

# **BRAZILIAN LOW AND INTERMEDIATE LEVEL RADIOACTIVE WASTE DISPOSAL AND ENVIRONMENTAL CONSERVATION AREAS**

**George Uemura and Valeria Cuccia**

CDTN - Centro de Desenvolvimento da Tecnologia Nuclear  
Av. Antônio Carlos 6627 – Campus UFMG  
31270-901 – Belo Horizonte, MG  
[george@cdtn.br](mailto:george@cdtn.br), [vc@cdtn.br](mailto:vc@cdtn.br)

## **ABSTRACT**

Low and intermediate level radioactive waste should be disposed off in proper disposal facilities. These facilities must include unoccupied areas as protection barriers, also called buffer zone. Besides that, Brazilian environmental laws require that certain enterprises must preserve part of their area for environmental conservation. The future Brazilian low and intermediate level waste repository (RBMN) might be classified as such enterprise.

This paper presents and discusses the main Brazilian legal framework concerning different types of conservation areas that are allowed and which of them could be applied to the buffer zones of RBMN. The possibility of creating a plant repository in the buffer zone is also discussed.

## **1. INTRODUCTION**

Brazil is planning a repository for low and intermediate level radioactive waste, a project called RBMN. The country have only one experience related to disposal facilities for radioactive waste: the repository built in the municipality of Abadia de Goiás – Goiás State (Figure 1). It was constructed only to receive the waste generated due to the 1987's radiological accident. The situation for this repository was unusual, because urgent measures had to be taken due to the accident.

The scenario is quite different for the new repository, since the goal is the disposal of the nuclear waste generated in the nuclear power plants of Angra, possible future Brazilian nuclear power plants and radioactive waste from other applications. This means a bigger variety of radionuclides to consider in the safety case (not only  $^{137}\text{Cs}$ , like the existing repository) and new logistical issues, like many possibilities of the site location, considering that new nuclear power plants could be built in any part of Brazil. Considering this new situation, CNEN (National Commission of Nuclear Energy), IBAMA (Brazilian Institute of the Environment and of the Renewable Natural Resources) and other institutions will have to spend great efforts to provide the licenses for the operation of the disposal facility.

The environmental conservation area associated to a repository is one of the issues involved on the licensing process of a disposal facility. This paper intends to present the main legal framework concerning different types of conservation areas that are allowed and which of them could be applied to the buffer zones of the repository.



**Figure 1: Repository of Abadia de Goiás [3]**

## **2. MAIN LEGISLATION AND CONCEPTS**

The Law 9985, July 18<sup>th</sup>, 2000 [1] creates the National System for Environmental Conservation Areas, so called SNUC (the Brazilian acronym). They are the territorial space and its environmental resources, including water, legally defined by the government. Its goal is conservation and defined boundaries, administrated by a special regime with guaranties for protection.

These environmental conservation areas (ECA) are divided in two groups: Unities for Integral Protection (UIP) and Unities for Sustainable Use (USU).

The Unities for Integral Protection are intended to maintain the ecosystems free from alterations caused by human interference. The natural attributes might be used only indirectly.

The Unities for Sustainable Use are areas where might occur some exploration if the perenity of the environmental resources and ecological processes, maintaining the biodiversity and other characteristics of the environment.

The Law 9985 [1] determines that enterprises with significant environmental impact (defined by the regulator after the environmental impact studies) are obliged to support the implementation and maintenance of a UIP, for the so called Environmental Compensation.

The types of environmental conservation areas are shown in Table 1, divided in their groups as Unities for Integral Protection and Unities for Sustainable Use.

**Table 1. Environmental conservation areas divided between Unities for Integral Protection and Unities for Sustainable Use.**

<b>Unities for Integral Protection (UIP)</b>	<b>Unities for Sustainable Use (USU)</b>
Ecological “Station” Biological Reserve National Park Natural Monument Wild Life Refuge	Environmental Protection Area Ecologically Interesting Area National Forest Extrativist Reserve Fauna Reserve Sustainable Development Reserve Natural Heritage Private Reserve

The Decree 4340 (Aug, 22th, 2002) regulates the calculation and uses for the funding from the enterprises for environmental conservation. It also settles that the environmental regulator, in this case, IBAMA, Will define the environmental impact degree, considering the negative and immitigable impacts [2]. The Decree 6848 (May, 14th, 2009) settles rules for financial evaluation of the impact [3].

The Resolution CONAMA 371/2006 sets that to define the impact degree for a enterprise, it is allowed to consider only impacts to the environmental resources, excluding operational risks [4].

### **3. POSSIBLE ENVIRONMENTAL CONSERVATION AREAS**

Table 2 shows the UIP. One of them will be choose to have its implementation supported by the Repository, if it is considered to have a significant environmental impact by the regulator, IBAMA. The regulator will define the destination for the funding for these areas in environmental licensing process.

The goals and characteristics for the UIP are very similar, as shown in Table 2. So, the choice will depend on some factors, especially:

- the main intention of the Repository Management and the UIP Management about the area, especially regarding public access;
- Repository location, because the UIP should preferably be within its same watershed and biome. Peculiar natural resources, ecological relevance and landscape beauty should also be investigated to be protected.
- IBAMA will set the value for the funding [3].

Considering that a site for the repository shall be choose already excluding places with singular resources as a regulatory settlement [5], the Ecological “Station” seems to be an interesting option for the repository, because it allows the area preservation, associated to scientific researches and public access with educational purposes.

**Table 2. Goals and Characteristics for Unities for Integral Protection**

	<b>Ecological “Station”</b>	<b>Biological Reserve</b>	<b>National Park</b>	<b>Natural Monument</b>	<b>Wild Life Refuge</b>
<b>Main Goal</b>	Preservation of natural resources and scientific research	Integral preservation of the biote and other natural attributes, without human direct interference or environment modifications, unless if they are for managing and recovery actions.	Preservation of very relevant ecosystems and special landscapes. Allow scientific researches and educational activities, recreation and eco-tourism.	Preservation of natural and rare sites or special landscapes.	Protect natural environments with special conditions to living and reproduction of fauna and flora species and communities.
<b>Public access</b>	Public access forbidden, unless if it is with educational purposes	Public access forbidden, unless if it is with educational purposes	Allowed under regulation	Allowed under regulation	Allowed under regulation
<b>Possession</b>	Public	Public	Public	Might be private	Might be private
<b>Scientific research</b>	Depends on previous authorization and regulation from the unity administrator.	Depends on previous authorization and regulation from the unity administrator.	Depends on previous authorization and regulation from the unity administrator.	Not defined	Depends on previous authorization and regulation from the unity administrator.

#### 4. CONCLUSIONS

The definition of the Environmental Conservation Area to be supported will depend on many factors, such as the main purpose of IBAMA, the repository and the area managers, the site selected and the funding required by IBAMA.

Considering that a site for the repository shall be choose already excluding places with singular resources as a regulatory settlement, the Ecological “Station” could be an interesting option, seems to be an interesting option for the repository, because it allows the area preservation, associated to scientific researches and public access with educational purposes. If the selected site has more special characteristics, other kinds of unities for integral protection might be selected.

This is a preliminary and simplified study about the regulatory framework regarding the environmental conservation areas. Further analysis must be carried for the next steps of the site selection and licensing process, especially regarding the interactions with the regulators involved.

## ACKNOWLEDGMENTS

The authors thank all the technicians that took part of the Environmental Licensing Group of the RBMN project at any time. Thanks also to the regulators from IBAMA and CNEN.

## REFERENCES

1. BRASIL. *Lei n° 9.985, de 18 de julho de 2000*. Regulamenta o art. 225, § 1o, incisos I, II, III e VII da Constituição Federal, institui o Sistema Nacional de Unidades de Conservação da Natureza e dá outras providências.
2. BRASIL. *Decreto n° 4340, de 22/08/2002*. Regulamenta artigos da Lei n° 9.985, de 18 de julho de 2000, que dispõe sobre o Sistema Nacional de Unidades de Conservação da Natureza - SNUC, e dá outras providências.
3. BRASIL. *Decreto n° 6848, 14 de maio de 2009*. Altera e acrescenta dispositivos ao Decreto no 4.340, de 22 de agosto de 2002, para regulamentar a compensação ambiental.
4. BRASIL. *Resolução CONAMA 371 de 05 de abril de 2006*. Estabelece diretrizes aos órgãos ambientais para o cálculo, cobrança, aplicação, aprovação e controle de gastos de recursos advindos de compensação ambiental, conforme a Lei no 9.985, de 18 de julho de 2000 (...).
5. CNEN. *CNEN NE 6.06: Seleção e escolha de locais para depósitos de rejeitos radioativos*. (1989)