

Practical Exercise

Group B

By

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Technical Meeting
Legal and Regulatory Aspects of Decommissioning

Research Reactor Decommissioning Demonstration Project (R2D2P)
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International Atomic Energy Agency



Background

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Background

- The Philippine Research Reactor (PRR-1) was built about 40 years ago under the U.S.A. Atoms For Peace Program.
- The reactor is an open-pool general-purpose type originally designed to use aluminum plate fuel designed by General Electric.
- The fuel and biological shielding were designed for 3 MWt maximum operating power, but the cooling system that was initially installed limited rated power to 1 MWt. The PRR-1 commenced operation at 1 MWt in 1963.
- PRR-1 was converted during the 1980s to a TRIGA type reactor. The fuel, cooling system, and instrumentation system were replaced beginning in 1984 with new components provided by General Atomics.
- TRIGA conversion was eventually completed and the PRR-1 was successfully restarted and tested to 3 MWt in 1988.

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Background

- Just a few weeks after the PRR-1 was successfully tested as a TRIGA reactor, the reactor pool liner sprung a serious leak
- The difficulty of resolving the reactor safety issue made it apparent that the PNRI had a problem with regulating the facilities it itself runs.
- The PNRI created a committee in 1998 to study the problem and recommend a course of action.
- The possibilities that were considered by the committee included outright decommissioning of the PRR-1 or moving the reactor to a site outside of the city.
- In 1999, all the 50 spent fuel elements were shipped back to the U.S.A.- the only irradiated fuel elements that remained were those from the TRIGA core, and they had been irradiated for only for a few hours during testing

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Regulatory Issues

Regulatory Framework

- **Regulatory infrastructure needed**
 1. **Clear responsibilities between regulatory bodies → law**
 2. **Independence of the regulatory body (creation of a single regulatory body responsible for the decommissioning) → law**
 3. **Financial resources for regulatory body → legal instrument**
 4. **Structure of regulatory body → legal instrument**
 5. **Authority (authorization, inspection, ceasing, ...) → law**
 6. **Decommissioning scope (Radioactive waste, spent fuel, waste disposal, release material and site from regulatory control) → regulation for decommissioning**
 7. **Human Resources → hire and train people**

Regulations

- a) Radiation protection standards (criteria, officers)**
- b) Spent fuel management**
- c) Decommissioning (e.g. contents of Decommissioning Plan + Safety Analysis Report + Quality Assurance)**
- d) Radioactive waste management (treatment, condition, classification, transportation, storage & final disposal)**
- e) Environmental Protection**
- f) Emergency Preparedness**

Regulations

- f) Safety of research reactor (from transition to decommissioning)**
- g) Funding mechanisms for decommissioning**
- h) Physical protection + security + safeguards**
- i) Transportation of radioactive material**
- j) Release of material and sites from regulatory control**
- k) Record keeping + archiving**
- l) Licensing procedure**
- m) Non-radiological hazards**

Solutions

Activities before decommissioning

- **Establish legal instruments mentioned above**
- **Official decision for permanent shutdown (documented)**
- **Transport spent fuel**
- **Submit a request for decommissioning**
- **Technical capability and responsibilities (operation history, including accidents, and extended shutdown)**
- **Prove financial capability**
- **Develop decommissioning plan**
- **Prepare procedures (e.g. inspections, reviews) for the decommissioning project (Regulatory body)**

Activities during decommissioning

- **Periodic and incidental inspection, according to procedure**
- **Periodic evaluation report of activities**
- **Review and approve alteration in procedures**
- **Program evaluation**

Activities after decommissioning

- **Final decommissioning report**
- **Final radiological survey**
- **Classification and isotopic composition of each waste type**
- **Summary, incidents during decommissioning**
- **Final safety report**
- **Release site from regulatory control**

Prioritization

- 1. Establish legal instruments**
- 2. Establish independent regulatory body; hire people**
- 3. Develop systematic regulations**
- 4. Review and approve the decommissioning plan; authorize decommissioning**
- 5. Conduct inspections and witness specific activities**
- 6. Terminate license and release site from regulatory control**

Not Considered Factors

- Decommissioning strategies other than those presented by the operator**
- Length of time to review the decommissioning plan**
- How long the archives will be kept**
- Public communication**
- Peer review process**
- International communication of decommissioning**

References

- **IAEA Safety Standards Series**

- Safety Fundamentals (111-F)
- Safety requirements „Decommissioning of Facilities“ draft (DS333)
- Safety Requirements on Decommissioning of Facilities (DS333) in print
- Safety Requirements on Legal and Governmental Infrastructure, GS-R-1
- Decommissioning of Nuclear Power Plants and Research Reactors (WS-R-2.1 of 1999)
- Decommissioning of Medical, Industrial and Research Facilities (WS-G-2.2 of 1999)
- Decommissioning Fuel Cycle Facilities (WS-G-2.4) 2001
- Application of the Concepts of Exclusion, Exemption and Clearance (RS-G.1.7) 2004
- Release of Sites from Regulatory Control upon the Termination of Practices (DS-332)
- Safety Assessment of Decommissioning of Nuclear Facilities DS376 (in preparation)

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References

- **IAEA Safety Reports, Technical Report Series, Tecdoc**

- Standard Format and Content for Safety Related Decommissioning Documents (SR 45)
- Safe Enclosure of Nuclear Facilities during Deferred Dismantling (SS 26) 2003
- A Report on the Worldwide Status of Decommissioning
- Safety Considerations in the Transition from Operations to Decommissioning of Nuclear Facilities (SR 36)
- Safe Enclosure of Nuclear Facilities During Deferred Dismantling (SRS 26)
- The Transition from Operation to Decommissioning of Nuclear Installations (TRS420)
- State-of-the-Art Technology for Decontamination and Dismantling of Nuclear Facilities (TRS395)
- Record Keeping for the Decommissioning of Nuclear Facilities: Guidelines and Experience (TRS411)

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- **IAEA Safety Reports, Technical Report Series, Tecdoc**
- **Organization and Management for Decommissioning of Large Nuclear Facilities (TRS399)**
- **Decommissioning of Small Medical, Industrial and Research Facilities (TRS 414)**
- **Safety Considerations for Research Reactors in Extended Shutdown (TECDOC 1387)**
- **Planning, Organizational and Management Aspects of Decommissioning: Lessons Learned (TECDOC 1394)**
- **Decommissioning Techniques for Research Reactors- Final report of a Coordinated Research Project 1997-2001 (TECDOC 1273)**
- **Methods for the Minimization of Radioactive Waste from Decontamination and Decommissioning of Nuclear facilities (TRS 401)**

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- **The status of the Philippine Research Reactor (PRR-1)**
- **Technical Meeting: „Legal and regulatory aspects of decommissioning of research reactors“ – R2D2P project – Project description**
- **Regulatory control program of PNRI facilities/laboratories**