

## NATIONAL CENTER FOR RADIOACTIVE WASTES (CENDRA)

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### ABSTRACT

Guatemala intends to secure the protection of the present and future generations and its environment while the radioactive substances have not reached dangerous levels.

The main activities generating radioactive wastes in the city of Guatemala are those due to medical practice (radiodiagnostic and radiotherapy), industry and research (in a lower scale).

The sources most used are Cesium - 137, Cobalt - 60, Iodine - 131, Technetium - 99m, among others. Among the sources not in use are Radium - 226, Cobalt - 60, and the contaminated material generated in medicine and research, just to name a few of them.

The resulting wastes are mainly of low and medium activity. The collection of these wastes is done periodically and the users must deliver them properly marked and packed. The users will customize their own waste when it is of short half life disintegration period, as in the case of Technetium - 99m. Otherwise, the competent authority, will be the DIRECCION GENERAL DE ENERGIA NUCLEAR (General Director of Nuclear Energy), the responsible of supervise and control the management of the waste under measure for Radiological Protection.

At this time, Guatemala wants to achieve, by means of the Centro Nacional de Desechos Radioactivos (National Center for Radioactive Wastes), the treatment and conditioning of the wastes for a proper management, storage and disposal.

The facilities of the National Center for Radioactive Wastes, located in the Capital City, consist of:

- **LOW ACTIVITY SOURCES STORAGE DEPOT:**  
With an area of 28 square meters with its corresponding security systems.
- **MEDIUM ACTIVITY SOURCES STORAGE DEPOT:**  
With an area of 11.2 square meters.
- **AREA OF IMMOBILIZATION AND STORAGE OF SOURCES:**  
It will have an area of 85.12 square meters.

Enclosed are the drawings of the National Center for Radioactive Wastes of Guatemala.

### INTRODUCTION

In all the activities done by man it is almost impossible not to have waste of one type or another; for that reason, it is not surprising that nuclear energy is not an exception.

In Guatemala, the management of wastes began along with the design of the radioactive facilities. The collection, treatment, storing and/or discharge to the environment has required complex work, since it has grouped several technical disciplines that covers the engineering aspects to the radioactive discharges to the considered environment.

Guatemala is working on the project with minimal resources. The fact that has helped is that it uses an already existing infrastructure which belonged in the past to the Gulf Oil Company.

In this way, with the adequate utilization of the considerations before mentioned, man and the environment can be protected, not only now, but for all the time in which the radioactive wastes show a potential danger.

### OBJECTIVE

Guatemala is in the search to secure protection for the present and future generations in addition to its environment by properly handling the radioactive wastes by means of its facilities for wastes management to diminish the risk of the ionizing radiations.

### ENCLOSURES FOR THE TREATMENT OR STORAGE OF RADIOACTIVE WASTES

The enclosure is the physical place that is meteorologically and geologically stable and in which the authorized facilities are located for the treatment or storage of wastes. Our installation are located in the Zone 12 in the capital city of Guatemala and they have their respective security systems.

In the evaluation of the facilities, as well as the design, many factors have been considered such as:

1. The natural environment: considering climatic conditions, hydrology, background radiation, flora and fauna.
2. The geological stability of the terrain and its endurance to the different climatic variations.
3. The planification and considerations of socio-economic matters: although in this aspect Guatemala is developing this project with minimal economic resources, with an existing infrastructure remodeled to adapt it to the needed requirements.
4. The activity the wastes have.
5. The treatments to be given to them.
6. Type of storage to be given.

These facilities are considered controlled zones, therefore, all the accesses are clearly identified.

### RADIOACTIVE WASTES

In Guatemala the main activities generating the radioactive wastes are:

1. Medical Activities
2. Industrial Activities
3. Research Activities

We are classifying the wastes according to its activity as radioactive wastes of low and medium activity beside taking into account other parameters:

- a. Types of Radiation
- b. Half-life
- c. Rate of Decomposition
- d. Physical state
- e. Radiotoxicity

Besides, the waste's collection consists of taking them from the generation facilities to the place in which they will be treated and/or stored. The collection is being done in a periodic manner and the transport is being performed according to the current regulations (Regulation for the Safe Transport of Radioactive Material. Collection Security No. 6)

Also, Guatemala is applying the policy that requires the sources coming into the country with long half-lives to be returned to the country of origin after their intended use.

Also, waste management on the part of the use must be properly standardized. It refers to the GENERAL DIRECTOR of NUCLEAR ENERGY as the authority to control through its different departments the current standards and regulations to be complied with.

### FACILITIES

The facilities include a burial site for decayed sources of long half-lives, an area for sources not in use and a warehouse

for immobilization and storage of sources not in use and of short half-lives, contaminated wastes.

This is, in fact, what constitutes the foundations for the actual work, considering that all the existing infrastructure conforms to the NATIONAL CENTER for RADIOACTIVE WASTES.

Besides, the methods of treatment for liquid and solid waste os low and medium levels would also be incorporated. This is considered viable from the economical point of view since it has an existing infrastructure that will only require modification and equipment.

The facilities of CENDRA consist of:

#### 1. Disposal of Low Activity Sources:

With an area of 28 square meters to be used to condition and implement, besides storage of wastes derived from the use of radioisotopes of low and medium radiation levels and of short half-lives; such as Technetium - 99m, Phosphorus - 32, Iodine - 131, etc. These facilities include the personnel monitoring area, washing, and showers in the event of contamination and its correspondingly security measures.

#### 2. Disposal of Medium Activity Sources:

A total area of 11.2 square meters is intended for implementation of the storage of the sources not in use. These facilities have a well underground for storage of the sources still active.

#### 3. Area for Immobilization and Storage of the Sources:

A total area of 85.12 square meters is intended for the immobilization of the sources and storage of the sources that must be contained in capsules.