# The Yellow Cake Accident at the Ezeiza Airport

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## INTRODUCTION

In January 12th, 1987, several drums containing yellow cake felt from about 6 meters during the loading operation of a Boeing 747 T-100 cargo aircraft.

As a result of the accident, about 50 % of the 38 drums involved lost their lids and a fraction of the radioactive content was released on an area of about 200 m2. Small amounts of yellow cake were dispersed down wind until about 100 m from the accident place.

The shipment was prepared for transport in standard 200 liters steel drums fullfilling the applicable Transport Regulations and the accident was the consecuence of an erroneous operation during the cargo associated with a mechanical failure of the cargo lift.

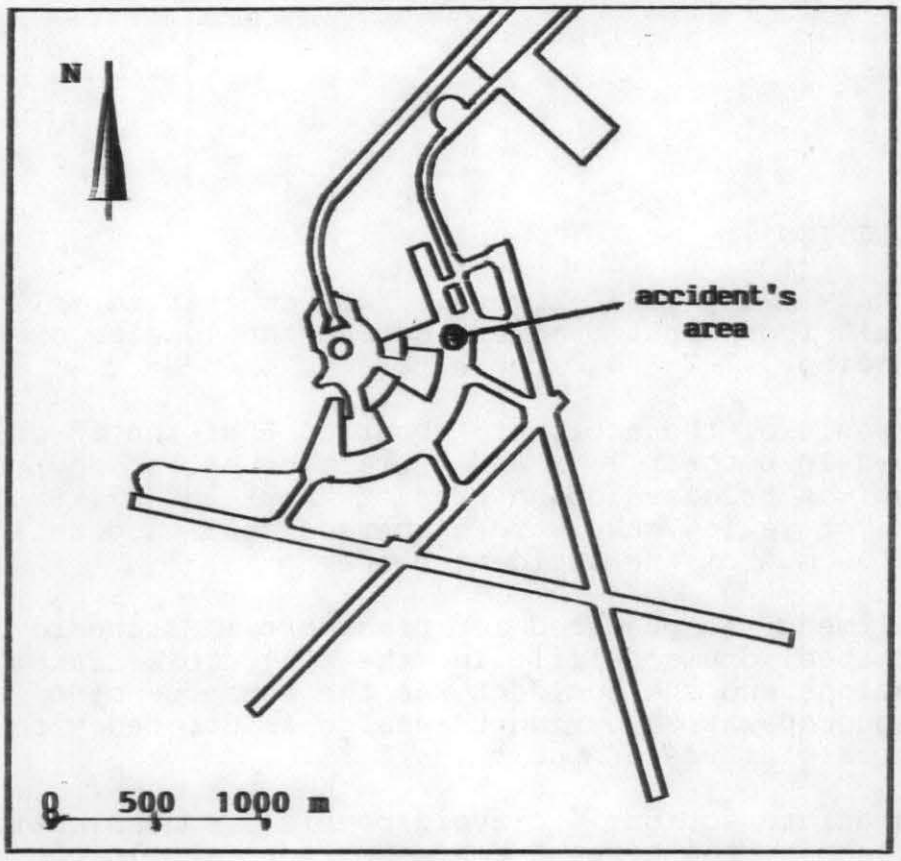
The inmediate actions, to avoid people's contamination, were taken by the airport emergency team and in the mean time the specialized groups of the National Atomic Energy Commission and the Federal Fire Brigades, were convened to take care of the decontamination and radiological evaluation problems.

This paper describes the accidental sequences, the accident scenery, the countermeasures taken, the recovery and decontamination actions and finally, as a conclusion, a brief description of the toxic and radiological aspects of the accident's mode.

## SCENERY AND ACCIDENTAL SEQUENCES

The accident took place in the auxiliary lane, general platform N. 4, at the International Ezeiza Airport, located at 35 kilometers south of the City of Buenos Aires

At approximately 1 a.m. on January 12th, 1987, specialized personnel from the state owned airline, was loading a cargo plane Boeing 747 T-100, with a yellow cake supply,




INTERNATIONAL EZEIZA AIRPORT

with final destination Canada, when suddently, a failure in the mechanical lock of the loading elevator initiates the event.

The operation in course was the displacement of the drums between the elevator and the airplane. The elevator lock position was not correctly checked before the operation was initiated.

Due to this circunstances 38 x 200 liters drums slide from the elevator impacting in to the cargo lane from 6 meters heigth, and as they where 19 drums intop of the other 19 the lower ones where severily damaged spreading the yellow cake in an area of approximately 200 sq meters.

The yellow cake was dispersed up to approximately 100 meters due to the prevailing wether conditions with moderately strong winds.

Inmediately after the accident the people involved evacuate the area and reported to the Control Tower taking into consideration that the drums had radioactive material indication labels.

**COUNTERMEASURES ACTIONS**

The airport authorities call the intervention of the Gendarmeria Nacional, responsible of the place security and not knowing the real risk involved they decided to close all the airport operations and also put a physical protective barrier around the accident place.

In the mean time the Airport Fire Brigade in spite of taking more protective actions convenned specialized groups from the National Atomic Energy Commission and the Federal Fire Brigades.

The first measure taken by this groups were to really evaluate the real implications of the accident monitoring the place and estimating the more realistic surface involved: this allows to significanty reduce the physical protective barrier and also to allow the airport to rutinely continue the commercial operations.

After this evaluation and trying to avoid and extense spreading of radioactive aerosols, due to the prevailing wind conditions, all damaged drums were covered with polyethylene sheets, the same method was also used in and around the place, to avoid the dispersion of already dispersed material.

**ACCIDENT EXTENT EVALUATION**

In total were involved 38 drums of 200 liters, with a probably content of yellow cake of 180 liters each i.e. a total 6840 lts, and that means 6840 kgs of yellow cake.

They were 19 top drums not damaged, 8 lower drums also not damaged at all, 7 only with the lid open and 4 drums

really damaged and we must asume (and as it was seen) that only part of the content was spread from this drums (content of each drum 180 kg).

And this amounts to a probably loss of 200 Kgs of yellow cake which was dispersed in the area.

## COLLECTING AND DECONTAMINATION OPERATIONS

The radiological protection specialized people already in site, wearing the neccessary protecting clothes, started separating all drums not damaged or only sligthly damaged and taking them to an adecuate interim storage place.

After that the operation continue with those drums (some of them lying horizontally in the floor) without damage but with the lid open, due to the fall, and with the internal liner broken and some loose of yellow cake. These where refilled, then sealed, the lid put back, and then transported to the storage.

All those drums (4) severaly damaged where placed in plastic bags, then sealed and sent to the Ezeiza Atomic Center (12 km from the airport), to be processed.

With reference to the dispersed material (nearly the accident place) it was put in new drums and bags and sent also to the storage place.

Finally it was mandatory to decontaminate the whole area of interest (up to 100 meters in the wind direction from the accident place).

First, as a redundant precaution, a water spray was spreaded over the whole area to allow any persistent aerosol in suspension to drop to the floor. Second, the whole material was concentrated in one small place with an intense water jet. Finally, the material was recuperated either with a vacuum cleaner or a liquids suction pump.

## CONCLUSIONS

This accident must be annalized from two different points of view: the reasons of the accident itself and the correctness of the countermeasures applied.

From the first point of view it is evident the existence of a mechanical failure and several human errors.

Mechanical failure: the loads elevator back lock didn't work.

Human errors: a) the operators didn't check the position of the locking device; b) the drums where already in the plane, but the captain realized that they were piled up with flammable and corrosive materials.

This was lately witnessed by the radiological protection people and also that the plane was being unloaded to correct the wrong mixing of risky materials (this was done at captain's request).

From the point of view of the countermeasures applied it seems that they were correct starting with the airport authorities, Gendarmeria and Airport Fire Brigade temporarily closing the airport to all operations and waiting for the specialized people to act (CNEA, Federal Fire Brigades).

The measures taken by this groups were also correct: first to limit the accident scenario (and also to allow to reopen the airport for commercial operations), and later on the recolection of the dispersed material and the final decontamination up to the point as it was before the accident.

This groups also need to evaluate the radiological accident consecuences. Taking into consideration that the material involved was natural uranium the ingestion and inhalation limit specified in the *Basic Nuclear and Radiological Safety Rules*, CNEA, S.I. N° 11, 1966, is based only in its chemical toxicity (2,5 mg for the workers).

Also as the airport is at 7,5 km in straigth line from the Ezeiza Atomic Center, it was possible to use the abundant studies already done at the Center for atmosferic dispersion.

From the existing weather conditions we could assume that not any risk involved the acting people or the nearby small inhabitants settlements.

**REFERENCES**

*Basic Nuclear and Radiological Safety Rules*, CNEA, S.I. n° 11 (1966).

*Safe Transport of Radioactive Materials Regulations*, AEIA, Safety Series n° 6 (1985).