Akkuyu NPP – the world’s first BOO project in the nuclear industry

Technical and Regulatory Issues
Facing Nuclear Power Plant
CORDEL, WNA
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Director for Industrial Safety and Quality Control
AKKUYU NÜKLEER A.Ş.
• General Project Information
• Current Status and Plans for 2016
• Lessons learned
Akkuyu Project Features

- **First Nuclear Power Plant in Turkey**
- **First Rosatom BOO (Build-Own-Operate) Project.** Under the IGA, Rosatom is responsible for engineering, procurement, construction, operation and maintenance of the plant.
- **Legal Basis:** Intergovernmental Agreement, May 12, 2010
- **Project Design:** AES-2006 (VVER-1200)
- **Total Capacity:** 4,800 MW. (4 x 1200 MW)
- **Development Period:** 2011-2026
- **Total Cost ~ $20 bln**
- **Power Purchase Agreement for 15 years, fixed price terms.** Term Sheet is signed.
- **Support of the Russian and Turkish Governments**
- **Maximization of Turkish personnel involvement in construction and operation of the Plant.**
- **Job Creation Potential – up to 10,000 for the construction only**
General: Stages of the Akkuyu Project

Single responsibility of the “Project Company” for all stages of the project and deadlines

1 stage
- Preparation
  - 12/10 Akkuyu NPP JSC registration
  - 03/11 Start site survey
  - 12/14 EIA-positive

2 stage
- Construction
  - 2016 Generation license
  - 2018 1st concrete

3 stage
- O&M
  - 2018 Construction license
  - Commissioning 2023 – 1 unit
  - 2024 – 2 unit
  - 2025 – 3 unit
  - 2026 – 4 unit

4 stage
- Decommissioning
  - 2086

Russian Government Funded up $2,75 billion
General: Project organization structure

**Other Investors**
- Investment to Project

**Rosatom State Corporation**
- Project sponsor
- General responsibility for Project implementation

**Board of Directors (shareholders)**
- PC Management

**AKKUYU NUCLEAR JSC**
- Tailor-made JSC incorporated in Turkey. Performs functions of a customer, licensee, NPP owner and liaison coordinator with public authorities in Turkey
- Operator, Owner of the NPP and electricity produced

**INTERRAO WORLEYPARSONS JSC**
- Licensing consultant
  - Owner’s Engineer*
    - Support during licensing
    - Independent expert review of the Project
    - Construction supervision

**Concern Rosenergoatom JSC**
- Technical customer
  - Preparation of terms of reference for technical documentation
  - Technical support in DSW acceptance
  - Services at all stages of pre-commissioning, commissioning and operation of NPP

**TVEL**
- Fresh fuel supplier
  - Production
  - Transportation

**Atomstroyexport JSC – NIAEP JSC**
- Prime Contractor
  - Design and Survey Works
  - PMC services for purchasing equipment and materials
  - PMC services for construction and installation works

**Atomenergoproject JSC**
- General Designer

**OKB Gidropress**
- General Designer of the reactor plant

**Kurchatov Institute**
- Scientific advisor

**«Rusatom ACS»**
- System integrator

**Chief Designer of APCS**

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* Tender is to be held in 2016
** EPC structure is subject to further discussions
General: Project Cooperation Between Russia and Turkey Covers a Wide Range of NPP Related Construction, Operation and Infrastructure Issues

### Russia’s / PC Responsibilities
- NPP engineering, procurement, design, field supervision
- Construction management/Supervision/Start up and Commissioning
- Design Documentation
- Nuclear Island and other special equipment and materials supply
- Fuel supply
- Ownership of NPP until decommissioning
- Operation, modernization, maintenance and upgrade
- Sale of electricity (51/49)%
- Decommissioning and decontamination
- Financing up to 51%
- Nuclear liability insurance,
- Radioactive waste disposal / treatment

### Joint Responsibilities
- Construction and assembly works
- Commissioning
- Physical Protection
- Emergency Response Planning
- Public Outreach
- Spent Fuel Management (subject to a separate IGA to be concluded)
- Other Investors (Turkey and other) up to 49%

### Turkey’s Responsibilities
- Support for Licensing, expropriation and permits
- Site allocation with existing license and infrastructure
- Turkey’s nuclear infrastructure development, grid connection
- Publish to Nuclear Laws and regulations
### Current Status

- The Project Company has received the NPP construction site with effective site license and renewed licensing conditions.
- Power Generation License application filed in 2011
- The Information Centers were opened in Büyükeceli and Mersin.
- Updated “Basic Site Selection Report” has been prepared and approved by TAEK.
- Site Parameters Report submitted to TAEK on 26.11.2014
- EIA Report Approved on 01.12.2014
- Pre-construction work (groundwork) has started
- NPP Design development is underway and close to completion
- Negotiations with TETAS on Power Purchase Agreement (PPA) are in progress. Term Sheet has been signed on 27.01.2015
- Preliminary License for Generation was obtained 25.06.2015
- Amendments to Law (Olive Trees, Coastal line, Electricity Market) was published on OG #29745 dated 17.06.2016

### Plans for 2016-2017

- Site Parameters Report to be approved by TAEK
- Application to TAEK for the Construction License (complete package – December 2016)
- Obtaining a limited construction permit from TAEK (August 2017)
- Application License for Generation to EMRA (December 2016)
- Completion of the engineering design development (March 2017)
- Approval of power distribution scheme and NPP grid connection to Turkey Grid System. Negotiations with TEİAŞ
- Detailed Design stage to be started
- Design of Offshore Hydraulic Engineering Structure to be completed and Construction of OHES to be started
- Start of manufacture the LLI equipment (reactor, steam generators, pressurizer, turbine, etc…)
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<tr>
<th>CHALLENGES</th>
<th>MITIGATIONS</th>
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<tbody>
<tr>
<td>The comprehensive Nuclear Energy Law and the Law of Civil Liability for Nuclear Damage need to be adopted</td>
<td>Drafted by MENR. The Nuclear Energy Law is new for Turkish Government and Authorities</td>
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<td>New Electricity Market Law</td>
<td>Setting up regulatory base prior to licensing</td>
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<td>Experience of the Turkish Party in regulating and licensing of NPP</td>
<td>Acceptance of the regulatory base of the supplier country in case of lack of host country base operators</td>
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<td>Understanding of local regulations and their implementation (On Improving Productivity of the Olive Trees, Coastal Line Law)</td>
<td>Assistance in development of regulatory basis and regulatory agency expertise Priorities: National Regulation – IAEA Safety requirements – Vendor Country Regulation – Third country nuclear standards</td>
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<td>Understanding of “nuclear” by government agencies and companies</td>
<td>Established effective system of consultations with government bodies and relevant agencies Student’s education, training for officials, regulatory bodies’ personnel</td>
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## Lessons learned - 2

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<tr>
<td>Possibility of changes in regulations</td>
<td>Working groups on the key issues of project implementation.</td>
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<td>Public fear of nuclear</td>
<td>Work with public opinion</td>
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<td>Having the first NPP EIA report in the country; Public Authorities were more demanding than their regulation’s requirements</td>
<td>«Fixed» legislative requirements for the EIA period</td>
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<td>Large number of institutions-members of the EIA Commission (55) - Ministries - Universities - Indivudial Deptartment of Ministries - Regulatory Body</td>
<td>Country’s Ministries (not more than 10) are key members of the EIA Commission</td>
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<td>BOO Model</td>
<td>Needs to be detailed before start to negotiate</td>
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<td>INIR Mission</td>
<td>To provide INIR mission on early stage of Project (Phase 1 and Phase 2)</td>
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Thank you for your attention!

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