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SAFETY IMPROVEMENT OF THE RADIOACTIVE WASTE STORAGE FACILITY IN ALBANIA

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Abstract

The Albanian National Radioactive Waste Storage Facility (RWSF) constructed in 1999 consists of an interim waste storage facility for very low level waste (VLLW), low level waste (LLW), intermediate level waste (ILW) and disused sealed radioactive sources (DSRS) coming from research institutions, agriculture and industrial activities and from applications in nuclear medicine in Albania.

The safety assessment of this facility is performed considering its impact to workers, public and environment. In 2018 Albania started a new National project Alb 9010 titled “Upgrading the Radioactive Waste Storage Building According to International Standards”. The two fundamental objectives are to ensure the protection of the public, workers and the environment and to ensure retrievability of waste packages for final disposal [1],[2].

The project focuses on ensuring the safety of the treatment, conditioning and storage of radioactive waste and DSRS. Under this project has been done the improvement of the safety of the RWSF and upgrading of the existing building infrastructure [8]. In the end of the project the objective is to improve the safety of the personnel in the RWSF, protection of public and environment [6], Upgrade the Equipment's used in the RW Management Activities, Upgrade the existing Infrastructure of the RWSF Building and also ensure retrievability of waste packages for final disposal.

1. Introduction

The National Radioactive Waste Storage Facility (**NRWSF**) receives LLW/ILW of non-nuclear power plant origin (health care, industry, agriculture, education, research). The old facility has been operating since 1971 with a capacity of 60 m^3, reinforced by concrete / bricks vaults accommodating solid spent sources into drums. The process of decommissioning of this facility in IANP began as result of its surrounding from the private houses at a 10-meter distance. For that reason the staff of IANP had transferred all plastic bags, lead containers and 200-liter drums conditioned with ^{226}Ra, ^{137}Cs, ^{60}Co into the new Radioactive Waste Management Storage Facility [7].

The facility represents a solid concrete construction with outside walls of a thickness between 20 and 40 cm. All main entrances to the facility are protected with double security locks. There exists an alarm system, which is monitored by cameras at the main entrance by policeman. Behind the fences of the IANP begins a residential area. The closest buildings are at a distance of 60-80 m. The fence separating these building from the site has a height of 2 m. The waste management facility has been designed for VII^{th} degree of seismicity MSK-64; therefore no detrimental impacts from earthquakes are to be expected. There are no faults close to the site and geo-technical conditions are appropriate. In the site vicinity has no major industries with risk of explosion. There is a sufficient distance from railway lines and the airport (over 10 and 20 km, respectively). Exposures from incidents and accidents will be addressed in the emergency response planning, ensuring that adequate responses are taken. The dimensions of this building are 16 x17 x 3.20 m.

The facility is designed based in the IAEA documents and consultancy [5]. There are two principal areas inside facility, Operational area and Temporary Interim Storage area. The centralized storage facility for waste management was designed, constructed and supported financially by Albanian government and equipped by IAEA Project. The license issued from RPC is renovated every five years.

2. Assessment of the present situation of the NRWSF

During the first phase of the National project Alb9010, IAEA experts evaluated the situation of NRWSF infrastructure and inventory of stored radioactive waste. Comparing the situation of the NRWSF building which was well described in the first IAEA End-of-mission report in March 2017 at the beginning of the project with the current situation, the last IAEA expert’s mission was positively surprised and fully agreed that during the last two years IANP made significant improvements. Refurbishment activities were carried out from March 2017 until April 2019 and are listed below.

The exterior refurbishment activities:

- Front door and stairs renovation (Figure 1&2),
- Renovation of facade,
- Roof reconstruction works (leaking of the roof was fixed),
- Regulation of meteoric drainage,
- Renovation of electrical installations.

Also, many improvements were implemented inside the NRWSF building:

- The floorplan was changed (some walls were moved, and certain doors were reallocated).
- Renovation of rooms and offices for personnel,
- Renovation of shower and toilet,
- Renovation of electrical installations,
- Renovation of lighting,
- The server was relocated to another building at the IANP premises.

Fig.1 Front door and stairs before refurbishment

Fig.2 Front Door and stairs after refurbishment

In addition to the refurbishment works, during the last two years the IANP has prepared 15 working procedures. Preparation of those working procedures represented an important milestone in achieving consistent results with the potential to assure an appropriate process control of all activities performed by IANP [4].

Significant progress has been made in the establishment of the Radiation Protection Program [1],[2]. According to this program, the radiological monitoring in the scope of contamination and dose rate control is in operation since July 2018. Regular controls and inspections looking for potential contamination of floor surfaces in the operational and storage area of the NRFWM facility have been carried out every month. The results of monthly measurements of smear tests which were taken on 22 measuring points did not show any presence of removable contamination in the facility. Surface contamination controls and inspections have been also performed on the drums containing conditioned radioactive waste and the results are similar to those previously described proving that the removable contamination is not present in the facility. Also, it was noticed that the air contamination inside the facility is regularly monitored (10 measuring points). The dose rate measurements have been performed inside and outside of the facility.

4. Current Status of conditioned Rad waste

Until 2015 IANP has converted the radioactive waste into a stable product by cementation method. The radioactive waste and DSRS were cemented into 200 litre drums. The result of using this conditioning method is 28 cemented packages. Additional 4 packages (drums) contain unconditioned slug. Using low-quality drums for packing and unfavorable conditions in the storage area have resulted in strong corrosion of packages.

The IAEA experts reviewed the situation in April 2019 and propose the following solution:

- It is necessary to overpack 28 corroded cemented drums
- It is necessary to repack 4 drums that contain slag (those drums are not cemented).

Under the new National project Alb 9010 titled “Upgrading the Radioactive Waste Storage Building According to International Standards”, within this year it was planned that in the period 06-17 June 2022 to be performed the Repacking and Overpacking of 15 drums containing cemented mixed solid radioactive waste and with slag from iron blast furnace

All activities that will take place in the NRWSF will be carried out in accordance with the License issued by the national regulatory body. IANP is required to obtain a license before starting work in the NRWSF. All records for waste packages must be clear, legible, permanent, and maintained up to date through all its handling and treatment stages and temporary storage. Each individual package will be able to be identified and tracked. For each characterization effort performed by the trained staff, records will be always created and kept up to date, so that they are readily available for review of inspection.

After the characterization, the database will be completed, and data will be transferred to the IANP database to check the criteria for storage.

5. Prospects of RadWaste Treatment in Albania

Management and treatment of radioactive waste is not a static process. Review of programs that deal with the problems for radioactive waste storage facilities is a permanent task of the staff working in this field. Rhythms of activities with radioactive sources in a near future in our country will be added, and, our study for them provides filling and closing of the works in the premises of temporary storage in IANP planned for the year 2030. For this reason is needed to undertake a study on the location and construction of a disposal facility in our country. This study should be undertaken taking into account the guidelines and recommendations of the IAEA for the design and construction of such buildings or special places for storage of radioactive waste with low and intermediate activity near the soil surface. For the DSRS should be provided for their return to the manufacturer after the end of working hours (consumption). In cases where return is not provided or is not feasible, and in other cases of unknown origin, the treatment of these radioactive waste or DSRS will be performed by IANP. Acceptance of these DSRS will be made on the basis of a draft agreement between IANP and interested companies. The experience of countries such as Turkey, Hungary, Czech Republic, Spain, France, and England, which have consolidated such activities, must be in consideration of specialists working in this field in our country for years to come.

6. References

[1] Law No. 8025, date 9.11.1995 “On Ionizing Radiation Protection” amended No. 9973, July 28-th 2008.

[2] Regulation on “Safe management radioactive waste in Republic of Albania”, Decision No. 08, date 07 January 2010 of Council of Ministers.

[3] INTERNATIONAL ATOMIC ENERGY AGENCY Development of Specifications for Radioactive Waste Packages IAEA-TECDOC-1515, October 2006

[4] INTERNATIONAL ATOMIC ENERGY AGENCY, Safety Standards- Storage of Radioactive Waste, Safety Guide No. WS-G-6.1, VIENNA, 2006

[5] INTERNATIONAL ATOMIC ENERGY AGENCY, Nuclear Energy Series, No-NW-T-1.4 Modular Design of Processing and Storage Facilities for Small Volumes of Low and Intermediate Level Radioactive Waste including Disused Sealed Sources, VIENNA, 2014.

[6] Regulation Nr.313 dated 9.05.2012 "On protection of the public from environmental emissions, the definition of sampling, regions and frequency of measurement

[7] INTERNATIONAL ATOMIC ENERGY AGENCY, IAEA SAFETY STANDARDS SERIES No. WS-R-5 Decommissioning of Facilities using Radioactive Material, Safety Requirements, VIENNA, 2006

[8] Regulation No.877 dated 30.10.2015 for the Physical Security of Radioactive Materials in the Republic of Albania.