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EC Cooperation To Enhance Regulatory And TSO Capabilities For Regulation and Safety Review of Radioactive Waste Management facilities and activities at Armenian NPP –

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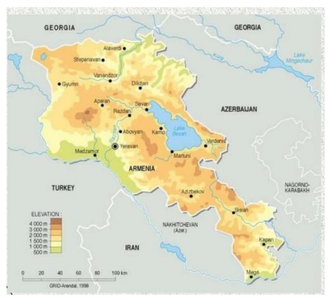
Introduction

The EC INSC Project A3.01/13 has been carried out in the Period 2016-2017 in Armenia to enhance the capacity of the Nuclear Regulator (ANRA), and of its TSO (NRSC), to regulate needed improvements and perform licensing review for RW management activity at the Armenian NPP.

The **overall objective** of the project was to improve radioactive waste management in the Republic of Armenia strengthening the capacity of the national Regulatory Authority and its Technical Support Organisation (ANRA and NRSC, respectively) and enhancing the regulatory framework related to radioactive waste management.



PROJECT TASKS	
TASK 0	Project Management
TASK 1	**Review of the safety documentation for the proposed processing and storage of LILW of ANPP** **Subtask 1.1** – Comparative analysis of technological options for treatment of solid and liquid LILW in VVER-440/230 reactors. **Subtask 1.2** – Review of ANPP proposal with related licensing documentation and develop regulatory requirements.
TASK 2	**Capacity building at ANRA and NRSC** **Subtask 2.1** - Review the existing experience on liquid RW management in WWER 440/230 reactors. **Subtask 2.2** – Training staff of the ANRA and NRSC to perform safety assessments of RW predisposal designs and/or facilities.
TASK 3	**Safety evaluation of the possible use of the LL waste storage facility at the ANPP**
TASK 4	**Safety requirements for radioactive waste disposal**

Project implementation – The project activity has been carried out according to the requirements of the EC contract and Terms of Reference covering the two 2 years duration of the contract. The task activities have been carried out in respect of the initial schedule, defined in the Inception Report with additional actions not envisaged in the initial planning to maximize the effectiveness for the beneficiaries.

The project has been effectively implemented achieving the pre-defined objectives and results. About **25 technical reports** have been issued approved by the beneficiary and the EC.

The importance and the need to improve the RW management activities at ANPP have been discussed giving attention to the technological and safety aspects of potential modifications to be adopted, licensed and implemented.

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EU INSC Cooperation

EC AidCo through **the Instruments for Nuclear Safety Cooperation (INSC**), since the beginning of 1990's is cooperating with Regulators and TSOs of countries outside EU , including Armenia; to strengthen their technical capacity for regulatory and licensing functions in the field of nuclear & radiation safety.

The project has been implemented Consortium led by ITER-Consult and with the support from the local subcontractor NRSC providing technical support

The cooperation between the Contractor's and the Armenian beneficiaries (ANRA and NRSC) has allowed the achievement of above objectives by working together, discussing issues, finalizing review work and providing training sessions.

Consortium members

Project objective and achieved results

Project Objectives

•To strengthen ANRA and NRSC capabilities in review, assessment and associated decision making of safety of long term management of historical solid RW generated at the ANPP.

•To improve the RW management safety in Armenia and contribute to strengthening of the national infrastructure of radioactive waste Management in Armenia.

•To enhance the regulatory basis of radioactive waste disposal.

Specific objective:

The specific objectives of the project are were as follows:

- assess the need to improve the safety of RWM onsite including log term storage;
- Identify, compare and discuss safety issue linked with needed improvements;
- develop and review regulatory requirements for pre-disposal and disposal RWM activities;
- strengthen the ANRA and NRSC capacity in the evaluation of proposed upgrading measures for conditioning and storage of LILW accumulated onsite;
- define regulatory requirements and conditions to be adopted also in view of future disposal;
- transfer knowledge and provide training for regulatory safety review.

Achieved results:

The **results to be achieved** were so defined:

• performed comparative analysis from safety point of view of the various technological options for the treatment of solid and liquid LILW.

• provided support for licensing review and evaluation of the proposal prepared by the ANPP for the treatment, conditioning and storage of the salt cake packages and solid LILW.

•reviewed draft regulatory requirements and conditions for the treatment, conditioning and further disposal of the LILW presently stored at the ANPP.

•trained staff of the ANRA and NRSC to perform safety assessments of RW predisposal facilities and use of analytical tools and procedures for safety assessment including delivery of related codes

•Reviewed feasibility study to convert the existing ANPP solid LLW storage facility into a conditioned LILW storage facility and definition of regulatory requirements to be met for the conversion

•Reviewed existing national legal and regulatory basis for RW disposal and develop draft safety regulations on the safe disposal of RW including requirements for the site selection, design, construction, commissioning, operation and after closure.

Conclusions

All project objectives have been fulfilled by carrying out meetings, exercises, review work, drafting regulatory requirements and training session.

The regulatory capacity of ANRA and the technical capacity of the TSO (NRSC) has been improved cooperating in this project and receiving dedicated training, in particular ''on the job training'' in safety review of RW management activities.

The TSO has got evidence of the major issues linked with licensing technical review for RW management activities and in providing support for the elaboration of related regulatory documents.

Major recommendations given:

•Importance to further proceed on the effort to issue the developed Regulatory Documents (RD) making them available to the ANPP to get their understanding and, if useful, potential comments.

•The responsibility of the licensee to fully demonstrate the implementation of safety requirements (in the needed improvements of RW management activities onsite) with comprehensive and auditable safety analysis shall receive higher attention and be further clarified in order to facilitate the incoming licensing of proposed improvement : for that purpose a clear definition of the expected (detailed) content of the SAR supporting the licensing process should be agreed.

Activity Performed

The good cooperation environment with ANRA and NRSC and the frequent, cooperative and effective technical meetings has favoured the successful implementation of the entire Project.

In particular the following specific achievements can be highlighted:

- The various options for the treatment of solid and liquid LILW have been analyzed and optimal solutions from the safety point of view have been identified and discussed with ANRA.

- The available documentation elaborated by ANPP as proposal for improvement of RWM onsite (treatment, conditioning and storage) has been reviewed and support given to ANRA for the safety evaluation.
- In cooperation with ANRA, supported by NRSC, the regulatory requirements for the management of solid and liquid radioactive waste at ANPP have been developed and agreed.

- The objective to enhance the knowledge and regulatory capabilities of the staff of ANRA and NRSC by providing knowledge transfer and specific training has been fully achieved.

- In particular, the **OJT** gave also the possibility to consolidate the understanding of the responsibilities and role of the Licensee from one side and of the Regulator from the other side during the licensing process of RWM activities (being both the Italian Regulator (ISPRA) and Operator (Sogin) involved in the OJT).

- The existing experience on management of liquid RW management in VVER 440/230 reactors has been fully discussed and transferred accomplishing additional meetings and practical application not foreseen in initial planning (mini-MADA) .

- The possibility to convert the solid low level waste (LLW) storage facility – existing at the ANPP site – into a waste storage facility applicable to store conditioned low and intermediate level (LILW) waste in a safe and controlled manner has been examined and the feasibility study evaluated and commented with specific recommendations. For this purpose a specific set of ''safety requirements for the conversion'' has been elaborated discussed and finalized.

- The review of criteria for the characterization and classification of RW and provided support to ANRA for the elaboration a preliminary document of ''waste acceptance criteria'' has been fully completed.

- The development of specific regulatory requirements on the safe disposal of RW for all aspects of its lifecycle has been performed.

- The Armenian legal framework and related content was reviewed (with respect to international approach, standards and EU practice) and a proposal for structure and content of a Regulatory Document for safety requirements for RW disposal has been elaborated, discussed and agreed.