TECHNICAL MEETING ON "THE RESEARCH REACTOR DECOMMISSIONING DEMONSTRATION PROJECT: CHARACTERIZATION SURVEY" PHILIPPINES, 3 – 7 DECEMBER 2007

PRESENT STATUS OF LEGAL & REGULATORY FRAMEWORK AND DECOMMISSIONING PLANNING FOR DNRR

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- Brief Introduction to DNRR
- Legal and Regulatory Framework in Vietnam concerning Decommissioning of Nuclear Reactors
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DNRR Characteristics (1/4)

Reactor type: Pool type
Nominal thermal power: 500 kW
Maximum thermal neutron flux in the core: 2.1×10^{13} $n.cm^{-2}.s^{-1}$
Coolant and moderator: Light water
Core cooling mechanism: Natural convection
Reflector: Beryllium and Graphite
Fuel type: VVR-M2, U-Al alloy, 36% enrichment and UO_2+Al, 19.75% enrichment
Number of control rods: 7 (2 safety rods, 4 shim rods, 1 regulating rod)
Control rod material: B_4C for safety and shim rods, Stainless steel for automatic regulating rod

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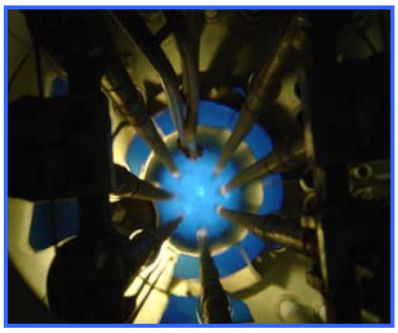
DNRR Characteristics (2/4)



Neutron measuring channels: 6 (3 CFC, 3 CIC)

Vertical irradiation channels: 4 (neutron trap, 1 wet channel, 2 dry channels) and 40 holes at the rotary specimen rack
Horizontal beam-ports: 4 (1 tangential, 3 radial)
Thermal column: 1
Spent fuel storage pool (temporary): inside reactor building, next to the reactor tank

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Operating Cycle and Results (3/4)

The control room of the DNRR

Operating cycle: Continuous operation for 108 hrs at full power and then shut down for 3 weeks to carry out maintenance work (sometimes short-run).

Accumulative thermal energy (burn up): ~600 MWd

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Utilization of the DNRR (4/4)

I-131 Production Line

Radioisotopes and Pharmaceuticals Produced at DNRI

DNRR is currently utilized for the following purposes:

- *Radioisotope Production*
- *Neutron Activation Analysis*
- *Basic and applied research in nuclear physics*
- *Research on reactor physics and thermo-hydraulics*
- *Personnel training and education*

Legal/Regulatory Framework on Decommissioning in Vietnam (1/7)

Is decommissioning covered in the nuclear legislation?

- A draft of National Atomic Energy Law, which includes provisions for decommissioning, was prepared and submitted to Vietnam National Assembly for review in November 2007. This draft law is expected to approve by our National Assembly next year.
- According to the National Atomic Energy Law:
  - *Article 43 states that a safety assessment report for construction of a nuclear facility shall include a proposed plan for operation termination, decommissioning and decontamination.*
  - *Article 45 assigns responsibilities for organizations (MOST, Regulatory Authority, Operating Organizations) in relation to decommissioning and decontamination of a nuclear facility.*

Legal/Regulatory Framework on Decommissioning in Vietnam (2/7)

Has a decision been made on levels for the release of materials, buildings and sites from nuclear regulatory control?

- Criteria for release of materials and sites have not been established yet.
- Criteria for release of materials, buildings and sites will be based on IAEA's standards.

Legal/Regulatory Framework on Decommissioning in Vietnam (3/7)

Is effective independence and empowerment given to the regulator (by law)?

- According to Article 8 of the draft law, Functions, duties and authorities of the **Agency for Radiation and Nuclear Safety** (or **Regulatory Authority**) are as follows:
  1. The regulatory authority's function is to assist the Minister of Science and Technology in State management of radiation and nuclear safety.
  2. The regulatory authority shall have the following duties and authorities:
     - *To develope and submit legal documents on radiation and nuclear safety to relevant authorities for promulgation and to implement those legal documents;*
     - *To register and license radiation and nuclear activities in accordance with this Law;*

Legal/Regulatory Framework on Decommissioning in Vietnam (4/7)

Is effective independence and empowerment given to the regulator (by law)? (con't)

- *To conduct assessment on radiation and nuclear safety in accordance with the law;*
- *To carry out inspection, check and to handle violations against regulations on radiation and nuclear safety as prescribed in the law;*
- *To organise for international safeguards related activities within its competency;*
- *To carrying out international cooperation activities in radiation and nuclear safety;*
- *To take part in emergency response to radiation and nuclear incidents within its competency;*
- *To perform other functions and authorities as prescribed by law.*

Legal/Regulatory Framework on Decommissioning in Vietnam (5/7)

Is effective independence and empowerment given to the regulator (by law)? (con't)

- Besides Regulatory Authority, the **National Nuclear Safety Council**, established by Prime Minister, shall have the following functions and duties:
  - *To provide advice to the Prime Minister on policies and measures to ensure nuclear safety for atomic energy utilisation;*
  - *To review and assess verification reports of the agency for radiation and nuclear safety on the safety of a nuclear power plant to provide advice for issuance of operation licenses; to ensure safe operation of nuclear power plants; to request to stop or shut down operation if safety requirements are not complied;*
  - *To review and evaluate nuclear safety level of other nuclear facilities to advise Prime Minister in decision making when needed.*

Legal/Regulatory Framework on Decommissioning in Vietnam (6/7)

Is funding addressed in the legal/regulatory framework? Are responsibilities clearly assigned?

- The draft of National Atomic Energy Law states:
  - *Once a nuclear facility has been closed down, operating organization shall apply to the Regulatory Authority for approval of the plan for decommissioning, decontamination, radioactive waste and nuclear fuel management, and shall carry out the approved plan.*
  - *The Regulatory Authority shall examine the decommissioning, decontamination, radioactive waste management process and shall issue a license to acknowledge that the nuclear facility is no longer responsible for safety.*

Legal/Regulatory Framework on Decommissioning in Vietnam (7/7)

Is funding addressed in the legal/regulatory framework? Are responsibilities clearly assigned? (con't)

- *The organization possessing the nuclear facility shall bear all the cost associated with decommissioning and management of wastes released from the decommissioning process.*
- *The Ministry of Science and Technology shall issue requirements for safety and environment protection in decommissioning; procedures of application for, assessment of and approval of the decommissioning, decontamination, radioactive waste management and nuclear fuel management plan of nuclear facilities.*

Decommissioning planning for DNRR (1/4)

A decommissioning plan:

- There has not been a decommissioning plan for the DNRR before.
- The decommissioning plan for the DNRR in operation stage, prepared by NRI staff, is expected to start from the beginning of 2008.

Selection of decommissioning option:

- An overall decommissioning strategy has not considered yet.
- Direct or deferred dismantling of the reactor will be selected before preparing the decommissioning plan.

Decommissioning planning for DNRR (2/4)

Radionuclide inventory and characterization:

- Assessment of the radionuclide inventory and characterization has not been carried out yet (except spent fuel assemblies).
- NRI has sufficient capability (software and manpower) for the assessment of the radionuclide inventory.

Cost estimate and funds:

- Cost estimate for decommissioning of the DNRR has not been made.
- Funs may be available from government when needed.

Decommissioning planning for DNRR (3/4)

Radioactive waste management from decommissioning activity:

- An assessments of the type and amounts of waste has not been carried out.
- An interim storage facility is available in NRI (spent fuel storage pool, temporary radioactive waste storage building).
- A permanent storage or disposal facility for the nation is now under consideration by VAEC (national program).

The end point of decommissioning:

- The end point of decommissioning (e.g. free release of the site or industrial use of the site or re-use for nuclear purposes) has not been decided yet.
- This issue will be considered while preparing the decommissioning plan.

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Decommissioning planning for DNRR (4/4)

Needs of waste processing and equipment for the dismantling:

- Needs of waste processing and equipment for the dismantling of the DNRR have not been considered yet.
- This issue will be considered while preparing the decommissioning plan.

International co-operation:

- The co-operation with other countries, hiring contractors and renting equipment for decommissioning the DNRR have still not considered in this time.

Thank you
For your attention!