# PEER REVIEW GROUP 2

R2D2P WORKSHOP
SAFETY ASSESSMENT FOR DECOMMISSIONING
RISØ • 04-08 OCTOBER 2010

Brazil
Indonesia
Iraq
Mexico
Vietnam

# CONTENTS

- Legal and regulatory framework
- Basics of decommissioning / decommissioning planning
- Transition from operation to decommissioning
- Characterization survey
- Cost estimates
- Decommissioning technologies

# LEGAL AND REGULATORY FRAMEWORK

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| Brazil | • The RB is empowered by law (Decree 40110/1956, Law 4118/62, Law 6189/1974, Law 7781/89), now going throughout the independency process (partially independent)<br>• Developing a National standard on Decommissioning (available 2012) based on IAEA documents |
| Indonesia | • Independent RB since 1998 (act no10 /1997)<br>• National standard on Decommissioning is available since 2009 (based on IAEA documents) Chairman Regulation No. 4/2009 |
| Iraq | • Independent RB since 2007 (Law 99/1980, Law 72/2004 )<br>• Two Laws available and will be modified to satisfy the requirements for Decommissioning |
| Mexico | • The RB is empowered by nuclear law (Art. 27, Chapter 6 /1985) no initiatives to create an independent RB<br>• No National standard on Decommissioning (adopt US NRC Regulations on Decommissioning) |
| Vietnam | • The RB was established in 1994, empowered by nuclear law (Art. 8, Chapter 1 /2008)<br>• National standard on Decommissioning is included on the Nuclear Law (art. 40/Decommissioning and Decontamination of Nuclear Facilities, and handling nuclear fuel, nuclear equipment and radioactive waste) |

# BASICS OF DECOMMISSIONING/ DECOMMISSIONING PLANNING

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| Brazil | • Start an CDTN/CNEN project to develop the IPR-R1 Decommissioning Plan in a joint work with CDTN´s Experts<br>• Use the developed plan for IPR-R1 as a model and after extending to all Brazilian Research Reactors<br>• Draft available (DECOMMISSIONING PLAN__TRIGA IPR-R1.doc)<br>• 4 RR are in operation with no prevision to decommissioning, a new one is under design stage which includes decommissioning issues |
| Indonesia | • 3 RR are in operation with no prevision to shutdown (aging of facilities)<br>• 3 Drafts of Decommissioning Plans are available by National Decommissioning Group |
| Iraq | • DP is under development for 3 Nuclear Facilities (1 RR and 2 Nuclear Labs)<br>• Project Management Plans have been used to regulate the decommissioning tasks and activities |
| Mexico | • 1 RR still in operation with no prevision to shutdown in short time<br>• No decommissioning plan is under development (5 years before shutdown a decommissioning plan should be approved by RB) |
| Vietnam | • 1 RR still in operation with no prevision to shutdown<br>• In 2010, the conversion of Dalat RR from HEU to LEU fuel will be implemented<br>• The preliminary DP is being prepared by RR staff (available in 2011). |

# TRANSITION FROM OPERATION TO DECOMMISSIONING

## THERE IS NO TRANSITION TAKING PLACE FOR ALL GROUP 2 COUNTRIES

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| Brazil | • RR operation staff intensely involved on the decommissioning activities.<br>• The cost of safety enclosure will be reevaluated during the transition phase to redefine the decommissioning option: Safety Enclosure (how long and why) or Immediately Dismantling (why and main benefits)<br>• Reassessment of the desired/expected End State<br>• Be sure that when necessary, all necessary arrangements are available for the dismantling phase |
| Indonesia | • Development of decommissioning plan (draft)<br>• Setting up an organization special for running the decommissioning plan;<br>• Identification of decommissioning tasks and equipments/tools required;<br>• Preparing procedures and working instructions;<br>• Developing training programme for workers; etc. |
| Iraq | • No transition – All nuclear facilities were bombed and destroyed |
| Mexico | • No transition plan for the moment . But as result of the workshop we are discussing how to address such topic. |
| Vietnam | • No transition plan needed until 2029 . But as result of the workshop we are discussing how to address such topic. |

# CHARACTERIZATION SURVEY

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| Brazil | Characterization tasks previewed to be accomplished:<br>• Revise the maps of the installation using as built information<br>• Gridding for Sampling and number of samples to be taken<br>• Clearance Values (CNEN-NN-3.01 based on BSS 115)<br>• Definition of scaling factors, radionuclide vectors, "fingerprints"<br>• Classification of the material as non-radioactive or radioactive waste, recyclable, reusable material<br>• Procurement of equipments and instruments (IAEA – SS 91/ table IX) |
| Indonesia | No Characterization Survey performed yet but the characterization plan has been developed not submitted to the RB previewing:<br>• Surface gamma radiation using GM Counter<br>• Surface contamination using smear test<br>• Airborne contamination by air sampling |
| Iraq | Physical Inspection has been completed, to be followed by radiological characterization survey.<br>The characterization plan has been developed, submitted to the RB and approved! |
| Mexico | No Characterization Survey performed yet. But as result of the workshop the Characterization Plan it was established as a regulatory requirement in section 17.1.4 of the SAR. |
| Vietnam | Radionuclide inventory assessment and Activation Modeling in the main structures of Dalat NRR are continuous activities |

# COST ESTIMATES

## THERE IS NO COST ESTIMATES TAKING PLACE FOR ALL GROUP 2 COUNTRIES

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| Brazil | • Cost estimates for NPP has been done and the expertise is available to provide support for the RR decommissioning cost estimation<br>• The cost estimate is part of a Project to develop the IPR-R1 decommissioning plan<br>•Decommissioning funds will be provided by CNEN (government budget)<br>• Evaluation of the estimated costs for each decommissioning options considering the safety requirements and types of waste generation.<br>• Total costs and cost breakdown for individual elements (preparing a detailed time table)<br>• Build inflation into the cost calculations |
| Indonesia | • The cost estimation is part of a Project to develop the decommissioning plan<br>• Based on the plan, the decommissioning activities will be funded from the national budget (annual bases) |
| Iraq | • The cost estimation mechanism is proposed to be applied in the future |
| Mexico | • No initiatives to perform the Cost Estimate. But as result of the workshop some approaches has begun to prepare some cost estimate for the decommissioning plan. |
| Vietnam | • Cost estimate is being prepared (Establishment of the cost estimation methodology and list items; Cost analysis of reference to the TRIGA |

# DECOMMISSIONING TECHNOLOGIES

## ALL GROUP 2 COUNTRIES (EXCEPT IRAQ) ARE CONTINUOUS REVIEWING THE DECOMMISSIONING TECHNOLOGIES FOR FUTURE DECOMMISSIONING OF RR

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| Brazil | • The National Repository is under design (LLW and ILW)<br>• CDTN/CNEN has an Intermediate Storage Facility with the requirements to store the radioactive waste<br>• Project to develop a Latin American Cask for spent fuel storage and transport (wet storage)<br>• Available Facilities for: Crushing, Chemical Treatment, Cementation, Dismantlement of sealed sources, Waste processing from NPPs |
| Indonesia | •The decommissioning plan (draft) does not address the decommissioning technology, but mentions several tools that to be applied:<br>•Shears (for cutting metal and dismantling concrete), Power nibblers (for cutting stainless steel and softer metals), Mechanical saws, Orbital cutter (for cutting an object by circling outer parts of the object), Abrasive Cutting Wheels, etc. |
| Iraq | •Iraq is using diamond cutting technique for dismantling heavy concrete structures |
| Mexico | •continuous reviewing the technologies in this field. |
| Vietnam | •continuous reviewing the technologies in this field. |

# IMPORTANT ISSUES TO BE DISCUSSED

- Not all countries achieved the total regulatory independency – the issue has been properly addressed
- National Standards on Decommissioning are available for Indonesia and under development for BR, MX, VN
- DP drafts are available (Brazil, Indonesia), DP is being prepared (Iraq, Vietnam)
  no DP under development (Mexico)

# IMPORTANT REMARKS !

- There is no Transition taking place for all group 2 countries
  - Some important activities are previewed to be performed during the transition phase in order to improves and guarantee the feasibility of all next decommissioning tasks
- There is no Characterization Survey taking place for all  group 2 countries except Iraq and Vietnam
  - The main characterization issues are well established/previewed

# IMPORTANT REMARKS !

- There is no cost estimates completed for all group 2 countries
  - Budget from the Government
  - Build inflation into the cost calculations, allowing margin for uncertainties
  - AEA TRS-446: Decommissioning of Research Reactors: Evolution, State of The Art, Open Issues
    http://www-pub.iaea.org/MTCD/publications/PDF/TRS446_web.pdf
  - IAEA: Financial Aspects of Decommissioning
    http://www-pub.iaea.org/MTCD/publications/PDF/te_1476_web.pdf
  - NEA: Decommissioning Funding: Ethics, Implementation, Uncertainties
    http://www.nea.fr/html/rwm/reports/2006/nea5996-decommissioning.pdf
  - NEA: Decommiss. Nuclear Power Plants: Policies, Strategies and Costs
    http://213.253.134.43/oecd/pdfs/browseit/6603221E.PDF
  - STANDARDIZED COST ITEMS FOR DECOMMISSIONING PROJECTS

# THANK YOU FOR YOUR ATTENTION