

# Republic of Congo



## First National Report

On the Joint Convention on the Safety of  
Spent Fuel Management and on the Safety of Radioactive Waste Management

Jointly Prepared by:

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**“ NRC ”**

**The General Direction of Mines**

**“ DGM ”**

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## ABREVIATIONS USED

<b>ACRSN</b>	Agence Congolaise de Radioprotection et de Sécurité Nucléaire
<b>AFRA</b>	African Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology
<b>DSRS</b>	Disused sealed Radioactive Source
<b>IAEA</b>	International Atomic Energy
<b>INFCIR</b>	Information Circular
<b>RWM</b>	Radioactive Waste Management
<b>NORM</b>	Naturally Occurring Radioactive Material
<b>NPP</b>	Nuclear Power Plant
<b>PPE</b>	personal protective equipment

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## **SECTION A : INTRODUCTION**

As a Member State of the IAEA and Party to the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management, the Republic of Congo is committed to managing radioactive waste in a safe, secure and sustainable manner in accordance with internationally recognized principles and good practices related to nuclear and radiation safety, and is committed to establishing a beneficial, responsible and sustainable radioactive waste management (RWM) system consistent with the IAEA Nuclear Energy Basic Principles, Fundamental Safety Principles.

The application of those principles aims at ensuring adequate and sustainable protection of workers, the public and the environment from the harmful effects of ionizing radiation.

This seventh national report is written in accordance with article 32 of the Joint Convention and is designed according to the guidelines concerning the form and structure of national reports, as presented in IAEA Information Circular INFCIRC/604.

The Republic of Congo has been a member of the IAEA since July 15, 2009. It has ratified the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

It is in the context of the implementation of this convention that this first report is produced. The legal framework in this area is not yet well-developed. The Republic of Congo has:

- Law No. 6-2014 of February 24, 2014 relating to radioactive sources;
- Law No. 33-2023 of November 17, 2023 on the Sustainable Management of the Environment in Republic of Congo.

Two bills that reached the end of their circuit were adopted 100% in the SENAT on August 9, 2024: One establishing the Congolese Agency for Radiation Protection and Nuclear Safety (ACRSN) and the other regulating the use of ionizing radiation sources and nuclear applications.

Two draft decrees: one on the regulation of exposures to ionizing radiation and the other on the regulation of activities exposing to ionizing radiation, were the subject of a validation workshop in September 2020. These projects will be relaunched with the upcoming publication of the new legislative framework.

## **SECTION B: POLICIES AND PRACTICES**

The national policy on radioactive waste management stipulates that “any natural or legal person whose activities generate radioactive waste is responsible for this waste and ensures its safe management”.

All radioactive wastes generated in Congo arise from the use of radioactive materials in the form of sealed sources in industry and medicine. There is also waste generated by Oil/Gaz and phosphate mining/milling industry that contains only naturally occurring radioactive materials (NORMs).

Due to the long half-life of certain radionuclides contained in NORMs, temporary storage is practiced while awaiting the establishment of a special regulatory framework

Holders of authorizations to import sealed radioactive sources are required to return the radioactive sources to the suppliers at the end of their period of use. In the event that the holder of the import authorization and/or the supplier has ceased to exist, the general directorate of mines which is the state structure responsible for regulatory control in this area, requisitions a bunker belonging to others for safe storage.

## SECTION C: SCOPE OF APPLICATION

As the Republic of Congo has not yet have a nuclear medicine unit or a nuclear power plant (NPP), this report only applies to NORMs and sealed radioactive sources removed from service without being returned to the supplier.

In detail, we meet :

- sludge or paraffins extracted from cleaned capacities;
- scales extracted from equipment such as filters, drill tubes, pipes (generally mass activities are higher);
- personal protective equipment (PPE), tarpaulins, polyanes, etc. used and potentially contaminated during the work (generally mass activities are very low, contamination being only occasional).
- Industrial radiography projectors with depleted uranium containing Ir-192
- Polyphase meters with Cs-137

## SECTION D: INVENTORIES AND LISTS

### D.1. Radioactive waste

The oil industry generates, each year, significant quantities of materials with enhanced natural radioactivity, called NORMs.

Two NORMs storage facilities exist in the vicinity of Pointe-Noire, the economic capital of Congo and the city where oil exploration and exploitation activities are concentrated.

**In the first storage site**, the current stock is **1150 boxes**. The dose rate in contact with these boxes vary from **0.05 to 1.11  $\mu\text{Sv/h}$** .

**In the second storage site**, the current stock is:

- **501 boxes**, including 259 boxes with radiological activities that do not really raise radiation protection issues, pending the establishment of a regulatory framework for a possible exit from regulatory control. The boxes with the high activities generate in almost contact, maximal dose rate of **2,91  $\mu\text{Sv/h}$** ;
- All the **122 tubings** contaminated generate a dose rate of around **1.019  $\mu\text{Sv/h}$**  in almost contact;
- 28 smoke detectors with ionization chamber each containing an americium source 241.

### D.2. Sealed radioactive sources removed from service

8 radioactive sources removed from service, with no prospect of reuse, pending to return to the supplier, are listed in the table below:

N°	Equipment/serial number	Radionuclide/activity/serial number	Shielding	Authorization's holders
01	TECOPS/1703	Ir-192/0,00 Ci/AK984	16,80 Kg of depleted uranium	Ex-CETE APAVE Congo
02	TECOPS/3172	Ir-192/0,00 Ci/AK983	16,80 Kg of depleted uranium	
03	SU100/S841496	Ir-192/0,00 Ci/9026HW	9,50 Kg of depleted uranium	

N°	Equipment/serial number	Radionuclide/activity/serial number	Shielding	Authorization's holders
04	TECOPS/790	Ir-192/0,00 Ci/Q109	16,80 Kg of depleted uranium	Marlier Congo
05	TECOPS/644	Ir-192/0,00 Ci/MM725	16,80 Kg of depleted uranium	
06	Polyphase meters	Cs-137	Lead shielding	ENI Congo
07		Cs-137		
08		Ba-133		

## SECTION E: LEGISLATIVE AND REGULATORY FRAMEWORK

Actually the Republic of Congo doesn't have an official radioactive and spent fuel policy and strategy. The Republic of Congo is on the process of adoption and promulgation of its national nuclear law, which contains all the elements relevant to the international obligations on radioactive waste management. In parallel, nuclear and radiation as well as radioactive waste regulations are being drafted and prepared. So, very soon the law will be promulgated. This law best describe the national policy and strategy relevant to radioactive waste management.

As indicated in the introduction to this report, the legislative and regulatory framework mainly of two laws and circular notes which were taken by the Ministry in charge of mines to resolve certain problems:

- 00000035/MMG/CAB of January 22, 2019 prohibiting the importation of smoke detectors with ionization chambers into the Republic of Congo, for the benefit of optical and thermal detectors;
- 00000035/MMG/CAB of January 22, 2019 requiring the declaration of any radioactive source that entered the Republic of Congo before the promulgation of Law No. 6-2014 of February 24, 2014 relating to radioactive sources;
- 00000258/MMG/CAB of September 2, 2020 setting the periodicity for carrying out the national inventory at 3 years.

A new legislative and regulatory framework is being put in place with the adoption, on August 9, 2024, in the SENAT of two bills as reported in section A.

In addition here is the list of legal international instruments that The Republic of Congo ratified in relation to radioactive waste management:

1. Convention on the Physical Protection of Nuclear Material (CPPNM) and its amendment (A/CPPNM);
2. Convention on Early Notification of a Nuclear Accident;
3. Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management;
4. Convention on nuclear safety;
5. Code of conduct on the safety and security of radioactive sources;
6. Bamako Convention;
7. Basel Convention.

## **SECTION F: OTHER GENERAL SAFETY PROVISIONS**

Obligation for any natural or legal person to have authorization before undertaking any activity exposing to ionizing radiation. Companies holding authorizations must have a Competent Person in Radiation Protection (CPR) who is the interface of the Authority. The CPR is responsible for the implementation the authorization holder's safety policy and the implementation of regulatory requirements.

## **SECTION G: SAFETY OF SPENT FUEL MANAGEMENT**

This section is not applicable to the Republic of Congo, because there is no nuclear power plants and research reactors.

## **SECTION H: SAFETY OF RADIOACTIVE WASTE MANAGEMENT**

The radioactive waste is first conditioned in the cubitainers and finally in the boxes for temporary storage. Two months ago, during an inspection mission, a prototype box was presented to inspectors from the service in charge of ionizing radiation sources. The boxes are being produced so that temporary storage with the second operator can also be done in boxes, pending the establishment of a national permanent storage policy, due to the long half-life of some radionuclides around 1500 years old.

The boxes have external dimensions of 100 cm x 100 cm x 100 cm. The nature of the walls from the inside to the outside is: 10 mm of black steel; 100 mm of common concrete dosed at

350 kg/m<sup>3</sup>; and 10 mm of black steel, paint. These boxes are generally completely filled to their full capacity during cleaning operations generating NORMs waste.

The activity concentrations above the decision threshold, in accordance with NF ISO 11929 standard, are essentially those of radionuclides with maximum mass activity in Bq/Kg: Pa-234m (90), Ra-226 (4100), Pb-214 (4100), Bi-214 (4000), Pb-210 (230), Th-234 (66), Ac-228 (1600), Pb-212 (1900), Ti-208 (660), K-40 (290). These maximum mass activity values are obtained in a few rare cases from analyzes of the NORMs of the containers. Their concentrations vary from one deposit to another and/or according to the stage of production.

Boxes and cubitainers typically contain one of the following three types of waste:

- sludge or paraffin extracted from cleaned capacities (usually mass activities are low);
- scales extracted from equipment such as filters, drill tubes, pipes, etc. (usually mass activities are higher);
- PPE, tarpaulins, polyanes, etc. used and potentially contaminated during the work (usually mass activities are very low, the contamination being only occasional).

**Waste collection:** the boxes or cubitainers are either filled during on-shore or off-shore construction sites then transported to the industrial bases, or filled in Djéno or other crude pre-treatment sites, by the various subcontractors carrying out the cleaning or decontamination work. From these sites, the boxes or cubitainers are transported to the two storage sites.

**Waste management:** departing from the collection sites, the boxes or cubitainers are checked for the absence of external contamination (by smear then measured with a contamination meter), their radiation at 1m and by touch is recorded with a survey meter. Radiation in the driver's seat and 1 m around the truck are monitored to ensure compliance with regulatory limits for transport.

On arrival at the storage sites, the boxes or cubitainers are checked and measured again, then temporarily stored in the warehouse. Once the storage strategy has been determined based on the existing stock and the radiation levels of each container, storage is carried out respecting the general principle consisting of placing the boxes with the highest radiation at the heart of the storage and those with the lowest radiation at the heart of the storage. periphery so that they act as a screen. At the end, the inventory with the location of each box is updated. Contracts with dosimetric monitoring organizations, radiological exposures of people working under ionizing radiation, incident reports, inventories, etc. are the subject of inspection missions.

During these inspections, inspectors re-evaluate the various risks in storage facilities, access procedures to the storage, emergency plans, overall management, etc. and prescribe corrective measures, in order to maintain an approach of continuous improvement from the point of view of safety and security culture in these facilities.

## SECTION I: TRANSBOUNDARY MOVEMENTS

Generally, only one type of transboundary movement is practiced in Congo, that of the re-export of radioactive sources when they become disused. These sources generally return to their country of origin (supplier).

Exceptionally, it happens that equipment containing at least one radioactive source leaves the country for maintenance reasons, before returning to Congo.



Before each movement, safety arrangements are taken and the source is removed from storage facilities for transport out the country. There are not transboundary movements under regulatory control for other radioactive waste. Regarding NORMS waste from oil and gas industry, there are facilities where they storage; for other operator they are storage on site.

## **SECTION J: SEALED SOURCES REMOVED FROM SERVICE**

There are an accountability of disused sealed source, we are:

- Five (5) projectors (gammagraphs) containing completely iridium 192 disused and depleted uranium.
- Five (5) gammagraphs containing iridium 192 are stored in a bunker
- Three (3) polyphase meters including two (2) associated with Cs-137 and another one with Ba-133. These sources are in pending of dissociation and conditioning to return to the supplier.

## **SECTION K: PLANNED ACTIVITIES TO IMPROVE SAFETY**

### **K-1 Adoption and implementation of a policy and strategy for radioactive waste and spent fuel management**

Despite the fact that the policies related respectively radioactive waste management and nuclear safety are not yet officially adopted, many activities within their framework were established.

Many good practices have always been done, but it is important that these are formalized in regulatory texts. Three draft decrees will soon be submitted for examination and approval. These decrees will relate to the establishment of the Regulatory Authority, the regulation of activities exposing to ionizing radiation and the statutes of the Regulatory Authority.

The Disused Sealed Radioactive Source (DSRS) is the AFRA project which the Republique of Congo is part. Under this project the management of radioactive waste is taken into account.

### **K-2 Preparation of the IRRS mission**

The temporary storage of radiation in the cubitainers is a real problem because of the sealing can constantly be broken. It was recommended that the second holder of authorization for the storage of radioactive waste stop with temporary storage in cubitainers. However, The Republic of Congo planned to request a IRRS mission during 2025.

## SECTION L: APPENDICES

### Appendix 1: Images of the prototype and the manufacturing of the concrete boxes





**Appendix 2: Image showing some cubitainers loaded with NORMS**



**Appendix 3: Images of temporary storage in the boxes at one of the authorization holders in this area**

