Peaceful Uses of Atomic Energy in Vietnam & National Regulatory Framework

Workshop on NNRPs in Bonn, Germany, 7/2011
Utilization of Radiation and Radioisotopes
Utilization of Radiation and Radioisotopes

In Health Care

- Production of radioisotopes in Dalat Nuclear Research Reactor for using in nuclear medicine.
- More than 20 nuclear medicine centers using unsealed radioisotopes for diagnosis and treatment.
- 3 Cyclotrons and 4 PET – CT centers.
- 12 radiotherapy facilities using Co-60 Machines, Gamma Knifes, Linacs for external therapy and sealed sources for Brachytherapy.
- More 2000 X ray machines in radiology.
Utilization of Radiation and Radioisotopes

In Agriculture

- Gamma Irradiators for plant mutation breeding
- Using tracer techniques in management of the soil, water and for researches of optimization of cultivation;
Utilization of Radiation and Radioisotopes

In Industry

- Industrial Irradiation facilities for food preservation and sterilization
- NDT facilities;
- NCS in process control, analysis of materials;
- Well logging
- Utilization of sealed sources in exploration
Nuclear Facilities

**Nuclear research reactor**
- a 500 kW, pool-type research reactor for purposes:
  - Radioisotopes production,
  - Neutron activation analysis,
  - Basic and applied research on nuclear physics,
  - Research on reactor physics and thermo-hydraulics,
  - Training
- Conversion of the reactor from highly enriched uranium to low enriched uranium in 2007 with IAEA, US and Russian support
In the time from 1991-2000, the Ministry of Industry and Trade (MOIT) and Ministry of Science & Technology (MOST) conducted studies on introduction of nuclear power to Vietnam.
Nuclear Power program

- The necessity of NPP, technology, safety, radwaste management, legislation system, site selection, human resource requirements, finance arrangement, public acceptance, international obligations were addressed in the study.

- Based on National Electricity Demand – Supply Balance, a conclusion was drawn from the study and submitted to the Government that Vietnam should develop nuclear power with the first NPP of capacity 2,000 MW in 2019-2020.
Nuclear Power programme

• On March 2002, the Steering Committee for development of the nuclear power programme (NEPIO) was established with responsibilities:

  ❑ Develop national strategy for nuclear power.
  ❑ Prepare a Pre-feasibility study for the first NPP.
Nuclear Power programme

- January 2006, the Strategy for Peaceful Utilization of Atomic Energy up to the year 2020 was approved by the Prime Minister, including 3 main objectives:
  - To enhance applications of radiation and radioisotopes in industry, agriculture, health care, environmental protection …
  - To construct and put the first nuclear power plant into safe operation in 2020.
  - To build up national infrastructure for safe management of radioactive materials and nuclear power plants.
Nuclear Power programme

- July 2007, Master Plan with 23 projects for implementation of the Strategy was approved by the Prime Minister.
- In 2007, the Pre-FS for the 1st NPP in Vietnam was completed.
- Pre-FS was reviewed by the National Review Committee in 2009.
- A project of the first NPP was approved by national assembly in 2009
Nuclear Power programme

1970s 2006 2009 present

Basic Studies for NPP project
Atomic Energy Law
Submission of Pre-FS and relevant studies
Country commitment

Development of legislative system
Human Resource Development Program
National Assembly’s Approval
FS & Bidding
Commercial Operation of the 1st reactor

2020 2022 2025

MILESTONE #1
MILESTONE #2
MILESTONE #3

Nuclear Power programme
Nuclear Power programme

The first nuclear power project

- **Feasibility Study**: 2009-2011
- **Specifications & cost estimate**: 2010-2011
- **Bids & EPC signing**: 2012
- **Construction**: 2013-2019
- **Commercial operation**: 2020
### ASSESSMENT OF VIETNAM INFRASTRUCTURE

<table>
<thead>
<tr>
<th>Content</th>
<th>Assessment to Milestone 1 conditions</th>
<th>Further Attention</th>
</tr>
</thead>
<tbody>
<tr>
<td>National position</td>
<td>Good</td>
<td>Focus on establishing nuclear safety capability and safety culture</td>
</tr>
<tr>
<td>Nuclear safety</td>
<td>Medium/Satisfied</td>
<td>Re-establish, Improve management ability (NEPIO, …)</td>
</tr>
<tr>
<td>Management</td>
<td>Medium</td>
<td>Continue to develop Decree, Circular ...</td>
</tr>
<tr>
<td>Legislative framework</td>
<td>Medium</td>
<td>Clear identification responsibility and improve regulatory framework ability</td>
</tr>
<tr>
<td>Safeguards</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>Regulatory framework</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td><strong>Content</strong></td>
<td><strong>Assessment to Milestone 1 conditions</strong></td>
<td><strong>Further Attention</strong></td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------------------------------------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>Radiation protection</td>
<td>Medium</td>
<td>Development of Standards, Facility and HR</td>
</tr>
<tr>
<td>Emergency planning</td>
<td>Medium</td>
<td>National plan to be approved</td>
</tr>
<tr>
<td>Security and physical protection</td>
<td>Medium</td>
<td>National plan to be approved by the Government</td>
</tr>
<tr>
<td>Environmental protection</td>
<td>Medium</td>
<td>Monitoring system to be established</td>
</tr>
<tr>
<td>Human resources development</td>
<td>Medium</td>
<td>Implementation of HRD plan</td>
</tr>
</tbody>
</table>
Viet Nam understands the importance of international cooperation for building its capacity in nuclear safety and security management;

At present, Viet Nam is Member of IAEA, RCA and FNCA;
International Cooperation

- Viet Nam signed 5 Governmental Agreements for Cooperation on Peaceful Uses of Nuclear Energy with Russia, China, India, Korea, and Argentina;
- Viet Nam has close cooperation with Russia, Japan, France, USA in nuclear safety and security
Nuclear Power programme

- Vietnam Government has made a strong commitment on development of nuclear power with the goal of putting into operation the first NPP in 2020.
- A lot of activities have been made for introduction of the first NPP in 2020. Vietnam reaches Milestone 1 and is ready to phase II
- Less than 11 years are left for Vietnam to prepare national infrastructure required for development of nuclear power, then big efforts and strong commitment from relevant national organizations have to be done.
- Close international cooperation with the IAEA and nuclear industry countries are essential for the success of the program.
Legal infrastructure for nuclear safety and security in Vietnam
Atomic Energy Law

Government Decree

Ordinances issued by MOST

Prime Minister’s Decision

Ordinances issued by other Ministries

Interministrial Ordinances

System of Guides and Technical Standards
Key provisions of the Atomic Energy Law

- Establishment of the national nuclear regulatory authority
- Licensing and permitting regime
- Enforcement, assessment and inspection
- Security and safeguards
- Physical protection and safety
- Control over orphan sources
- Emergency preparedness and response
- Safe transport of radioactive material
- Import and export controls
- Waste management and spent fuel management
- Decommissioning
- Civil liability for nuclear damage
- Criminal and civil offences and penalties
- Insurance
## Review of Vietnam’s Atomic Energy Law

<table>
<thead>
<tr>
<th>Subject matter</th>
<th>Content of the Law</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establishment of nuclear regulatory authority</td>
<td>A number of different government ministries and agencies are to carry out regulatory functions.</td>
</tr>
</tbody>
</table>
| Licensing                                   | The Law sets out a three stage licensing process for nuclear new build:  
|                                             |   - Site approval  
|                                             |   - Construction licence  
|                                             |   - Operating licence  
|                                             | Various government entities are involved in the review and approval process.                                                                      |
| Inspection                                  | High level provision is made for inspections during construction and operation. The Radiation and Nuclear Safety Agency is to report to the National Council for Nuclear Safety. |
## Review of Vietnam’s Atomic Energy Law

<table>
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<tr>
<td>Enforcement</td>
<td>The Law defines a list of prohibited acts. Peoples’ Committees and local police officers are involved in enforcement.</td>
</tr>
<tr>
<td>Nuclear and radiation safety</td>
<td>The Law focuses on radiation safety and nuclear safety.</td>
</tr>
<tr>
<td>Emergency preparedness and response</td>
<td>A potentially very complicated process involving a number of state agencies.</td>
</tr>
<tr>
<td>Radioactive waste and spent fuel management</td>
<td>High level treatment only.</td>
</tr>
</tbody>
</table>
## Review of Vietnam’s Atomic Energy Law

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<tbody>
<tr>
<td>Decommissioning</td>
<td>High level treatment only.</td>
</tr>
<tr>
<td>Third party liability for nuclear damage</td>
<td>The current regime provides that compensation for nuclear damage is determined according to civil law.</td>
</tr>
</tbody>
</table>
Review of Vietnam’s Atomic Energy Law

Key areas for further development:

- Establishment of a national nuclear regulatory body
- Implementation of international obligations
- Drafting the regulatory scheme
- Developing a licensing and permitting regime
- Developing a national waste management strategy
- Decommissioning funding arrangements
Licensing process under Atomic Energy Law

Site Approval
- Prime Minister approval
- MOST controls content of application
- Submitted by EVN?

Contents
- General report on site
- Preliminary design
- EIA
- Preliminary SAR
- Safety assessment report
- Radiation plan
- Report of State Evaluation Council
- Resolution of Provincial-level Peoples’ Council

Construction License
- Prime Minister approval
- Submitted by investors

Contents
- Detailed design
- EIA
- Safety analysis report
- Decommissioning plan
- Waste and spent fuel management plan
- Report of State Evaluation Council

Operation License
- Obtained prior to fuelling
- Valid for 10 years – may be extended

- Evaluated by Radiation and Nuclear Safety Agency
- Industry and Trade Ministry issues license for official operation after reaching agreement with Science and Technology Ministry and National Council for Nuclear Safety

Other Licenses to Perform Radiation Jobs
- Disposal of radioactive waste/spent fuel
- Exploit/explore/process radioactive cores
- Transport radioactive materials
- Import/export radioactive materials and nuclear equipment
Legal documents at Governmental level

Government Decrees:

- Decrees on implementation of some provisions of the Atomic Energy Law
- Decree on implementation of provisions of the Atomic Energy Law in nuclear power plants
- Decree on Enforcement of acts violating the Law, implementing regulations, conditions attached to licences and codes and standards.
Legal documents at Governmental level

Prime Minister’s Decisions:

- Prime Minister’s Decision on Strategy for Peaceful Utilization of Atomic Energy up to the year 2020.
- Prime Minister’s Decision on plan to develop NP up to 2030.
- Prime Minister’s Decision on Establishment of National Council for Nuclear Safety.
- Prime Minister’s Decision on Establishment of National Council for Atomic Energy Development and Application.
- Prime Minister’s Decision on Safeguards.
- Prime Minister’s Decision on establishment of national environmental monitoring network.
**Legal documents at Ministrial level**

**Ordinances:**

- MOST Ordinance on detailed guidance of licensing process
- Ordinances by Ministry of Finance on fees for licensing
- MOST Ordinance on occupational and public exposure control
- MOST Ordinance on security of radioactive sources
- MOST Ordinance on security of nuclear materials and nuclear facilities
- MOST Ordinance on radwaste management
### Status of international nuclear instruments in Vietnam

#### Instruments currently in force

<table>
<thead>
<tr>
<th>Instrument</th>
<th>In force</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treaty on the Non-Proliferation of Nuclear Weapons (the <em>NPT</em>)</td>
<td>Yes</td>
</tr>
<tr>
<td>Safeguards Agreement - Application of Safeguards in Connection with the NPT</td>
<td>1990</td>
</tr>
<tr>
<td>Convention on Early Notification of a Nuclear Accident</td>
<td>1987</td>
</tr>
<tr>
<td>Convention on Assistance in the Case of Nuclear Accident or Radiological Emergency</td>
<td>1987</td>
</tr>
<tr>
<td>Agreement on the Privileges and Immunities of the IAEA</td>
<td>1967</td>
</tr>
<tr>
<td>Revised Supplementary Agreement concerning the Provision of Technical Assistance by the IAEA</td>
<td>1983</td>
</tr>
</tbody>
</table>
## Status of international nuclear instruments in Vietnam

### Instruments that need to be ratified

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Status</th>
<th>Ratification required?</th>
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<tbody>
<tr>
<td>Protocol Additional the Safeguards Agreement</td>
<td>signed</td>
<td>✓</td>
</tr>
<tr>
<td>Convention of the Physical Protection of Nuclear Material and Amendment</td>
<td>Non-Party</td>
<td>✓</td>
</tr>
<tr>
<td>Convention of Nuclear Safety</td>
<td>Non-Party</td>
<td>✓</td>
</tr>
<tr>
<td>Vienna Convention on Civil Liability for Nuclear Damage</td>
<td>Non-Party</td>
<td>✓</td>
</tr>
<tr>
<td>Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage</td>
<td>Non-Party</td>
<td>Recommended</td>
</tr>
<tr>
<td>Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention</td>
<td>Non-Party</td>
<td>Recommended</td>
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<tr>
<td>Convention on Supplementary Compensation for Nuclear Damage</td>
<td>Non-Party</td>
<td>Recommended</td>
</tr>
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</table>
National nuclear regulatory authority
Ministries and entities involved in Vietnam’s Nuclear Power Programme

- **Prime Minister**
  - Control of Vietnam’s nuclear power programme
  - Approves licences for nuclear new build

- **National Council for Atomic Energy Development and Application**
  - Established by the Prime Minister
  - Advise Prime Minister
  - National Council for Nuclear Safety has a licensing function for nuclear new build

- **Ministry of Science and Technology**
  - Responsible to the Government on state management of atomic energy
  - Elaborating on the Master Plan on atomic energy development and application
  - Licensing function for nuclear new build

- **Vietnam Agency for Radiation and Nuclear Safety**
  - State management function for Ministry of Science and Technology
  - Record keeping regarding radioactive sources

- **Industry and Trade Ministry**
  - Licensing function; maintains records; selects locations, construction, managing and operating NPPs
  - Nuclear programme development
  - Uranium exploration and processing
  - Research on science and technology

- **Vietnam Atomic Energy Institute**
  - Health
  - Construction
  - Finance
  - Defense
  - Agriculture & Rural Development
  - Industry and Trade
  - Natural Resources & Environment
  - Foreign Affairs

- **Other Ministries**
  - Health
  - Construction
  - Finance
  - Defense
  - Agriculture & Rural Development
  - Industry and Trade
  - Natural Resources & Environment
  - Foreign Affairs
Regulatory Authority

Ministry of Science & Technology

DOTs

VARANS

Administration Division

Licensing Division

Inspection Division

International Relations Div.

Regulation and standards Div.

Nuclear Safety Division

Safeguards Division

TSO & Emergency response
Vietnam Nuclear Regulatory Portal

- Website of Regulatory Authority: www.varans.vn
- Website with both Vietnamese and English versions.
- It includes information of legal system, inventory of radiation sources, function of RA and other related organization, regulatory activities …
- It is also linked to relevant website http://www.varans.vn
Nuclear Seismic Safety Training Course in Vietnam

On 19 October, 2010 at the Headquarters of the Vietnam Agency for Radiation and Nuclear Safety (VARANS), the VARANS in collaboration with the Japan Nuclear Energy Safety Organization (JNES) organized the Nuclear Seismic Safety Training Course in Vietnam. Dr. Le Chi Dung, Deputy Director General of VARANS came to attend and addressed opening speech of the Training Course.

AGENCY’S ACTIVITIES

Nuclear Seismic Safety Training Course in Vietnam

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For more information, please visit our website: http://www.varans.gov.vn
Vietnam Nuclear Regulatory Portal

- Information of radiation sources, radiation works and nuclear activities is included in RAISVN only in Vietnamese (Based on IAEA E-RAIS)
It is a good opportunity for Vietnamese managers to exchange and gain experience from other countries in nuclear safety and security.

Thank you for your attention!