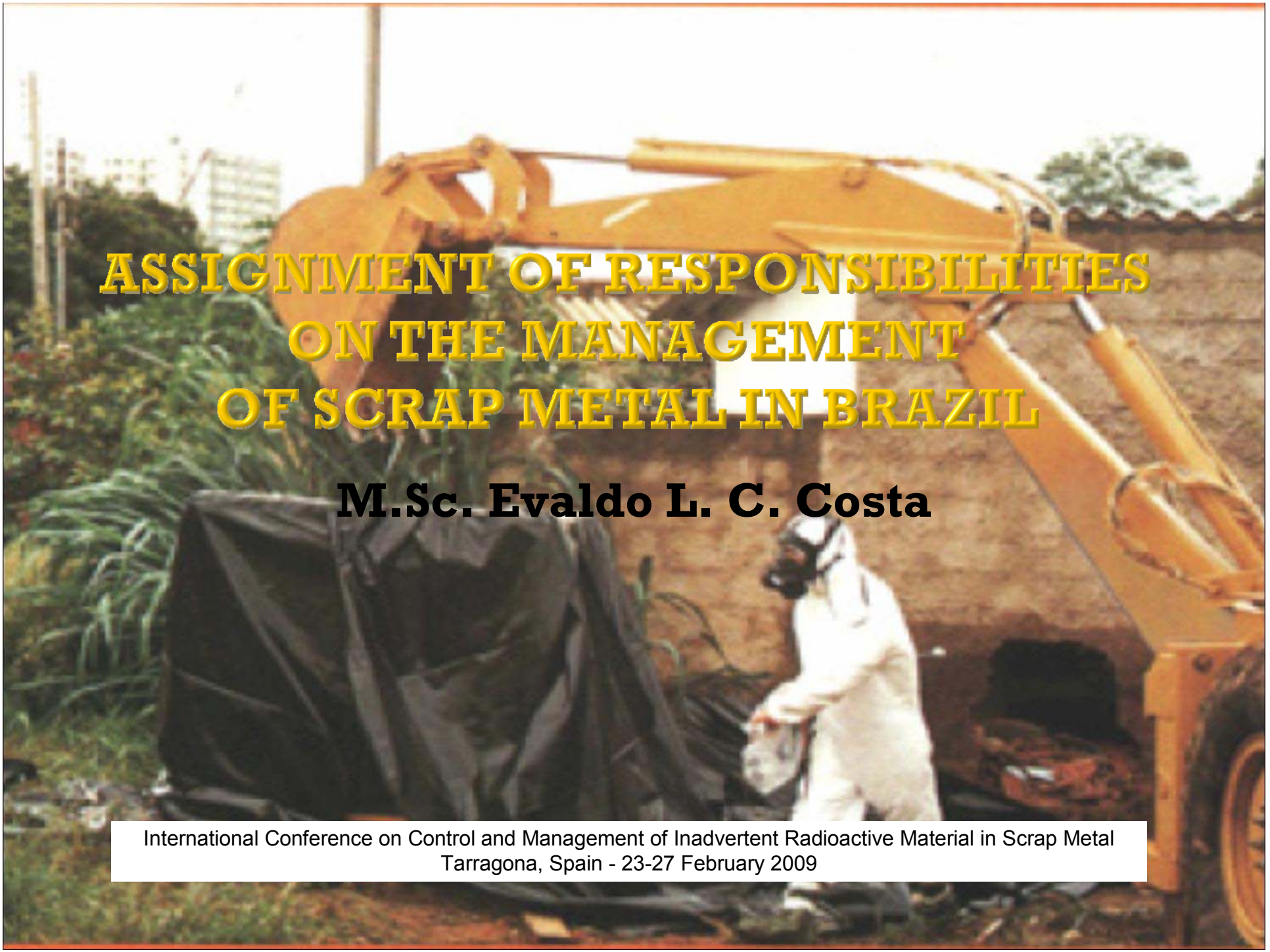


ASSIGNMENT OF RESPONSIBILITIES ON THE MANAGEMENT OF SCRAP METAL IN BRAZIL

M.Sc. Evaldo L. C. Costa

International Conference on Control and Management of Inadvertent Radioactive Material in Scrap Metal
Tarragona, Spain - 23-27 February 2009

Overview

- Introduction
- Synopsis of the main recommendations on source control and scrap metal
- Regulatory structure in Brazil concerning source control and scrap metal
- Goiania's aftermath and lessons learned
- Brazil's outlook on scrap metal
- Conclusion e Final Remarks

Introduction

- We have to live together with metal scraps, since it is important to our economy:
- Some data and figures to consider (benefits):
  - Metal scraps are the most convenient raw material on casting – minor losses in the process quality
  - Metals are 100% recyclable
    - **One ton of aluminium scraps save 5 ton of bauxite**
  - Recycling iron and steel scrap comprises half of the industry's revenue
  - Power economy of 95% on metal recycling when compared to conventional industrial processing

Introduction

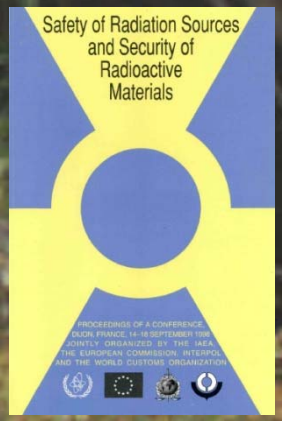
- On the other hand, we should deal with scrap metal with care:
- Some data to consider (drawbacks):
  - Orphan sources and contaminated material
  - Most of metals are extremely valuable
  - Recycling iron and steel should be managed very cautiously (facilities under regulatory control)
  - A clearance policy must be considered

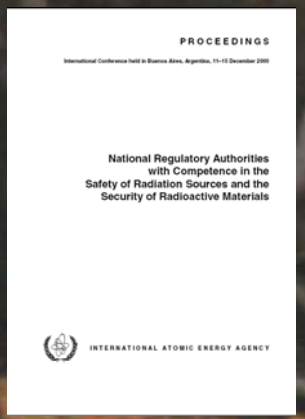
Introduction

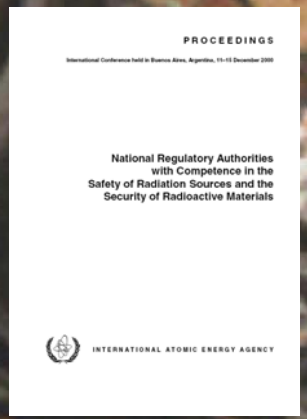
- The debate is more encompassing than scrap metal, passing by orphan sources, leading to the main issue: source control
- September 11, 2001: a turning point
  - Before September 11, the main concern: accidents involving radioactive sources
  - After September 11, the main concern: terrorist actions using radioactive sources
  - Changes on national, regional and international recommendations to cope with this new scenarios

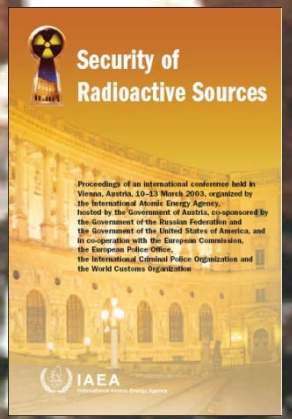
Synopsis of the main recommendations on international, regional and national levels

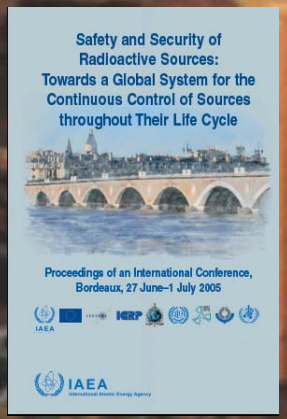
- Recommendations on source control
- Recomendations on orphan, disused and spent sources
- Recomendations on scrap metal





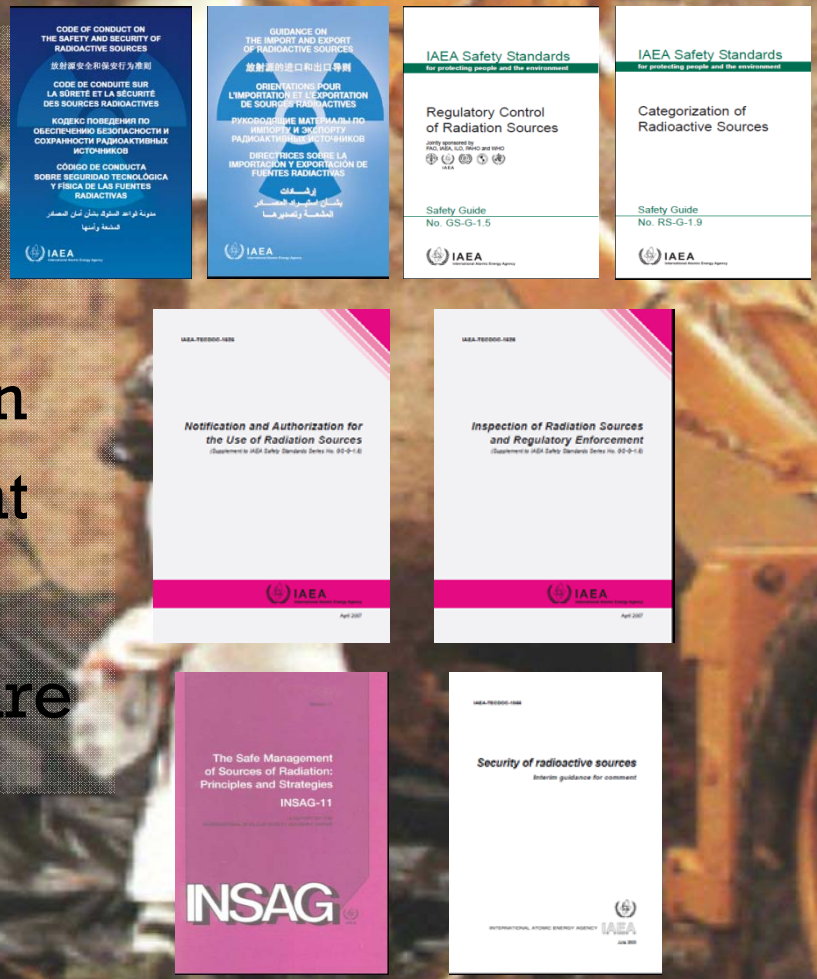






Synopsis of the main recommendations on international, regional and national levels

- Source Control
  - Legislation & Regulation
  - Regulatory Structure
  - Notification/Authorization
  - Inspection & Enforcement
  - Commerce of Sources
  - Safety and Security Culture

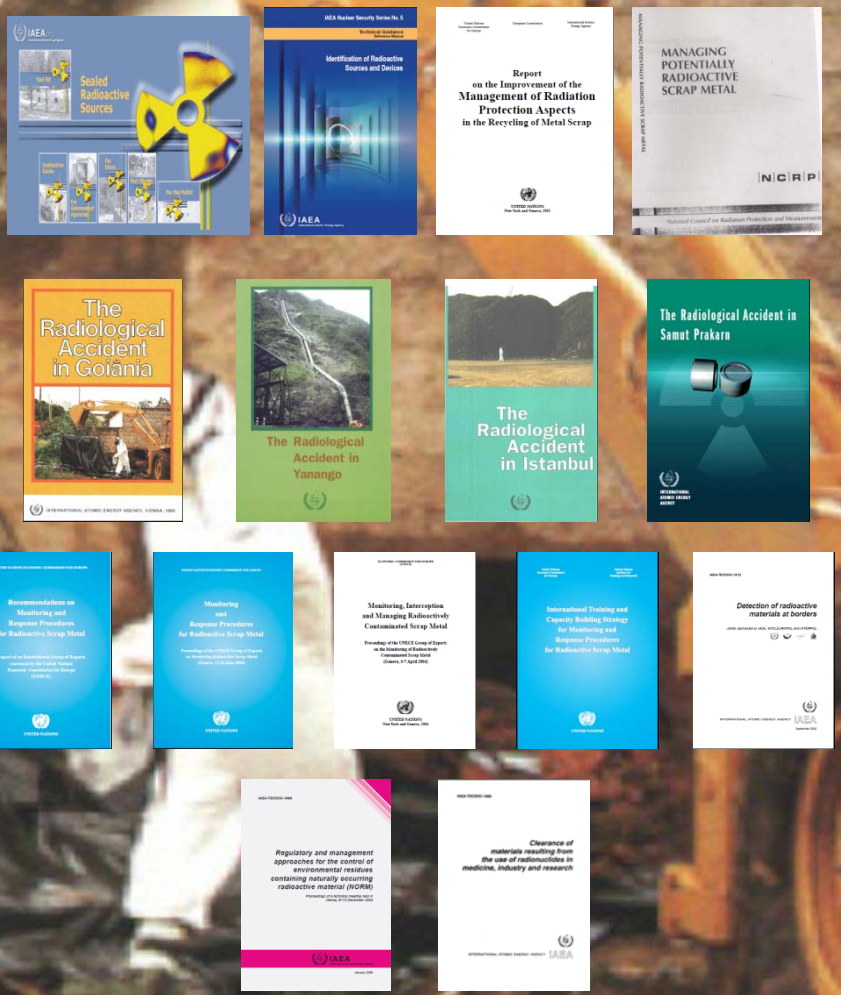


Synopsis of the main recommendations on international, regional and national levels

- Orphan, Spent and Disused Sources
  - Preventive Measures
  - Collecting
  - Interim Storage
  - Waste Management
  - Disposal
  - Decommissioning
  - Illicit trafficking

Synopsis of the main recommendations on international, regional and national levels

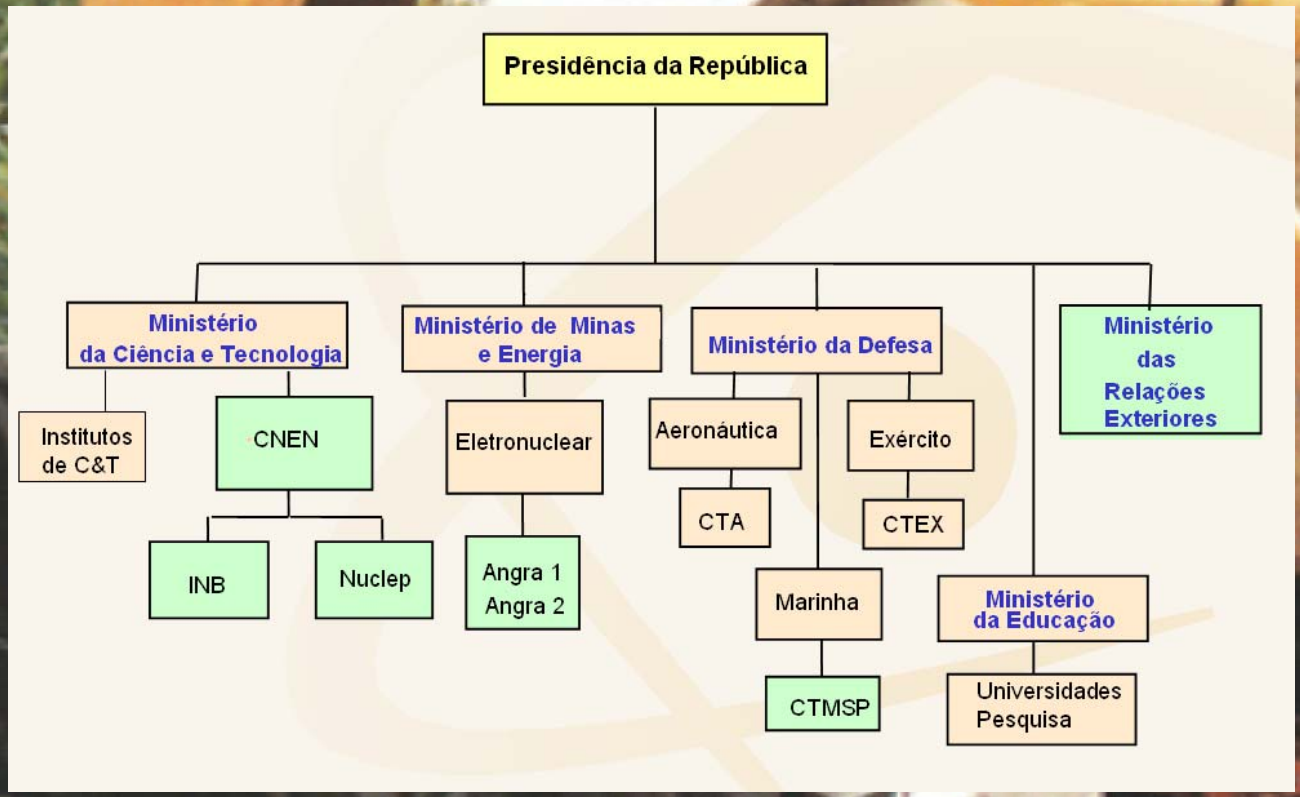
- Scrap Metal
  - Preventive Measures
  - Orphan Sources
  - Contaminated Material
    - NORM/TENORM
  - Monitoring Systems
  - Recycling
  - Clearance
  - Stakeholders Involvement



Regulatory structure in Brazil concerning source control

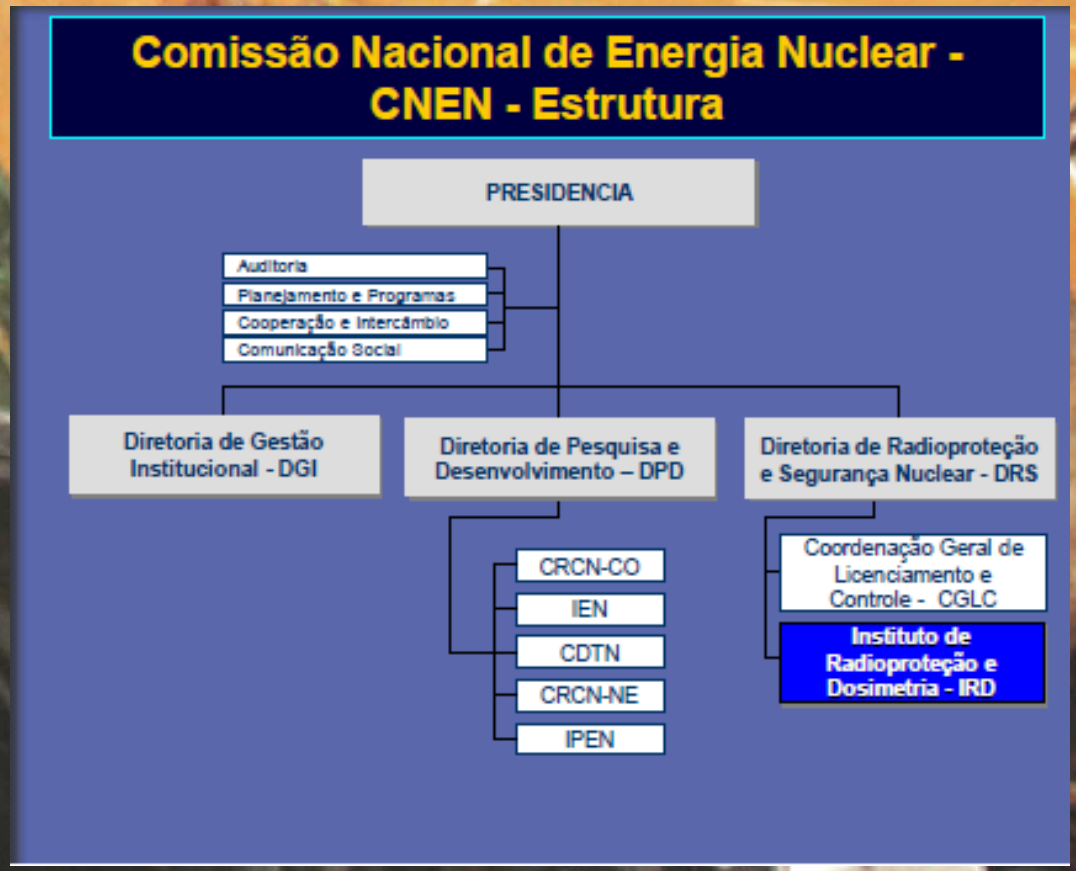
- Overview on the National Commission of Nuclear Energy: legislation, structure and main actions
- Licensing of radioactive facilities and controlling of radioactive sources
- Managing of radioactive waste and of orphan sources
- Preparedness and response to radiological emmergencies
- Patrolling over illicit trafficking involving radioactive material

Regulatory structure in Brazil concerning source control



- Overview on the National Commission of Nuclear Energy: **Structure of CNEN**

Regulatory structure in Brazil concerning source control



- Overview on the National Commission of Nuclear Energy: **Structure of CNEN**

Regulatory structure in Brazil concerning source control

- Overview on the National Commission of Nuclear Energy: **Brazilian Legislation**
  - The main Laws and Decrees concerning CNEN's actions and responsibilities
    - Law 4118/62 (Creation of CNEN)
    - Laws 6189/74 and 7781/89 (Attributions of CNEN)
    - Decree 5667/06 (Structure of CNEN)

CNEN Comissão Nacional de Energia Nuclear

Ministério da Ciência e Tecnologia

BRASIL UM PAÍS DE TODOS GOVERNO FEDERAL

Regulatory structure in Brazil concerning source control

- Overview on the National Commission of Nuclear Energy: **CNEN Regulation**
  - The main Norms elaborated by CNEN:
    - Six major groups classified by subject
      - Group 1: Nuclear Facilities
      - Group 2: Physical Protection
      - **Group 3: Radiation Protection (3.01; 3.02; 3.06)**
      - Group 4: Nuclear Materials, Minerals and Ores
      - Group 5: Transport
      - **Group 6: Radioactive Facilities (6.02; 6.04; 6.05)**

Regulatory structure in Brazil concerning source control

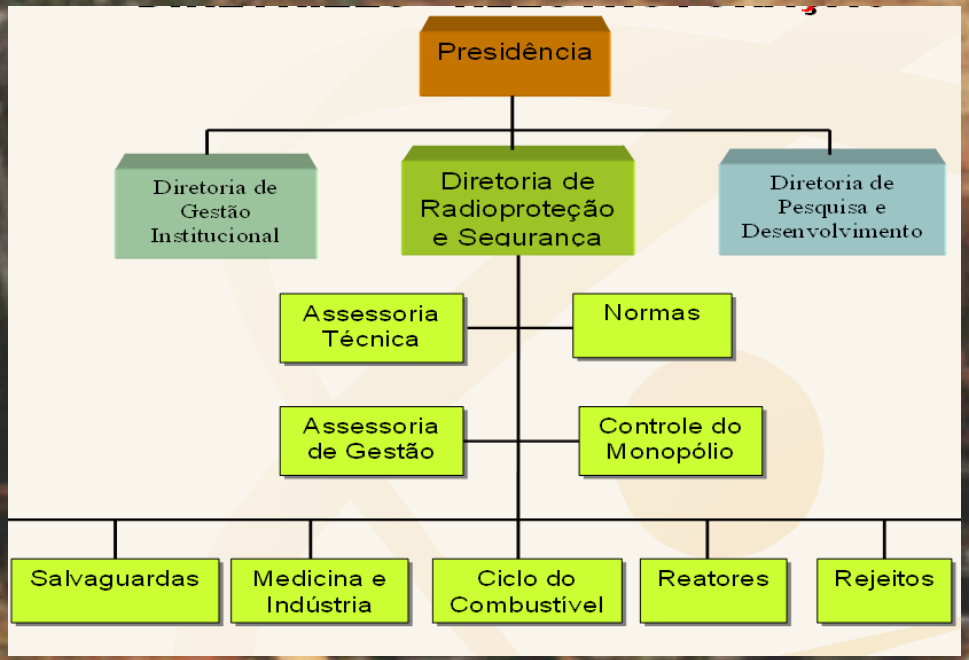
- Overview on the National Commission of Nuclear Energy: **Main actions and responsibilities**
  - Research and development concerning nuclear technologies and correlated areas
  - Institutes and Supporting Regional Centers
    - The main intermediate repositories in national level to radioactive waste and orphan sources

Regulatory structure in Brazil concerning source control

- Institutes and Supporting Regional Centers

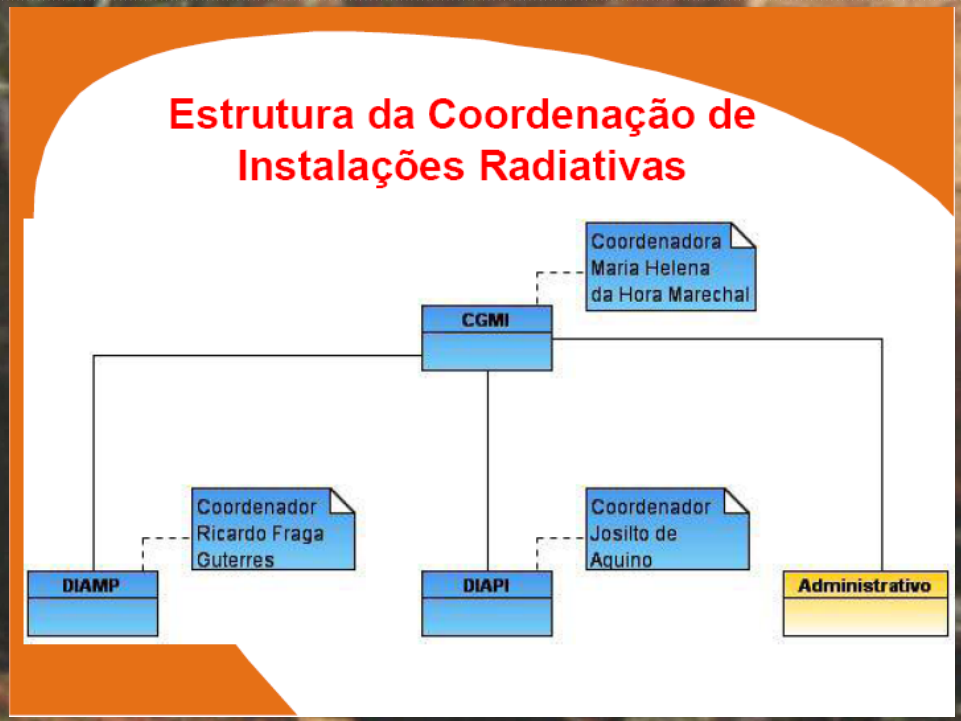
Regulatory structure in Brazil concerning source control

- Overview on the National Commission of Nuclear Energy: **Main actions and responsibilities**
  - Licensing, control, safeguards, waste management, emmergency preparedness and response
  - Main departments concerned to Directorate of Radiation and Nuclear Safety (DRS)



Regulatory structure in Brazil concerning source control

- **Licensing of radioactive facilities and control of radioactive sources**
  - General-Coordination of Medical and Industrial Facilities - CGMI's Structure (two technical divisions)



Regulatory structure in Brazil concerning source control

- **Licensing of radioactive facilities and control of radioactive sources (CGMI)**
  - More stringent licensing over practices and sources of major risk: IAEA categories 1 and 2, and sometimes 3

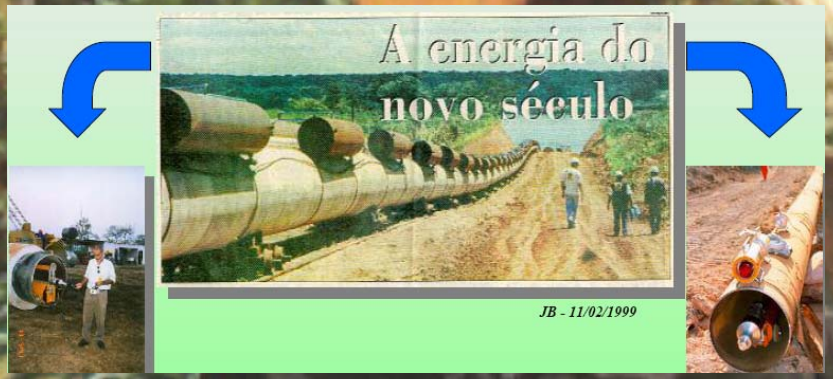
Industrial Irradiation

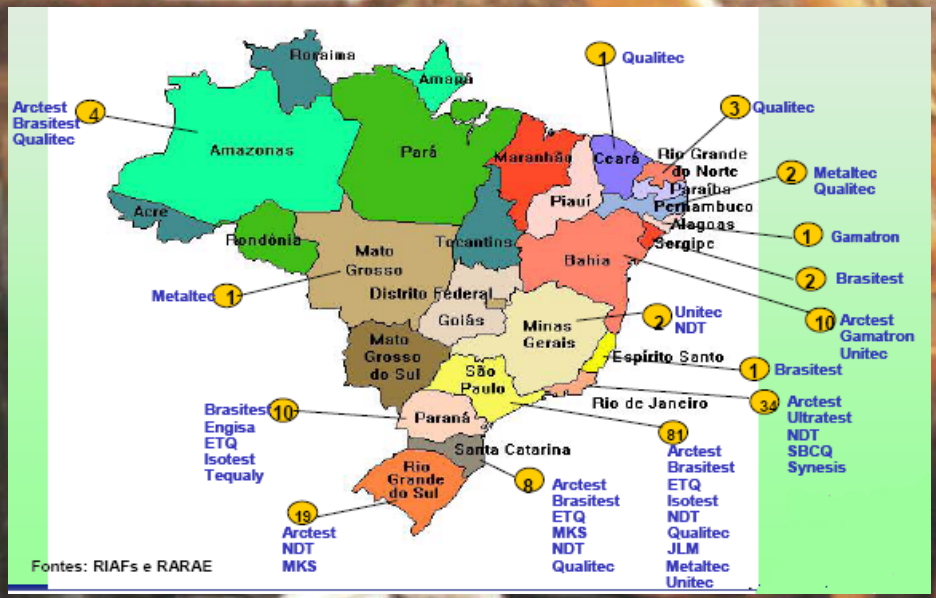
Industrial Gammagraphy

Well Logging

Regulatory structure in Brazil concerning source control

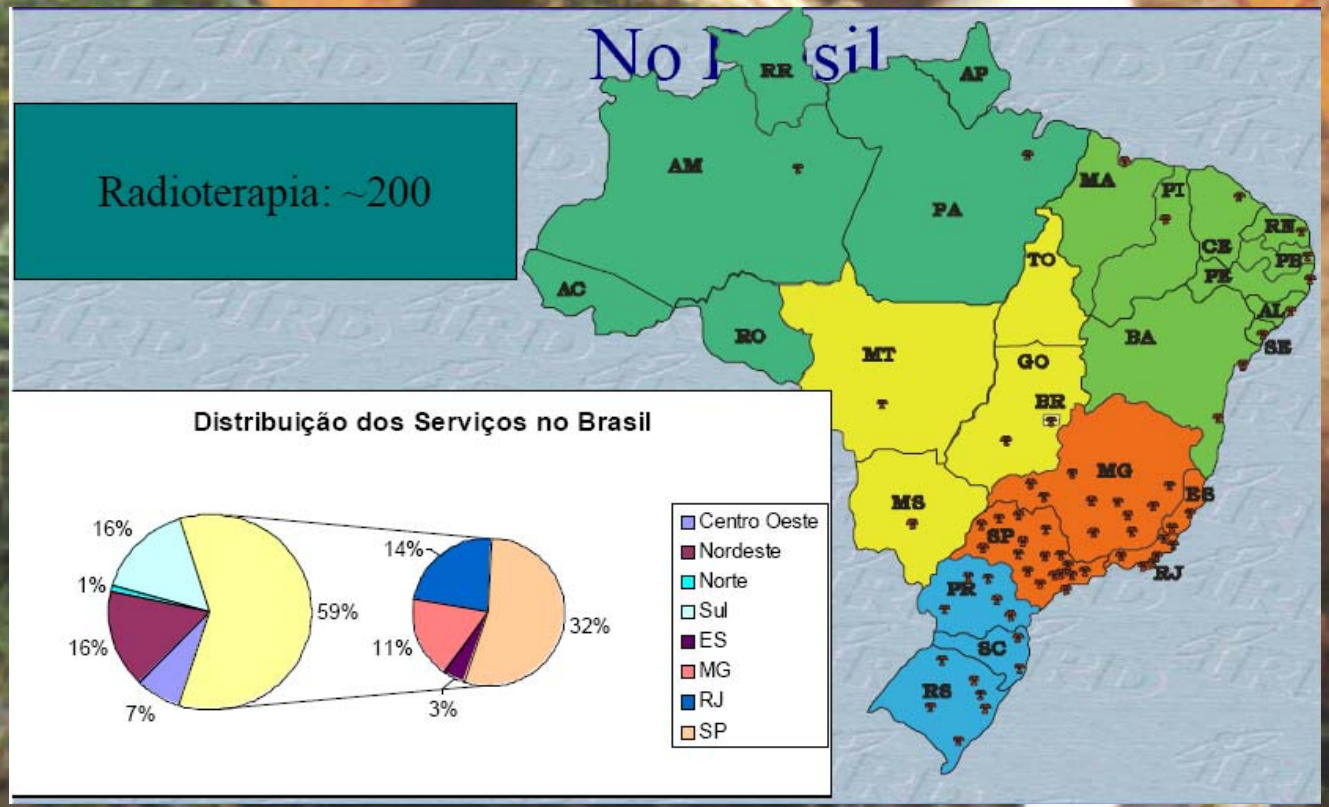
- **Industrial Gammagraphy On Site**





Regulatory structure in Brazil concerning source control

- **Radiotheraphy Facilities Distribution**

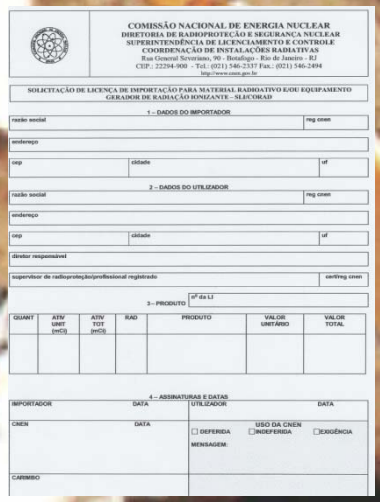


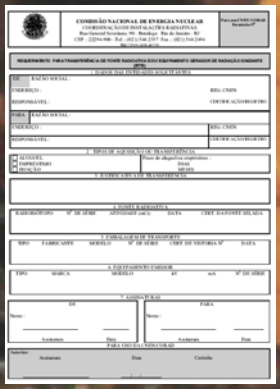
Regulatory structure in Brazil concerning source control

- **Licensing of radioactive facilities and control of radioactive sources (CGMI)**
  - Controlling of commerce of radioactive sources: domestic and foreign trading
    - Domestic trading of radioactive sources by permission
      - CNEN applied forms and requirements for productions and transfers in the country
    - Foreign trading of radioactive sources by permission
      - CNEN applied forms and requirements for imports and exports
      - Involvement of other institutions
      - Integrated System of Foreign Trade (SISCOMEX)

Regulatory structure in Brazil concerning source control

- **Integrated System of Foreign Trade**





Regulatory structure in Brazil concerning source control

- **Managing of radioactive waste and collecting of orphan sources (DIREJ)**
  - Historical participation on collecting radioactive waste and orphan sources (not anymore)
    - This responsibility belongs today to the institutes and the supporting regional centers
  - Implementation on a data base on these collectings of sources and wastes
  - Licensing of waste and orphan sources repositories (final and intermediate)
  - Supporting on NORM (oil E&P and mines)

Regulatory structure in Brazil concerning source control

- **Preparedness and response to radiological emmergencies (DIEME)**
  - Rescue of abandoned, lost and stolen sources and contaminated material
  - Decontamination of facilities and recovering of affected areas due to accidents involving liberation of radioactive products




Regulatory structure in Brazil concerning source control

- **Patrolling over illicit traficking involving radioactive material (COSAP)**
  - Point of contact of Brazil before IAEA concerning the International Traffic Database (ITDb)
  - Work together in regional level with other countries of MERCOSUL on prevention, detection and response to illicit trafficking of nuclear and radioactive material
  - Work together in national level with other departments of CNEN and security forces, intelligence agencies and border control authorities

Goiania's aftermath and lessons learned

- **A brief overview on the Goiania's accident**
  - **It involved scrap metal dealers**
  - 4 people died, 249 people contaminated, 112.000 monitored
  - 5000 m^2 of highly contaminated sites
  - 3500 m^3 of total volume of waste removed
  - 15% fall on the GDP of Goias State
  - Social, emotional, psychological and economical consequences

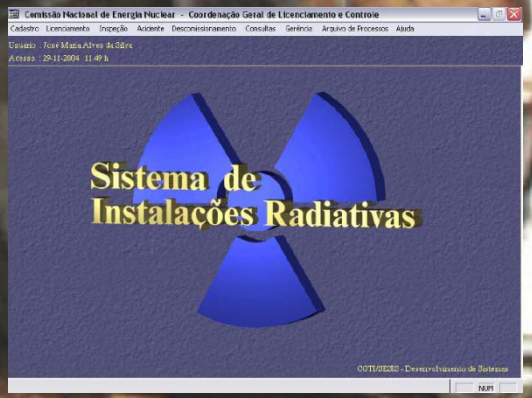
Goiania's aftermath and lessons learned

- **Lessons Learned**
  - Extra care on the decommissioning of facilities
  - Sources control in a national level
    - Data base of radioactive facilities and sources (SIR)
    - Inspection and audits with frequency according to the risk of practices and sources (SS 120)
  - Stricter licensing procedures on sources and practices of major risk categories
  - Collecting of disused sources that might be substituted for:
    - new technologies (Ra-226 needles and Cs-137 tubes brachitherapy sources)
    - more secure practices (Cs-137 teletherapy sources)
    - non justified practices (Am-241 foils of lightning preventers)

Goiania's aftermath and lessons learned

- **Data System of Radioactive Facilities**

INDÚSTRIA		
centro oeste	medidores nucleares	1
	medidores nucleares fixos	31
	medidores nucleares móveis	1
	polimerização	1
	técnicas analíticas	15
nordeste	esterilização por radiação gama	1
	medidores nucleares	4
	medidores nucleares fixos	110
	medidores nucleares móveis	9
	perfilagem de poços	11
	radiografia industrial	9
	técnicas analíticas	13
norte	irradiação de alimentos	1
	medidores nucleares fixos	37
	medidores nucleares móveis	1
	perfilagem de poços	2
	técnicas analíticas	12
sudeste	esterilização por radiação gama	8
	irradiação de alimentos	2
	medidores nucleares	3
	medidores nucleares fixos	443
	medidores nucleares móveis	28
	perfilagem de poços	12
	polimerização	10
	radiografia industrial	159
	soldagem	1
	técnicas analíticas	159
	traçadores radioativos industriais	4
sul	medidores nucleares fixos	144
	medidores nucleares móveis	2
	polimerização	2
	prospecção mineral	1
	radiografia industrial	22
	técnicas analíticas	14
	total indústria	1273



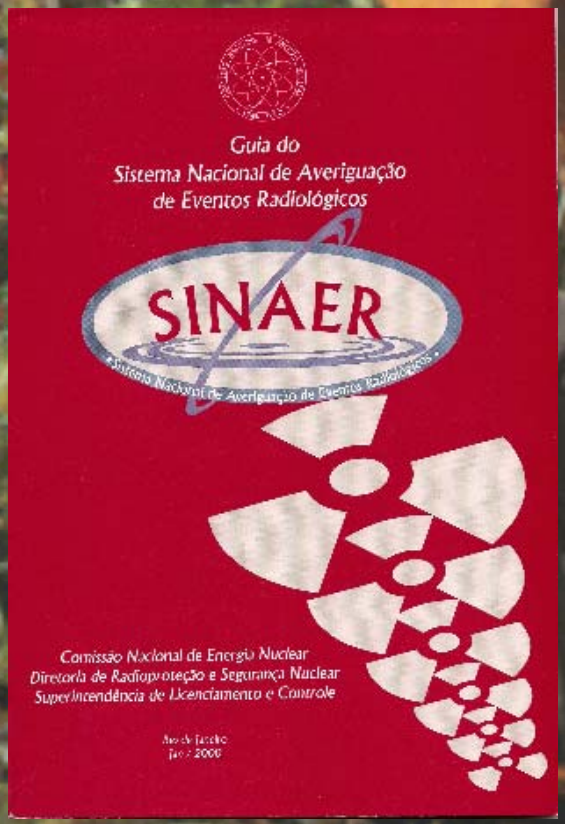
INDÚSTRIA		
centro oeste	medidores nucleares fixos	109
	medidores nucleares móveis	1
	técnicas analíticas	19
nordeste	medidores nucleares	1
	medidores nucleares fixos	373
	medidores nucleares móveis	18
	perfilagem de poços	110
	radiografia industrial	6
	técnicas analíticas	28
norte	irradiação de alimentos	22
	medidores nucleares fixos	191
	perfilagem de poços	6
	técnicas analíticas	20
sudeste	esterilização por radiação gama	664
	irradiação de alimentos	1
	medidores nucleares	1
	medidores nucleares fixos	2252
	medidores nucleares móveis	114
	perfilagem de poços	301
	polimerização	2
	radiografia industrial	295
	soldagem	1
	técnicas analíticas	227
	traçadores radioativos industriais	12
sul	medidores nucleares fixos	545
	medidores nucleares móveis	4
	polimerização	1
	prospecção mineral	1
	radiografia industrial	13
	técnicas analíticas	16
	total indústria	5354

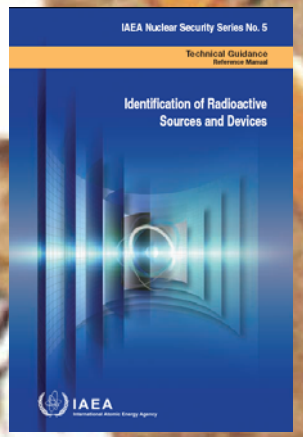
Goiania's aftermath and lessons learned

- Some good practices worth to mentioning:
  - **Implementation of a system of identification of radioactive sources in national level (SINAER), consisting of two basic parts:**
    - a book with illustration of sources and practices, the main radioisotopes involved and the data related, as well as the necessary safety and security instructions
    - a grouping of volunteers, experts on nuclear matters, spread throughout Brazil strategically, to cover all the regions of the country, in order to orientate the actions to collect occasional sources that might have been lost, abandoned or stolen and notify CNEN for the final actions as needed

Goiania's aftermath and lessons learned

- Integrated System for Investigation of Radiological Events



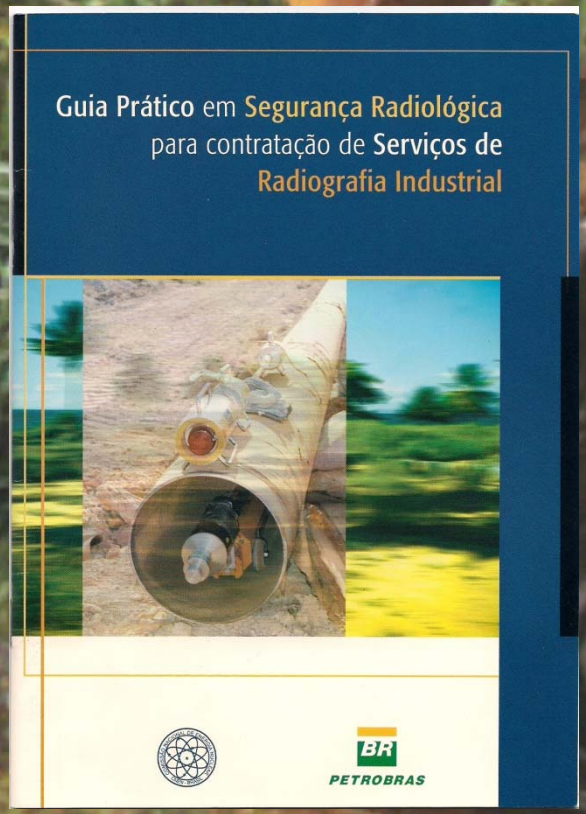


Goiania's aftermath and lessons learned

- Some good practices worth to mentioning:
  - **Elaboration of a booklet in order to orientate the contracting of services of industrial radiography concerning safety and security measures**
    - Distributed among the main contractor of these services in the country so as to guarantee these services to be done safely and securely, and all the measures to protect the workers involved, the public and the environment to be taken, as well as foster a safety and security culture throughout all the main stakeholders in this area, especially the industries which are non users of radioactive sources
    - Among the big contractors, we have to make a special mention to PETROBRAS, which was a great contributor to these project, and actually jointed CNEN to make it real

Goiania's aftermath and lessons learned

- Practical Guide on Radiological Safety for the contracting of Industrial Radiography Services



Brazil's outlook on scrap metal

1. **Promote a debate among all departments of CNEN directly or indirectly related to source control and scrap metal**
   a) Identify actions of each department
   b) Verify possible double efforts
   c) Implement necessary changes
   d) Propose a joint action of deparments
   e) Elaborate a Plan of Action

Brazil's outlook on scrap metal

2. **Identify potential partnerships through governmental institutions and society**
   a) Special Secretariats on the Ministries
   b) Association of steel and metal industries
   c) Association of recycling industries
   d) Union of workers in these businesses
   e) Elaborate a strategy to involve these parties in a joint action with CNEN

Conclusion and Final Remarks

I. Despite the fact Brazil still do not have an effective control on scrap metal, there is a national structure encompassing licensing and control of sources and practices, reducing the probabilities of ocurrences of orphan sources and, consequently, scrap metal.

Conclusion and Final Remarks

II. There is a background legislation and regulation supporting all these actions concerning licensing and control of sources and related practices, complying with international recommendations.

Conclusion and Final Remarks

III. There are already individual actions of departments of CNEN related to the control of scrap metal, which need to be put together in a joint action.

Conclusion and Final Remarks

IV. There might be partners on governmental institutions and society to joint the actions carried out by CNEN concerning the control of scrap metal and related recycling industries.

Conclusion and Final Remarks

v. Putting all these efforts together, along with the existing structure of legislation, regulation and effective actions of a national regulatory authority, we firmly believe that Brazil will be able to build its own Protocol in a few years, as some countries have been doing.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Questions?