

## THE PROGRESS IN ARMENIAN NPP DECOMMISSIONING PLANNING

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**Abstract:** The decommissioning issues had not been considered for ANPP at the design stage. The planning activities for ANPP decommissioning started in 2005. This paper describes implemented and on-going activities for ANPP decommissioning, including implementation of the pilot dismantling project on two systems of shut down Unit 1.

### 1. INTRODUCTION

The ANPP consists of two units of the WWER/440/270 model, a modified version of the WWER/440/230 in view of special seismic considerations. Unit 1 started its operation in 1976 and Unit 2 in 1980. Both units were shut down shortly after the 1988 Spitak earthquake. The Unit 2 restarted operation in 1995. Design life-time of Unit 2 expires in 2016. Unit 1 is in a long-term shut down mode. Decision is taken on life extension of Unit 2 operation. The safety of ANPP is regulated by the Armenian Nuclear Regulatory Agency (ANRA).

### 2. DECOMMISSIONING PLANNING

#### 2.1 Decommissioning Strategy and Plan

The strategy for ANPP decommissioning was developed within EU TACIS Project in 2006 and adopted by the Government of Armenia in 2007. The selection process was based on the IAEA recommendations [1,2].

The strategy is called the Sequential Dismantling. In view of the Unit 2 lifetime extension the Strategy document will be revised.

Initial decommissioning plan (IDP) was developed within TACIS On-site Assistance Project by UK Babcock Company (2010).

The main purpose of the IDP was to initiate a 'live' document that will evolve as ANPP moves closer to the end of its operation.

A Gap Analysis report on the IDP had been prepared (ANPP and Babcock experts) and identified a series of activities to address areas, where the IDP does not fully meet the IAEA recommendations [3]. Based on GP report the Action Plan was developed identifying the areas for improvement (i) develop the details of decommissioning strategy implementation; (ii) develop detailed cost estimate; (iii) develop Decommissioning Information System; (iv) develop Waste Management Strategy.

#### 2.2 COST ESTIMATE

The ANPP decommissioning cost was estimated by the Slovak subcontractor (NS and Decom Company). The cost estimate corresponds to the level of the IDP, i.e. budgetary estimate. Cost calculation methodology is based on the International Structure for Decommissioning Costing of Nuclear Installations [4]. Detailed WBS was proposed and related decommissioning schedule. Total cost is 545 M€.

#### 2.3 ON-GOING DECOMMISSIONING ACTIVITIES

Currently within EU Instrument for Nuclear Safety Cooperation Action Programme 2009 the decommissioning related project is implemented. Overall objective of the project is to develop the detailed ANPP decommissioning concept and selected licensing documents (within Part 1) and start pilot implementation of the concept and approach for Unit 1 selected systems (within Part 2).

Specific objectives of Part 1 - (i) develop the concept at a high & intermediate level describing the major processes with their general interrelations –Process Map, and the conceptual ideas/ logic behind these processes –Process Model; (ii) develop licensing documents - SAR and EIA Report;(iii) develop Decommissioning Information Management System; (iv) develop Decommissioning Waste Management Program.

Specific objectives of Part 2 - applying the systematic approach prepare full set of D&D documents for a pilot dismantling project for two selected systems of the ANPP Unit 1 and conducting all necessary operations for the achievement of a complete D&D for these systems. Dismantling activities are in progress.

### 3. CONCLUSION

The baseline planning, including the cost estimation for decommissioning, are important parts of the planning for ANPP decommissioning. The results of this phase are essential for safe implementation, a proper identifying the risks for future decommissioning, scheduling and the allocation of the financial resources.

### REFERENCES

[1] INTERNATIONAL ATOMIC ENERGY AGENCY, Decommissioning of Facilities, IAEA Safety Standards Series, No. GSR, Part 6, IAEA, Vienna (2014).

[2] INTERNATIONAL ATOMIC ENERGY AGENCY, Decommissioning Strategies for Facilities Using Radioactive Material, IAEA Safety Report No.50, IAEA, Vienna 2007.

[3] INTERNATIONAL ATOMIC ENERGY AGENCY, Standard Format and Content for Safety Related Decommissioning Documents, IAEA Safety Report Series, No. 45.

[4] International Structure for Decommissioning Costing (ISDC), OECD/NEA, IAEA, 2012.

## **Country or International Organization**

ARMENIA

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