

# **Licensing of nuclear facilities in Brazil: Radiological aspects**

Prof. Dr. Wagner de Souza Pereira, UVA, INB, UFF

Dra. Ana Cristina Lourenço, INB

Prof. Dr. Alphonse Kelecom; UFF

Prof. Dr. Ademir Xavier da Silva, UFRJ

# Licensing of nuclear facilities in Brazil: Radiological aspects

Prof. Dr. Wagner de Souza Pereira, UVA, INB, UFF

Dra. Ana Cristina Lourenço, INB

Prof. Dr. Alphonse Kelecom; UFF

Prof. Dr. Ademir Xavier da Silva, UFRJ

# INTRODUCTION

- Regulatory Approach
  - CNEN was created in 1956
    - To control and regulate the development and use of atomic energy in Brazil
- Licensing process
  - Nuclear safety, environmental protection and security
  - For all nuclear facilities (In Brazil, including uranium mining)
  - Site approval, construction license, Authorization for initial operation, Authorization for permanent operation, suspension, cessation and abandonment of the site.
  - Environmental licensing

# INTRODUCTION

- Regulatory Approach
  - CNEN was created in 1956
    - To control and regulate the development and use of atomic energy in Brazil
- Licensing process
  - Nuclear safety, environmental protection and security
  - For all nuclear facilities (In Brazil, including uranium mining)
  - Site approval, construction license, Authorization for initial operation, Authorization for permanent operation, suspension, cessation and abandonment of the site.
  - Environmental licensing

# LICENSING PROCESS

- Site approval
  - Describing
    - Design
    - Operation
    - Site characteristics
    - Possible environmental impact
    - Background and baseline
  - Approved
    - Conceptual design
    - Assessment criteria
    - Submission to environmental agency

# LICENSING PROCESS

- Site approval

Cost: R\$ 446,400.00  
U\$ 150,000.00

- Describing

- Design
    - Operation
    - Site characteristics
    - Possible environmental impact
    - Background and baseline

- Approved

- Conceptual design
    - Assessment criteria
    - Submission to environmental agency

# LICENSING PROCESS

- Construction license
  - Detailed description of the facility (prediction and understanding of impacts)
  - Safety of general public and environment
  - Schedule for construction activities
  - Assessment of potential impacts
  - Preventing or controlling radiation doses (workers and public)
  - Waste management
  - Postulated accident conditions
  - Plan for responding emergency
  - Conceptual decommission

# LICENSING PROCESS

- Construction license
  - Detailed description of the facility (**prediction and understanding of impacts**)
  - **Safety of general public and environment** Cost: R\$ 3,978,000.00
  - Schedule for construction actives U\$ 1,333,000.00
  - **Assessment of potential impacts**
  - **Preventing or controlling radiation doses (workers and public)**
  - **Waste management**
  - **Postulated accident conditions**
  - **Plan for responding emergency**
  - **Conceptual decommission**

# LICENSING PROCESS

- Authorization for initial operation
  - Detailed safety analysis
  - Issued for a limited period of time
  - Renewed periodically provide compliance whether the license has been satisfactory
  - Estimation of the total operation periods
  - As built
  - Description of the conceptual plans and procedure

# LICENSING PROCESS

- Authorization for initial operation
    - Detailed safety analysis
    - Issued for a limited period of time
    - Renewed periodically provide compliance whether the license has been satisfactory
    - Estimation of the total operation periods
    - As built
    - Description of the conceptual plans and procedure
- Cost: R\$ 5,392,000.00  
U\$ 1,800,000.00

# LICENSING PROCESS

- Authorization for permanent operation
  - Complementary data
  - Any other relevant information
  - The license will be issued when there is reasonable assurance that operation of permanent nature can be conducted with no undue radiation hazard to the workers, the general public and the environment.
  - In this phase, the regulatory body conducts compliance and regulatory inspections
  - Regulatory standards and license conditions are being fulfilled

# LICENSING PROCESS

- Authorization for permanent operation
    - Complementary data
    - Any other relevant information
    - The license will be issued when there is reasonable assurance that operation of permanent nature can be conducted with no undue radiation hazard to the workers, the general public and the environment.
    - In this phase, the regulatory body conducts compliance and regulatory inspections
    - Regulatory standards and license conditions are being fulfilled
- Cost: R\$ 5,392,000.00  
U\$ 1,800,000.00

# LICENSING PROCESS

- Authorization for the use of nuclear material
  - Cost: R\$ 74,000.00 (U\$ 25,000.00)
- Renovation of license
  - Cost: R\$ 409,200.00 (U\$ 140,000.00)

# LICENSE PROCESS

- Decommissioning
  - At the end of the production stage the facilities should be decommissioned by the operator
  - CNEN drives the process
  - Conducts an assessment to ensure safety and security

# LICENSE PROCESS

- Decommissioning
  - At the end of the production stage the facilities should be decommissioned by the operator
  - CNEN drives the process
  - Conducts an assessment to ensure safety and security

# LICENSING PROCESS

- Radiation protection requirement
  - Justification
  - Optimization
  - Limitation of risk (dose)
- Workers have to know the exposure situation
- Workers should be trained
- Radiation protection present in routine and accident condition
- Only justified exposition

# CONCLUSION

- There is a rational licensing system, logical and based on solid technical concepts.
- Periodic evaluations are necessary to maintain good licensing terms.

- Tank you for your attention

- [wspereira@inb.gov.br](mailto:wspereira@inb.gov.br)
- [Wagner.Pereira@uva.br](mailto:Wagner.Pereira@uva.br)