FOBOS AND EQUIPMENT QUALIFICATION DATABASE AS A PRACTICAL TOOL FOR A PRESERVATION OF NUCLEAR KNOWLEDGE AT IGNALINA NPP

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PRESENTATION OUTLINE
- Short information about Ignalina NPP
- Database of FOBOS system
- Requirements for EQ
- Assessment methodology
- EQ Status Database
- Conclusion
The Ignalina Nuclear Power Plant (INPP) is located in the NORTH-EASTERN Part of LITHUANIA.

The Ignalina NPP consists of two units, commissioned in December 1983 and August 1987.

The Ignalina NPP contains two RBMK-1500 water-cooled graphite-moderated channel-type power reactors.

Unit 1 was shut down on 31 December 2004.

**REACTOR CONTROL AND PROTECTION SYSTEM**

**Control Rod System**

211 control rods, which categorized as follows:
- 147 manual and automatic control rods,
- 40 short bottom-entry absorber rods,
- 24 fast acting emergency protection rods.
Online refueling capability

- Refueling machine:
- Under normal operation and nominal reactor power, it is feasible to change up to two fuel assemblies per day (24-hours)
- The maximum capacity of this machine is 5 fuel assemblies per day and up to 20 when the reactor is shut down

ELECTRICITY PRODUCTION IN LITHUANIA

80.3%
DATA BASE AS A PRACTICAL TOOL FOR A PRESERVATION KNOWLEDGE AT INPP

- **FOBOS SYSTEM** a set of modules of IFS Applications system, close to concept EAM (Enterprise Asset Management) as IFS Application – it is used for maintenance service

**Purpose:**
- Creation of conditions for improvement of quality of maintenance for the equipment of systems important for safety (RMMS)
- Implementation of Configuration Management System (CMS)

**The parallel decision of the problem:**
- Management of warehouse stocks
- Management of purchases
HISTORY OF IMPLEMENTATION OF SYSTEM “FOBOS”

- INPP Safety Improvement Programmer SIP-1
- The tripartite agreement of governments LR, Sweden, the USA
- Project RMMS/CMS
- Start of the work 1996 год

SCOPE OF SYSTEM FOBOS

- List of INPP equipment
- Work Order
- Daily Task
- Recording Management
- Request on repair
- Documentation Control
- Work Planning
- Registration of parameters
- 2004 – start of module “Equipment Ageing Management”
- 2005 – system integration of the processes Maintenance and Repair (repair certificate, check-list, work permit, request, planning, reporting)
Module DOCUMENTATION

Viewing and search of necessary documents
### Requirements for EQ

The “General Regulations for Qualification of Systems of a Nuclear Facilities”, VD-E-10-2001 have been developed by Lithuanian State Nuclear Power Safety Inspectorate (VATESI) in compliance with «Basic Safety Guidelines for Nuclear Power Plants», «Nuclear Safety Regulations for Reactor Facilities of Nuclear Power Plants» and other applicable standards and regulations of nuclear safety with reference to the documents of the International Atomic Energy Agency (IAEA) and institutions of Nuclear Regulations of USA, France and Russian Federation.
Stages of implementing EQ of Unit 2

The EQ of safety related system equipment of the Unit 2 was implemented for the limited number of electrical equipment, which performs three main functions:

- Reactor shutdown and maintaining it in under sub-critical state;
- Heat decay removal;
- Preventing from release of radioactive products in the environment in the volume exceeding the approved limits.

Stages of implementing EQ of Unit 2

The EQ was done in two stages.

The first stage included the implementation of the pilot project, the purpose of which was to study, to develop methods and program for assessing electrical equipment related to INPP safety systems based on the examples of the assessment of three types of elements.

The second assessment stage included implementing the comprehensive assessment project for the limited number of the Unit-2 electrical equipment related to safety systems, taking into account the outcomes obtained from the first stage assessment (pilot project) and “General Regulations for Qualification of Systems of a Nuclear Facilities”, VD-E-10-2001.
Assessment methodology

In compliance with the IAEA recommendations EQ process comprises three main stages:

- Compilation of design data of safety-related systems;
- Implementing the assessment of the safety-related system by applying the preferred method;
- Confirming the status of the assessed equipment.

Results of EQ for Unit 2

The experts have assessed the following:

- equipment 28 items;
- components 43 type;
- totally components 209;
- rooms with the equipment 6.

The basic data concerning the equipment and its components with the assigned assessment class are brought in the data base.
The following abbreviations and statements are used:

- **Spray wetting** - Equipment in the room can be hit by water spray from pipe ruptures.
- **Flooding** - The room can be flooded to such extent that equipment will be submerged.
- **DBE** - Design Basis Event environment in the applicable room according to INPP SAR.
- **NA** - Not Applicable. The headed parameter is not applicable to the specific component or location.
- **NC** - Not Considered. The headed parameter is not considered significant to the specific apparatus or component.
- **NE** - Not Evaluated. The impact of the headed parameter is not evaluated. This does not imply that the apparatus or component does not meet the requirement. Information may be available but is not evaluated.
- **Qualification Class** - A sorting parameter assigned by the analyst.

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The “Equipment Qualification Status Database” displays six entry points:

- VIEW BY ROOM
- VIEW BY APPARATUS
- VIEW BY COMPONENT/ENVIRONMENT
- VIEW BY COMPONENT
- SEARCH APPARATUS – VIEW BY COMPONENTS/ENVIRONMENT
- VIEW/PRINT QUALIFICATION REPORTS
Environmental parameters are presented for each room. Records from the onsite inspection. All considered equipment in that room is listed. The following information is presented for each Apparatus ID:
- Manufacturer
- Type Designation
- DBE time properties
- DBE function properties
- Qualification Status
DATA BASE FOR EQ

VIEW BY APPARATUS
The Room ID and other relevant information from the on-site inspection are presented.
DATA BASE FOR EQ

- VIEW BY COMPONENT/ENVIRONMENT
  The following information is presented for each type of component:
  - Apparatus ID
  - Description
  - Room No.
  - Normal operating temperature
  - Accumulated Dose at DBE
  - Temperature at DBE
  - DBE time properties
  - DBE function properties

- VIEW BY COMPONENT
  The following information is presented for each type of component:
  - Unit Price indication
  - Description
  - Type of location; inside Containment/Outside Containment/Both
  - Formal Qualification Status
  - All related Apparatus IDs
DATA BASE FOR EQ

SEARCH APPARATUS – VIEW BY COMPONENTS/ENVIRONMENT

Any apparatus ID and component can be selected in a pull-down menu, showing the view "VIEW BY COMPONENT/ENVIRONMENT".
DATA BASE FOR EQ

VIEW/PRINT QUALIFICATION REPORTS

Any “Qualification Class” can be selected, listing on the screen all components in each location in that class. The list can be printed.
<table>
<thead>
<tr>
<th>Qualification Class</th>
<th>Investigation required</th>
</tr>
</thead>
</table>
| MNFR 1 1012001     | TECG 2010             | 18 | 40 | 60 | 78°C, 85% |wash 
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CONCLUSION

- FOBOS database serves as a practical tool for a preservation of knowledge about plant specific equipment (date of installation, maintenance, qualification, modifications and others)
- Equipment qualification database is a practical tool for a preservation of knowledge about status of equipment qualification
- Existing databases allow to generate, capture, manage sharing and utilize the information which are paramount in the construction, operation and maintenance of the INPP.
- The databases allow people do not loss the specific information at any stage of INPP operation, and provide knowledge, which could be important for safe and economical completion of work, and which could be used for analysis of problems and options.
Thank you for your attention