Description

Objective

The On-site assistance (OSA) programme is implemented by EU companies or consortia with experience of NPP operation in the EU that are contracted by the EC to work on site at a nuclear power plant of the Beneficiary country. The aim of OSA is to provide the Beneficiary nuclear power plant with support to different areas i.e. safety culture, quality assurance, maintenance, management and training, etc. and to upgrade the safety of the plant through the supply of equipment. The OSA team maintains a site presence and assists the plant management/operation in various safety aspects, such as the safety culture, safe operation and maintenance. In addition, the OSA Team assists the EC, End User and suppliers implementing the supply projects that deal with replacement of the old equipment which does not meet safety requirements or installation of the new equipment based on its safety importance.

The aim of the On-Site Assistance programme at Armenia NPP (ANPP) was to combine the experience of the OSA Consultant with the experience and needs of the Nuclear Power Plant (NPP) operator in order to:

• improve the operational safety of the Armenia NPP through the transfer of know-how and operational best practice;
• identify, prepare and implement safety related specific projects which include the tendering and procurement of equipment required to improve the safety of the power plant.

Background

The Armenian Nuclear Power Plant (ANPP) consists of two units of the WWER/440/270 model Soviet type reactor that is a modified version of the WWER/440/230 in view of special seismic design considerations. Unit 1 started its commercial operation in 1976 and Unit 2 in 1980. Both units were shut down shortly after the 1988 Spitak earthquake. Re-commissioning works were performed from 1993 to 1995 and in November 1995 Unit 2 restarted operation, and has been operational since then.

The ANPP design is similar to other WWER/440/230 NPPs and has the same generic safety issues and inherent safety features as other plants of this type. In addition, this plant has specific problems, some of which were resolved during the re-commissioning phase while
others were either resolved since then or are still in the evaluation and upgrading processes.

In the frame of the 1996 TACIS Nuclear safety Programme, the Commission of the European Communities allocated budget so that to assist Armenia NPP in addressing the most urgent design, operational and maintenance issues that were closely linked with the ANPP Unit 2 restarted operation (1995).

In this context, an exploratory mission has been carried out by experts provided by ENEL, RWE Energie, and TRACTABEL. A mission objective was to conduct a plant walk down, meet the Armenian organizations involved in operation and discuss with them the main technical aspects related to safety improvement of ANPP.

A Memorandum of Understanding (MoU) was signed between the EC Team leader, ANPP plant manager and Ministry, Department of Atomic Energy. This MoU lists safety improvement projects that were agreed during and which involve both the safety culture improvement and equipment supply projects. A two year General On-site assistance programme to ANPP Project A1.01/96 was formally established as the first OSA project to Armenia NPP.

This project A1.01/97 is therefore a successor of the previous OSA 96' project. As such, there were number of on-going activities that OSA 97'project just take over, as well as new activities that formally started under the new OSA 97 contract.

**Results**

The OSA 97 project formally started on 15 October 1999. An arrangement for implementation the OSA activities remained the same as in previous OSA 96'contract, and involved two general areas:

- General Operational Assistance activities
- Implementation of specific projects

1) General on-site assistance activities involved implementation of the following projects:

- Continuation of activities on improvement of normal operating procedures. This task resulted in completion of Alarm sheets for most important Main Control Room alarms. Improvement of normal operating procedures also continued

- Revision of the plant Event Oriented Emergency Operating Procedures (EOP); this activity involved review of existing ANPP event oriented emergency oriented procedures. Those procedures were one way oriented (towards success) and did not provide sufficient guidance to the control room operators to deal with multiply failures, and intersystem dependencies during the events. The OSA team prepared a Decision on EOP improvement, an EOP writer's guide, and EOP Technical guides and flow charts.

- Feasibility study for symptom-based EOP; the OSA team performed a study how event
oriented procedures could be supplemented by symptom based EOP.

- Operational safety assistance to ANPP involved a workshop on Leak Before Break (LBB) concept during which ANPP experts learned about LBB technical background. The OSA Consultant proposed the Commission of European Communities to launch a project A1.01/01A Leak Before Break Concept application and related equipment implementation.

2) Continuation on management of the implementation of specific equipment supply projects from the Tacis 96' programme:

- A1.01/96A - Greifswald Main Generator Breakers installation
- A1.01/96 B - Medium Voltage and Low Voltage Circuit Breakers replacement
- A1.01/96 E - I&C Basic Engineering and Equipment Procurement involved a replacement of Steam generator water level measurement
- A1.01/96 F - Leak detection system between primary and secondary loop
- A1.01 96 G1 – Replacement of pressurizer safety valves
- A1.01/96G2 - Replacement of steam generator safety valves
- A1.01/96 H - Primary Circuit Integrity verification
- A1.01/96 I – Seismic hazard analysis
- A1.01/96 J – A confinement leak tightness Improvement
- A1.01/96 K – Operator Training Centre Improvement

A Project Management and co-ordination for implementation of above projects dealt with the following main aspects, such as:

- Project scheduling
- Cost estimating
- Equipment tendering process management and in particular proposal for the procedure to be followed for each procurement;
- Preparation of Technical Specifications for equipment procurement and evaluation criteria;
- Technical, commercial and financial evaluation of the bids.
- Quality Assurance Program and the Quality Procedure for administrative management of
the contract were issued and sent to EC with the Inception Report.

- Licensing activities have been performed in parallel with the relevant specific projects implementation and according to the specific steps of “2+2” licensing approach defined for Armenia.

Above mentioned specific equipment supply projects were agreed in MoU between the European Commission and Armenia Ministry of Energy in October 1996, and constituted a near term safety improvements, i.e. they addressed the most urgent issues identified at ANPP after its restart. As it was shown later, this near term safety improvement programme was too ambitious to be implemented at ANPP within two years. Remaining projects from TACIS 96 that were not fully implemented during OSA 96 programme were transferred to TACIS 97, some of these even to TACIS 2000 OSA contract.

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### General Information

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<th>Status: Closed</th>
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<td><strong>Programme:</strong> TACIS</td>
<td><strong>CRIS number:</strong> 25989</td>
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<td><strong>Amount:</strong> € 995,661,98</td>
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<td><strong>Contractors:</strong> SOGIN (Societa Gestione Impianti Nucleari)</td>
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