

# NATIONAL REPORT BRAZIL

R2D2P WORKSHOP  
REVIEW OF A DECOMMISSIONING PLAN  
MARGURELE-BUCHAREST • 04-08 JULY 2011

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National Nuclear Energy Commission

# LEGAL AND REGULATORY FRAMEWORK

- ◉ ***The National Standard NN-9.01: Decommissioning of Nuclear Power Plants (instead of Nuclear Facilities) is under development*** by the regulatory body with the cooperation of national experts in the subject;
- ◉ All Brazilian R2D2P participants are involved in this joint work;
- ◉ Based on the following documents:
  - WS-R-5, Decommissioning of Facilities Using Radioactive Material;
  - DS333, Decommissioning of Nuclear Facilities;
  - DS376, Safety Assessment for Decommissioning of Facilities Using Radioactive Material

# LEGAL AND REGULATORY FRAMEWORK

- ◉ The original proposition for this national standard was for Decommissioning of Nuclear Facilities.
- ◉ The redactor group made the proposition to consider only the Nuclear Power Plants on this national standard.
- ◉ Due to the structure of a Decommissioning process, the representatives of R2D2P proposed the inclusion of Research Reactors and other Nuclear Facilities.
- ◉ After discussion, it was agreed that the standard will cover only the Nuclear Power Plants.
- ◉ The regulatory demand for a national standard for Decommissioning of Research Reactors was addressed to the Advisory Group of Standards to be included on the Schedule of Standards to be developed next year.

# LEGAL AND REGULATORY FRAMEWORK

- ◉ As Brazilian Representatives for R2D2P project, we have been worked on the *diffusion of the decommissioning culture in Brazil* focusing on the establishment of the *National Policy regarding to decommissioning*, creation of a National Work Group skilled on Decommissioning Planning and Projects, preparation of *national standards and procedures* and *promotion of the development of Decommissioning Plans for Brazilian Research Reactors*
- ◉ According to the Regulatory Body, the *National Standard NN-9.01 will be available in 2012*

# LEGAL AND REGULATORY FRAMEWORK

- ◉ Creation of **Group 8** of standards dedicated to **Radioactive Waste Management**;
- ◉ Review of standard NN-6.05 “Radioactive Waste Management in Radiation Facilities” which will be changed to **NN-8.01 “Radioactive Waste Management”** (available in 2011-2012). New in NN-8.01:
  - New classification of radioactive waste: RI, RVMC, RBMN-VC, RBMN-RN, RBMN-VL, RAN (based on **GSG-1**);
  - Values of activity concentration for bulk amounts of material (based on **RS-G-1.7**).

# LEGAL AND REGULATORY FRAMEWORK

- ⦿ Preparation of the new standard ***NN-8.02 “Licensing of Disposal Facilities for Radioactive Waste”*** (available in 2011-2012).
  - Standard format for Safety Analysis Report of storage facilities;
  - Standard format for Safety Analysis Report of disposal facilities for LILW-SL (RBMN-VC).

# LEGAL AND REGULATORY FRAMEWORK

- ◉ The Constitution of 1988 of the Federal Republic of Brazil states in its articles 21 and 177 that the Union has the exclusive competence for managing and handling all nuclear energy activities, including the operation of nuclear power plants.
- ◉ The Union holds also the monopoly of the survey, mining, milling, exploitation and exploration of nuclear minerals, as well as of the activities related to industrialization and commerce of nuclear minerals and materials, and is also responsible for the final disposal of radioactive waste.

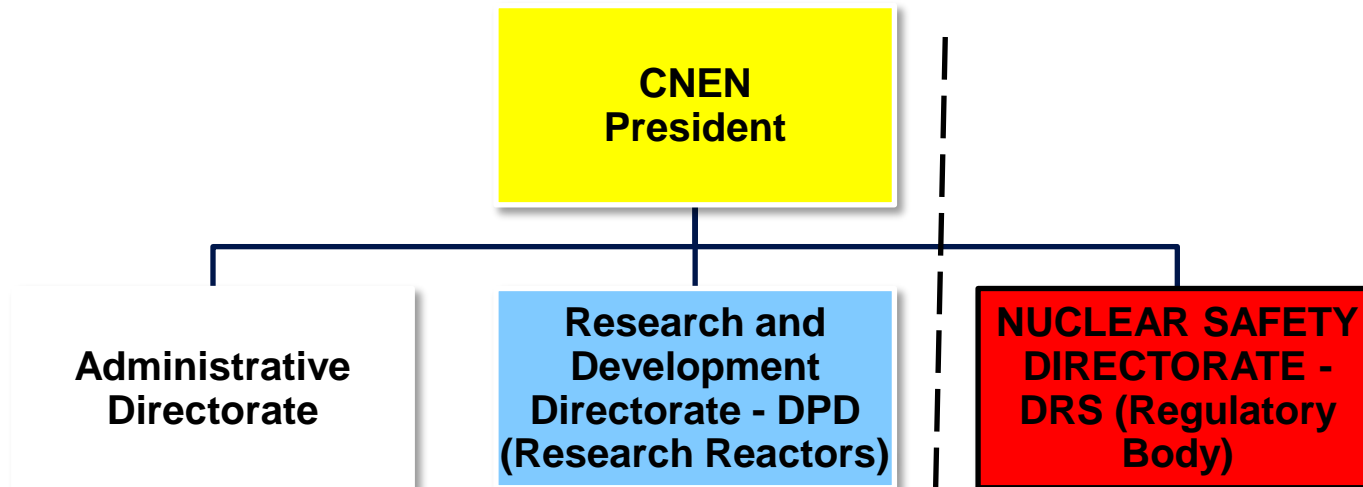
# LEGAL AND REGULATORY FRAMEWORK

- ◉ The National Nuclear Energy Commission (Comissão Nacional de Energia Nuclear - **CNEN**) was created in 1956, and is:
  - responsible for **regulating, licensing and controlling** nuclear energy utilization (Nuclear Safety Directorate, **DRS/CNEN**);
  - in charge of research and development and production of radioisotopes (Research and Development Directorate, **DPD/CNEN**). The DPD is also responsible for receiving and disposing of radioactive waste from the whole country.



# LEGAL AND REGULATORY FRAMEWORK

- The National Nuclear Energy Commission -  
CNEN



Separation of DRS from CNEN is likely to occur in 2012, to create a National Nuclear Agency.

# LEGAL AND REGULATORY FRAMEWORK

- ◉ Environmental Licensing:
  - **IBAMA** (Institute for Environmental and Renewable Natural Resources) under the Ministry for Environment is responsible for the environmental licensing process.

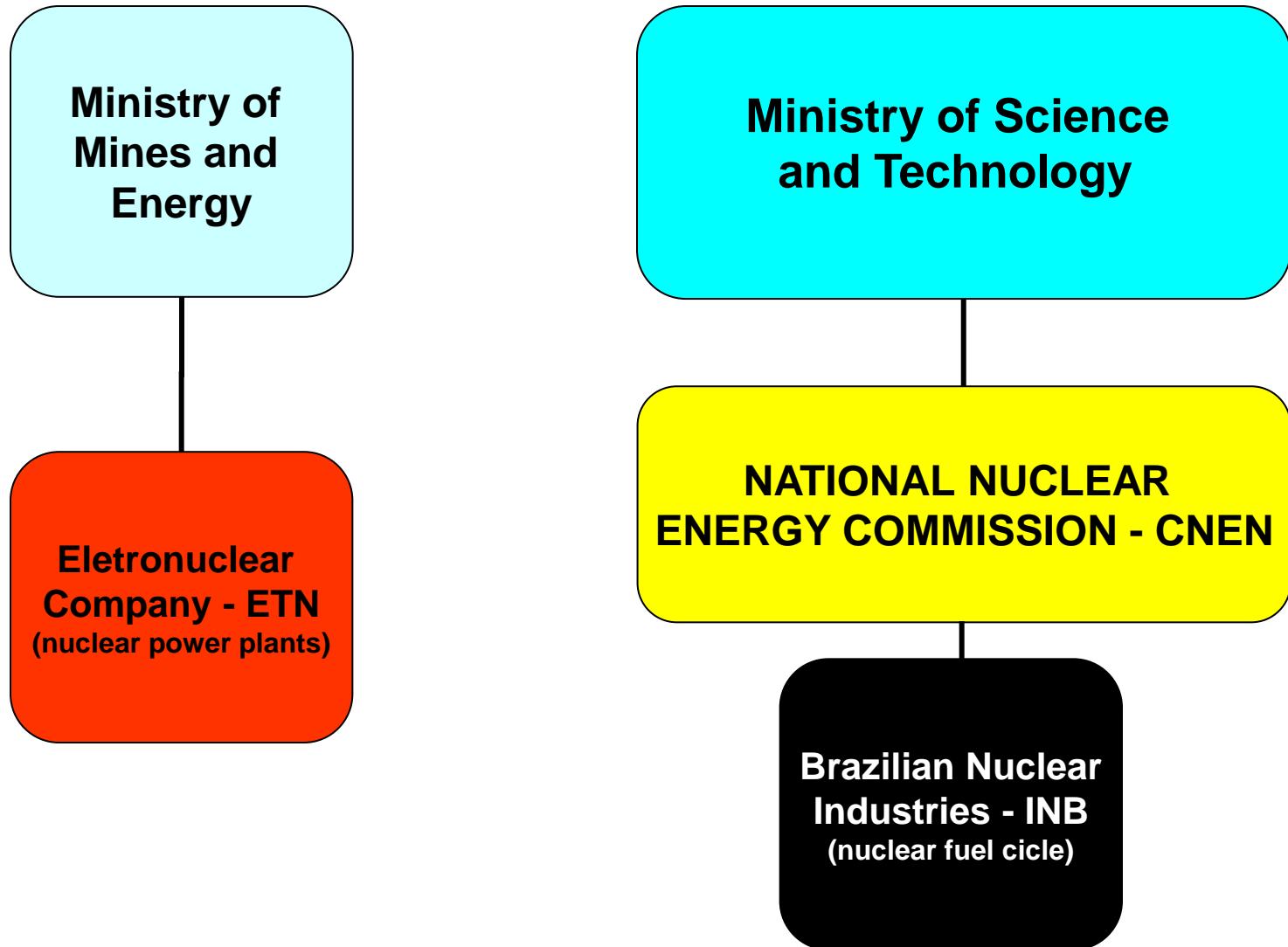
# LEGAL AND REGULATORY FRAMEWORK

Other Brazilian organizations involved in Nuclear Safety:

- ⦿ Eletrobras Termonuclear S.A. (**ELETRONUCLEAR**):
  - Responsible for Angra I and Angra II NPPs.
- ⦿ Nuclear Industries of Brazil (**INB\***):
  - nuclear fuel manufacturing plant;
  - yellow-cake production plant;
  - uranium enrichment plant;
  - mining facility in operation since 2000;
  - monazite sand extraction facility.

\* CNEN owns 99.9983 % of INB.

# LEGAL AND REGULATORY FRAMEWORK



# DOCUMENTS APPLIED TO IPR-R1 DECOMMISSIONING ACTIVITIES

- "Developed Devices for Dismantling and Maintenance of IPR-R1 Research Reactor" (NI-AT4-004/95) 1995. (under revision)
- "Shielding and Criticality Safety Analyses of a Latin American Cask for Transportation and Interim Storage of Spent Fuel From Research Reactors ", 2003.
- "Characterization of Burned Fuel of the TRIGA IPR - R1 Research Reactor Using MonteBurns Code ", 2002.
- CDTN 0023 (Radioactive Waste Management)
- CDTN (Radiation Protection Plan)

# BASICS OF DECOMMISSIONING / DECOMMISSIONING PLANNING



decide to start an internal project (Aug 2011):

## “Planning of Decommissioning activities for IPR-R1 Research Reactor”

### ⦿ Expected Goals:

- *Develop the IPR-R1 Decommissioning Plan in a joint work with CDTN's Experts*
- Use the developed plan for IPR-R1 as a model and after extending to all Brazilian Research Reactors, and other facilities;

# BASICS OF DECOMMISSIONING / DECOMMISSIONING PLANNING

In the actual stage we have a good draft with relevant information, contents, structure and general aspects to be considered in a research reactor decommissioning plan, as you can see in the attached file ([DECOMMISSIONING PLAN\\_\\_TRIGA IPR-R1.doc](#)).

This document was reviewed R2D2P representatives after some suggestions from AIEA staff (Vladan and Ernest) to reorganize the presented information considering some IAEA publications (Safety Reports Series No. 45 - Standard Format and Content for Safety Related Decommissioning Documents, Standardized Cost Items For Decommissioning Projects, among several others as shown as reference inside the document).

We encountered some delays due to very limited human resources to develop each activity planning described on the chapters of the document.

# BASICS OF DECOMMISSIONING / DECOMMISSIONING PLANNING

To contour this lack of people we proposed to the Director of our Research Institute the creation of a internal project entitled "Planning of Decommissioning Activities for IPR-R1 Research Reactor" only available in Portuguese (attached file: [Projeto Draft\\_Planejamento de Atividades de Descomissionamento para Instalações do CDTN.doc](#)) allowing the contribution of specialists of our institute on each particular Decommissioning Planning issue.

This project is now under final evaluation by the CDTN's projects approval staff.

Other activities accomplished to keep de wheel moving were discussions and interactions with the regulators highlighting the importance of development the national regulatory framework on Decommissioning.

A national group is involved on this issue and a national standard is under development but only available in Portuguese (*Norma Descomissionamento - [Draft 0 Jul2009.doc attached](#)*).

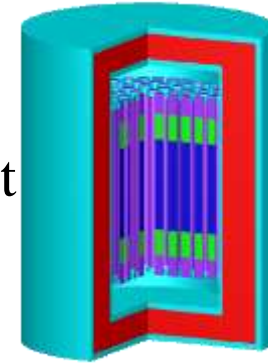
We were invited to contribute with the development of this national standard



# BRAZILIAN ONGOING ACTIVITIES

- ◉ Disassembly procedures and equipments
  - review and updating
- ◉ Spent fuel safe storage/transport package (cask in development / dry storage)
  - IAEA regional project
  - prototype performance tests
  - correction of the non-conformities

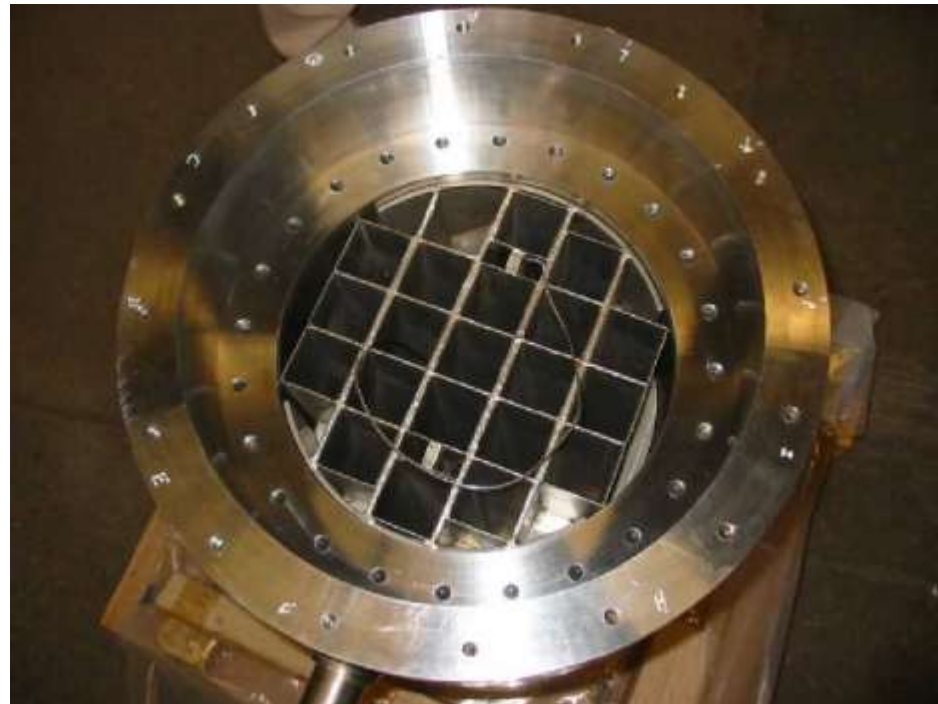
# LATIN AMERICAN CASK



Numerical Assessment  
Project Parameters



Prototype – external view



Prototype – internal view

2 basket types (78 TRIGA or 21 MTR elements ) USD\$ 60,000.00

# DECOMMISSIONING PLAN CONTENTS

1. **INTRODUCTION**
2. **OBJECTIVE**
3. **TRIGA IPR-R1 DESCRIPTION**
  - Historical
  - Properties and construction aspects
  - Lifetime estimation
  - Location and using area description
  - Drawings and maps
4. **DECOMMISSIONING STRATEGY AND END STATE**
5. **RESPONSIBILITIES**

# DECOMMISSIONING PLAN CONTENTS

## 6. FINANCIAL ASPECTS

## 7. QUALITY ASSURANCE PROGRAM

## 8. RELATED DOCUMENTATION

- Federal Standards
- CNEN Standards and Procedures
- CDTN Procedures
- Environmental Standards
- IAEA Recommendations
- Other relevant documents

# DECOMMISSIONING PLAN CONTENTS

## 9. CHARACTERIZATION PROGRAM

- Maps of the installation
- Contamination Level Approach
- Gridding for Sampling and number of samples to be taken
- Clearance Values
- Analysis and Results (Standard Values)
- Destiny of the samples (release or stored as witness)
- Classification of the material as non-radioactive or radioactive waste, recyclable, reusable material

# DECOMMISSIONING PLAN CONTENTS

## 10. TEAMS AND ACTIVITIES (FLOWSHEET)

- Reactor Operation
- Health & Safety
- Radiological Protection
- Waste Management
- Infra-structure & General Maintenance
- Administrative and Financial
- Legal
- Environmental
- Risk, Burn-up and Waste Approach Assessment
- Audit and QA
- Communication

# DECOMMISSIONING PLAN CONTENTS

**11. EQUIPMENT AND INSTRUMENT**

**12. ROUTES**

- Personnel
- Wastes
- Other Materials

**13. EMERGENCY PLAN**

**14. TIMETABLE**

**15. CONCLUSION**

**16. TABLE OF REVISION**

**17. ANNEXES**

***THANK YOU FOR YOUR ATTENTION***



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*For more detailed information about this information contents*