Nuclear Energy Institute, in Rio de Janeiro. "When a source is stolen it is not our fault," he said, "It is a police matter."

A Telephone Call Away

The question of the fiscalization, transportation and storage of radioactive sources has been nicknamed "black-hole" within the Brazilian nuclear program. More recently, however, some steps were taken to ease the dangers in nuclear transport. Two manuals were written to train personnel and patients exposed to radioactivity.

These are preventive measures. Added to these, more surprise inspection visits to hospitals and industries, which transport or store equipment have been made. But even more important was the establishment of a nuclear emergency hotline, and a 24-hour team will be on hold at the Cnen office in Rio, by December.

A recent agreement signed between Argentina and Brazil for mutual nuclear fiscalization foresees a plan for the transportation of fission materials, such as enriched Uranium. Before this plan is activated, however, it must be detailed by a mutual agency still to be created. So far, the Brazilian Congress has approved no new specific laws for this purpose.