

Radioactive Waste Management System in Georgia (Ways for Development)

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Abstract: Georgia is small country situated on the territory of south Caucuses. The country gained difficult heritage for radioactive waste management after ruining of Soviet Union. The country had only one closed “Radon” type disposal and no other facilities to handle with radioactive waste. No administrative system was also established. At the same time Georgia had great problems with s.c. orphan radioactive sources. More than 300 of them were found and recovered. Operation of nuclear research reactor was stopped and decommissioning activity needed to start. All these factors has stipulated establishing and fast developing of radioactive waste management national system including construction of new facilities, upgrade the old one and establish necessary administrative system.

1. Introduction

After gaining the independence Georgia had problems with radioactive waste management system. As a heritage from soviet era the country received only one near surface “Radon” type disposal, which was closed at 1989 being not under the proper control. At the same time nuclear research reactor operation was stopped at 1988. One important factor making impossible to start the reactor decommission was absence of any radioactive waste management facility (simple storage), where radioactive waste can be possible to keep safely. On other hand the country had serious problem with s.c. orphan radioactive sources. More than 300 such sources were found and recovered. The existed situation provoked fast establishment of some elements of radioactive waste management system and their further development.

Generally speaking, it is possible to identify the following main elements for the given system:

1. Legal basement – Laws and regulations defining main requirements for safe handling with radioactive waste;

2. Administrative structure – Governmental institutions (Regulatory body, radioactive waste state operator and others), which conduct state regulation and handling with radioactive waste;
3. Infrastructure for handling with radioactive waste - Facilities (storage facility, disposal and others) and means, using for handling with radioactive waste;
4. Financial system – financial mechanism for handling with radioactive waste

2. Legal Basement

National system for conducting of nuclear and radiation activity and its state control is mainly based on Law “On Nuclear and Radiation Activities”, which was put in force at 1999. The Law was amended several times. The last changes were incorporated at 2015 to conduct reform for national regulatory and radioactive waste management system. The Law establishes general requirements for handling with radioactive waste and together with Law “On Licenses and Permits” defines national system for licensing of radioactive waste management activity as required by international standards [1]. Georgia tries to follow international standards and norms: The country became member of “Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management” at 2009 and already submitted two national reports for review and considering issued recommendations. The more specified requirements are set by Law “On Radioactive Waste”, where responsibilities of regulator and operator is defined. The Law also sets principles for RAW management generally corresponded to the basic principles defined by IAEA [2].

More detailed requirements for radioactive waste management are given by Technical Regulation N189 “On Handling with Radioactive Waste”, which covers all stages for handling with radioactive waste: waste generation, treatment and conditioning, emplacement into storage and disposal facilities and transport. The regulation also covers response on incidents and physical protection system related to waste. It should be emphasized that Georgian national system applies IAEA classification of radioactive waste [3], which is established by Technical Regulation N689. The same regulation defines the rules for establishing of register for radioactive waste.

The country regulation is also set requirements for clearance levels and procedures, as defined by the Agency documents [4]. The site release requirements are also defined. All these requirements are established by Georgian national BSS - Technical Regulation N450.

Special requirements for conducting of Safety Assessment of storage and near surface disposal are also developed.

It should be noted that Georgia has not developed national policy for radioactive waste management as a separate documents. The policy statement are given by Laws “On Nuclear and Radiation Activities” and “On

Radioactive Waste”. The policy recognizes Disused Sealed Radioactive Sources (DSRS) as a special type of radioactive waste, therefore allows import of radioactive waste. Meantime the import of radioactive waste is strongly prohibited. According to the national policy end point for all type of radioactive waste should be disposal. Meantime Georgian legislation contain requirements to issue national strategy for 15 years’ period and its supplementary action plan. Based on the support Swedish Regulatory Body SSM and considering international rules and standards [5] the National Strategy for Radioactive Waste Management for 2017-2031 years together with 2 years action plan is adopted. The strategy sest the following goals for activity:

- a) Allocation of all radioactive waste amendment facilities on the one site;
- b) Development of the infrastructure for radioactive waste management in the country;
- c) Enhancing of radioactive waste processing capability;
- d) Implementation of security requirements for handling with radioactive waste;
- e) Elaboration new safety requirements in accordance of international standards and norms

3. Administrative Structure

The Regulatory Body for nuclear and Radiation activity in Georgia was established according to the requirements of Law “On Nuclear and Radiation Safety”. The regulatory functions were assigned to Ministry of Environment and Natural Resources Protection and Department for Nuclear and Radiating Safety was established within the Ministry for practical application of regulatory activity. The reform was conducted at 2015 - Department for Nuclear and Radiation Safety was transformed to Legal Entity of Public Law Agency of Nuclear and Radiation Safety (ANRS). All regulatory functions were transferred to ANRS. The Ministry only remained functions for elaboration of national policies and strategies. The conducted reform increased effectiveness of regulatory activity, which had good impact on nuclear and radiation activity and handling with radioactive waste particularly. Before the reform operation of Centralized Storage Facility was conducted by scientific-education organization – Institute of Physics, which belongs to Tbilisi State University. No operator for closed “Radon” type disposal (s.c. Saakadze disposal) was defined. As a result of the reform one operator for both facilities – Department for Radioactive Waste Management was defined. Considering limited human and technological resources the Department was established at ANRS, as a temporary action. To provide splitting of functions between ANRS and the Department, special requirements were issued to obliged the Department to be accountable against the Minster of Environment and Natural Resources Protection.

4. Infrastructure

Responding the needs of the country Centralized Storage Facility (CSF) was constructed at the territory of Applied Research Center (former Nuclear Center) of the Institute of Physics and put in operation at 2007. The storage is two floor building with four modules on each floor. CSF is equipped with update security system to fix any motion and not authorized enter (Fig.1).



Fig.1 View of CSF

Before CSF was operated by Institute of Physics, now – by Department for Radioactive Waste Management, which applies the requirement for integrated management system [6] to pay attention to nuclear security not compromise the safety – CSF is under video monitoring conducted from the office of the Department; same time radiation background is monitored in live regime. A number of DSRS are kept at CSF. Among them most notable are six s.c thermogenerator based on $^{90}\text{Sr}/^{90}\text{Y}$ with initial activity 1 295 TBq. There are also conditioned waste (immobilized into concrete matrix) from reactor decommissioning. Other reactor waste is hermetically closed pipes, which are placed into specially arranged building at the Applied Research Center. During the dismantling activity, Institute of Physics (The reactor operator) had not capability to clean the contaminated parts, therefore the decision was issued to keep contaminated tubes hermetically closed conditions. Afterword Georgia received special abrasive cleaning device within IAEA TC project GEO/9/011 and waste treatment is conducted by the Institute.

Georgia had one closed “Radon” type near surface disposal. The disposal was closed at 1989. It contains vault for solid waste and three tanks for liquid waste. The conducted investigation proved that only the first tank contains liquid contaminated by ^{226}Ra (2019.6Bq/l). The handling with liquid waste is considered to conduct at the nearest future within IAEA TC project GEO/9/013. Physical protection of the disposal site was

rearranged by establishing of new fence and enter check point. The site was provided with electricity and water. The addition confinement for the disposal vault cover was just constructed.

At 2015 SA for CSF and disposal was conducted. The results proved the safety condition for both sites.

According to the requirements of the adopted national strategy new activities for investigation of Saakadze site is planned. It is assumed, that Saakadze site can be used as a national repository where centralized storage, waste processing and disposal facilities can be allocated. As a first step for this activity it is proposed investigation of task for transferring of CSF to Saakadze site. The activity is supported by EU and Sweden regulatory authority SSM and considers implementation of the following tasks:

- a. Assessing Radioactive waste (already existing as well as future waste flow) according to the radioactive waste categories and activities and determining the type of treatment needed for assessed radioactive waste;
 - a.a Collection of information
 - a.b Waste characterization
 - a.c Assessment of waste flow
 - a.c. Identifying the final waste form (for safety point of view)
 - a.d Identifying the method for waste processing
- b. Developing of waste framework and defining of end points for different type of waste
 - b.a Analyze the collected information
 - b.b. Define disposal types for different waste
- c. Identifying of general design for radioactive waste storage and processing facilities
- d. Collection of geological, meteorological and seismic information for Saakadze disposal
- e. Identifying the necessity to obtain additional geographical, geological, meteorological and seismic information and conducting required measurements and assessments at Saakadze site;
 - e.a Site measurement
 - e.b Taking the samples
 - e.c Laboratory measurement
- f. Initiating proposal and issuing the government decision to determine Saakadze site as a national repository site;
 - f.a Preparing justified proposition and sending to the government
 - f.b Discussing the proposition and agreement with different ministries and organizations
 - f.c. public hearings
 - f.d Issuing the government decision
- g. Preparation documents for authorization of construction of new storage facility at Saakadze site

g.a. Conducting preliminary Safety Assessment

- Analyze Georgian legislation
- Defining the storage and waste processing facilities design
- Site description (Demography data, transport routes, seismic data, geological data and others)
- Waste characterization and inventory
- Physical protection system
- Normal operation of the storage
- Accidental cases (Deterministic and probabilistic approaches)
- Emergency system

g.b. Conducting environmental impact assessment

- Scoping
- Public involvement

5. Financial System

There are two sources for financial support of radioactive waste management: state budget and private finances. The state budget is used to handle for waste being under the state ownership (orphan sources, illegal materials, legacy waste and others). All licensees are responsible to pay for handling with radioactive waste generated during their activity. The waste should be transferred to Department for Radioactive Waste Management. Considering not big amount of waste stream Georgia applies direct payment method, when waste generator pays to the Department according to established price list.

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