

GOIÂNIA PUBLIC RISK PERCEPTION AFTER 25 YEARS

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GOIÂNIA RADIOLOGICAL ACCIDENT

The
Radiological
Accident
in Goiânia



INTERNATIONAL ATOMIC ENERGY AGENCY, VIENNA, 1988

- 13th September 1987 - Goiânia (Capital of Goiás - GO)
 - Population < 1 million inhabitants → Main region affected
 - central district of the city (Setor Aeroporto)
- Teletherapy model: Cesapan F-3000 - Cs-137 : 1375Ci (50.9 TBq) (Set/87) - cesium chloride (CsCl) – soluble powder - CsCl mass 93 g → Cs-137: 19.3 g →
... short term consequences ... 4 fatalities (4-6 Gy), 112,000 people monitored, 271 contaminated persons, severe contamination of the environment → 7 major sites (incl. 3 junkyards and 57th street) + 42 sites) → Generated 3,500 m³ (6,000 Tons) of radioactive waste.
- Economic losses for the state (grains and cattle production)
- **Substantial psychological impact on the population**



Figures D.5 - (a) Great Capacity Container, (b) Repository at Abadia de Goiás



CNEN

- Introduction to Risk Perception ...

- Recognizing the psychological impact on the local population, CNEN started a new informational program based on “CNEN Go to Schools” project, developed for Angra dos Reis population, but directed to **GO** and a broader stakeholder spectrum, i.e.:
 - a) public schools;
 - b) private schools; } students with fundamental science in curriculum
 - c) teachers of science from public and private schools;
 - d) 3rd grade students (university);
 - e) civil society representative organizations (Engineers, Lawyers, Medical, Rotary, Lions);
 - f) security organs (Civil defense, Fire fighters, Police, Army, ...)

Emphasis to doctors, nurses & pharmacists
↓
- This was conceived to improve the communication with the public about the Goiania radiological accident, provide rudiments of nuclear science, biological effects of radiation, radiation protection, and disseminate the benefits of nuclear research and its various applications.
- The program methodology was developed in three stages until final implementation:

The first step was during the emergency phase, the second called “initial methodology to explain the public” applied after the emergency phase. In a third step, an integrated and structured educational activity was developed together with tools to evaluate the risk perception of the public →

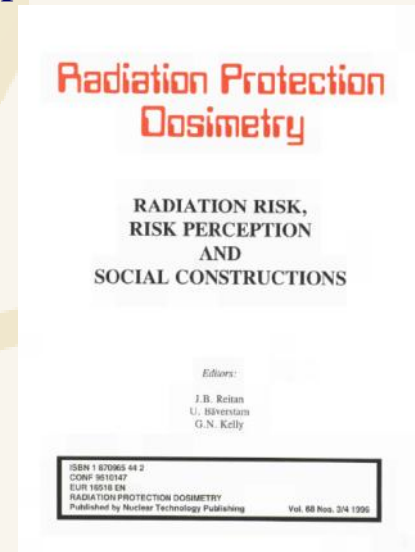
- How to measure risk perception? And to assess it?

Once the program was set, how to deal with the psychological impact, the conflicting information, antagonism (media?), and widespread ignorance (nescience) about the accident → CNEN adopted it as information and communication channel with the population (besides media/with media) →

A methodology analysis was established to evaluate the concepts of risk, risk perception and attitude of the public shortly after the remediation and decontamination of areas.

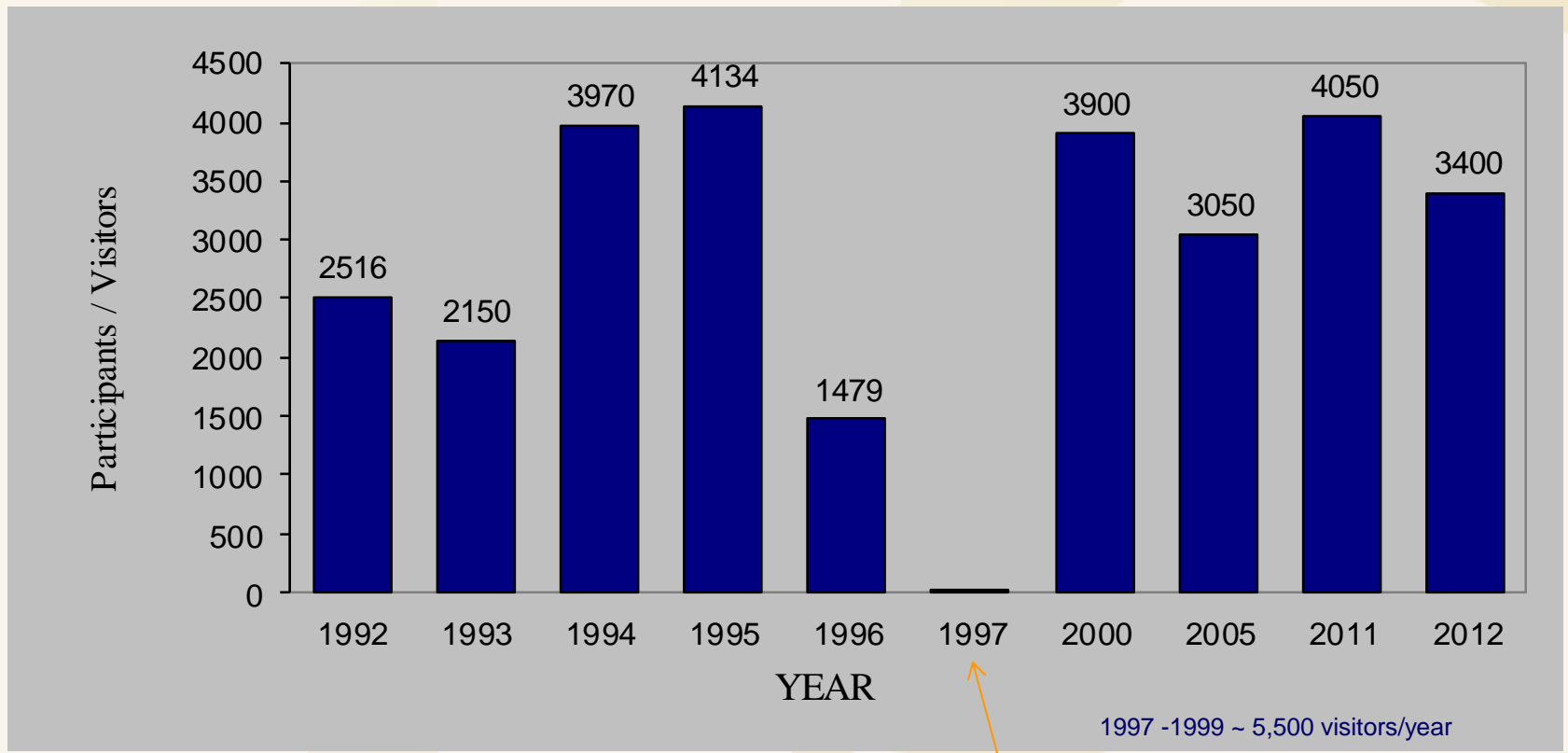
One way to assess risk perception is through the aspects of public acceptance, risk elucidation, and to organize basic elements of opinion, using appropriate language according to specific audience, and prepare **written** or **oral** questionnaires to measure their degree of responsiveness.

In this stage was used the contributions of a Workshop →
Proceedings of a Workshop, Oslo, Norway, October 19-20 1995
Radiation Risk, Risk Perception and Social Constructions
RPD, V. 68, n. 3/4, 1996.



- Results and Discussion

The program has been presented to ~ 2% of the population of the city of Goiania
(Population census 2010 1,302,001)



CRCN-CO
Open 1997

- Results and Discussion

Schools: After the presentations/lectures, a questionnaire was distributed to the teachers and students to evaluate:

- a) representative image associated with radiological accident, and
- b) representative image associated with the risk of nuclear technology.

a) Representative image associated with the **Goiania radiological accident**
150 teachers from **public and private** schools - Year 1993

Risk category	Frequency	Representative image
Contamination	127	Destruction
Disease	115	Fear
Death	112	Temporal
Future generations	97	Cancer
Accident victims	86	Abandonment

- Results and Discussion

b) Representative image associated with the risk of **Nuclear Technology**
350 2nd Grade Students from public and private schools - Year 1993

Technology	Frequency	Representative image
Hiroshima (Bomb)	145	Death, cancer
Nagasaki (Bomb)	118	Death, cancer
Chernobyl (accident)	106	Death, contamination, cancer
Goiania (accident)	102	Death, uncontrolled situation
Atomic waste	99	Contamination
Medical applications	78	Disease, ignorance
Nuclear Power Plants	83	Accident, catastrophe

- Results and Discussion

“CNEN Go to Schools” project has been changed to “Program for Public Acceptance of Nuclear Energy” (“Schools go to CRCN-CO”) where lectures, events, courses and specialized library are accessible to schools and general public. The original questionnaire has been simplified and the same happened to the evaluation methodology.



CRCN-CO visitor center and Library



Radiation Protection Laboratory
Inaugurated in 2007

MISSION - Run the institutional control of the final deposit and conduct the permanent Environmental Monitoring Program (EMP)

- Results and Discussion - Present situation - 25 years after

Overall risk perception for last 12 years of operation of the
“Program for Public Acceptance of Nuclear Energy”

Average number of visitors per year - 3,600 from 2000 to 2012

High frequency worries of visitors (mainly schools from GO) after the lecture

Risk category	Frequency	Risk perception
Repeat accident (Goiania)	High > 80%	Minimum
Remediated areas	High > 75%	Small
Repository waste	High > 75%	Minimum
Contamination	High > 75%	Minimum
Disease	High > 70%	Medium
Accident victims pension	High > 70%	Maximum

- Conclusions

- The evaluation results indicated that risk perception and attitude of the individuals of the public are guided by subjective ideas, formed according to the formal instruction received, and the social environment.
- The radiological risks are unknown by most individuals from the public, with the need for ongoing interventions, through lectures and continuous informational programs and must include the media.
- Courses and lectures allowed CNEN to compose a strategy of interaction with the public, addressing specific issues of nuclear science. This shall be continued for the sake of safety and security.
- The population is grateful to the CNEN for decontamination the city, but what prevails is a slight nuclear “phobia” and opposition feeling. Environmental Monitoring Program in remediated areas is impaired due to NIMBY symptoms.



- References

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4. SLOVIC, P., **Perception of Risk from radiation**, Radiation Protection Dosimetry, V. 68, No. 3/4, p. 165, **1996**, Nuclear Technology Publishing.
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