

IAEA Workshop on the Research Reactor Decommissioning
Demonstration Project (R²D²P): Safety Assessment for Decommissioning,

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MEXICO: NATIONAL REPORT

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Atoms for Peace: The First Half Century
1957–2007

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Nuclear Facilities

- Laguna Verde Nuclear Power Station
- TRIGA Mark III Research Reactor
- Pilot Plant for Manufacturing Nuclear Fuel

Laguna Verde Nuclear Power Station

- 2 Boiling Water Reactors
- General Electric Mark II Containment
- Commercial Operations: Unit 1 (1990) and Unit 2 (1995)
- Thermal Power: 2027 MWt
- Electric Power: 675 MWe
- Actual Power Up-rate project (Increase 20% above original power)



TRIGA Mark III Research Reactor

- TRIGA Mark III (U.S.A.)
- First criticality: November 8, 1968
- Owner: National Institute on Nuclear Research
- Operation licensee: April 10, 2014
- 40 years in operation
- Reactor core: 85 fuel elements and 4 control rods
- 29 new fuel elements y 4 control rods (storage in room)
- 64 spent fuel elements and 3 spent control rods (storage inside the reactor pool)

Reactor Description

- Type Pool and reactor core positional (movable), cooled and reflected by soft water
- The reactor operates at thermal power levels of up to 1 MW (steady operation) and has the capacity to be operated at a power peak of approximately 2,000 MW
- Applications: Activation analysis, production of radioisotopes for medicine, and training of personnel in sciences and nuclear technology



Pilot Plant for Manufacturing Nuclear Fuel

- In Operations from March of 1994 to March of 1999
- On September 2003 issue an application for two licenses to regularize their status:
 - a) License for Suspension of Operations for part of the Pilot Plant for Manufacturing of Nuclear Fuel
 - b) Temporary License for Storage of Nuclear Material in the stores 1 and 2
- Requesting still under evaluation of the CNSNS (Regulatory Body)
- This year a reanalysis for requesting clearance of contaminated areas and disposal of contaminated equipment for use the building for other projects




Legal and regulatory framework

- As the non-power reactor comes from U.S.A., then it was decided to adopt the standards established by US NRC.
- For the decommissioning activities will be applied the following standards:
 - 10 CFR 50.75(f)(4) Reporting and recordkeeping for decommissioning planning
 - 10 CFR 50.82(b)(1) Termination of Licensee for non-power reactors
 - 10 CFR 51.53(b) Post-construction environmental reports
 - American National Standards Institute/American Nuclear Society, ANSI/ANS 15.10 “Decommissioning of Research Reactors”, 1981.
 - U.S Nuclear Regulatory Commission, Regulatory Guide 1.86 “Termination of Operating Licenses for Nuclear Reactors”, 1974.
 - U.S Nuclear Regulatory Commission, NUREG/CR-1756 “Technology, Safety and Costs of Decommissioning Reference Nuclear Research and Test Reactors”, 1983.
 - U.S Nuclear Regulatory Commission, NUREG/CR-2082 “Monitoring for Compliance With Decommissioning Termination Survey Criteria”, 1981.

Legal and regulatory framework (Cont.)

- **Safety Analysis Report, Chapter 17
“Decommissioning”:**
 - Section 17.1.1 “Preliminary Decommissioning Plan”
 - Section 17.1.2 “Submittal of the Decommissioning Plan”
 - Section 17.1.3 “Decommissioning Alternatives”
 - Section 17.1.4 “Release Criteria and Final Survey”
 - Section 17.1.5 “Format and Content of Decommissioning Plan”
 - Section 17.2 “Possession-Only License Amendment”

Legal and regulatory framework (Cont.)

- The compliance with some IAEA documents it is mentioned in the Operations License Conditions such as:
 - Safety Series 74 “Safety in Decommissioning of Research Reactors”, 1986.  IAEA Safety Guide No. WS-G-2.1 “Decommissioning of Nuclear Power Plants and Research Reactors”, 1999.
- Also it is clearly established in the Operations License Conditions that the owner shall comply with any other IAEA recommendations oriented to maintain the both nuclear and radiology safety, such as:
 - IAEA Technical Report Series No. 446 “Decommissioning of Research Reactors: Evolution, State of the Art, Open Issues”, 2006.

Legal and regulatory framework (Cont.)

- Last licensee renewal using the US NRC NUREG-1537 “Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors (Format and Content) [December 2000]
- None improvements in this topics have been done due to a well and solid regulatory framework from U.S.A. and Guidelines from IAEA for decommissioning activities will be used when necessary.

Legal and regulatory framework (Cont.)

- **Regulatory Body Independence:**

In the National Report presented by the United Mexican States to meet the requirements of the Nuclear Safety Convention 2007-2009 Period it is established that:

“It can be concluded that the Commission is not administratively independent of the organisms responsible for promoting nuclear technology. However, since its creation, the Regulatory Body has been conducting all its affairs with complete technical independence.”

Basics of decommissioning / decommissioning planning

- Currently there is not a defined date for decommissioning the TRIGA Mark III Research Reactor
- Regulatory requirements:
 - Each non-power reactor licensee shall at or about 5 years prior to the projected end of operations submit a **preliminary decommissioning plan** containing a cost estimate for decommissioning and an up-to-date assessment of the major factors that could affect planning for decommissioning.

Basics of decommissioning / decommissioning planning (Cont.)

- Factors to be considered in submitting this preliminary plan information include:
 - The decommissioning alternative anticipated to be used, including consideration of the requirements of 10 CFR 50.82(b)(1)
 - Major technical actions necessary to carry out decommissioning safely
 - The current situation with regard to disposal of high-level and low-level radioactive waste
 - Residual radioactivity criteria
 - Other site specific factors which could affect decommissioning planning and cost
 - Plans for adjusting levels of funds assured for decommissioning to demonstrate that a reasonable level of assurance will be provided that funds will be available when needed to cover the cost of decommissioning.

Basics of decommissioning / decommissioning planning (Cont.)

- In this topic there are not any improvements or advance in activities because there are not any intention for suspension of operations of the research reactor.

Transition from operation to decommissioning

- Actually, the research reactor has a project to change the high enrichment uranium core for a low enrichment uranium core
- The core licensing process represents a new licence for at least 20 years from 2014 (year in which the actual license will expire)
- So, there are not sufficient elements to defined a specific date for the transition from operation to decommissioning

Characterization survey

- As mentioned previously the new core modifications for the research reactor will allow the reactor operations for at least 20 years from 2014 (year in which the actual license will expire)
- So, there is not a initiative to start a characterization survey for the moment

Cost estimates

- As mentioned previously the new core modifications for the research reactor will allow the reactor operations for at least 20 years from 2014 (year in which the actual license will expire)
- So, there is not a initiative to start a cost estimation for the moment

Decommissioning technologies

- As mentioned previously the new core modifications for the research reactor will allow the reactor operations for at least 20 years from 2014 (year in which the actual license will expire)
- So, there is not a initiative to look for decommissioning technologies for the moment

Safety issues

- The Pilot Plant for Manufacturing Nuclear Fuel is planning to perform a reanalysis for requesting clearance of contaminated areas and disposal of contaminated equipment for use the building for other projects.



Safety issues (Cont.)

- I would like some direction about what activities should be considered for evaluating such request.
- Also, if it is necessary to request some partial/total decommissioning plan and the topics that should be considered.
- I want to know a general overview of the full process that should be used to solve such issue.

Conclusions

- The TRIGA Mark III research reactor will still be in operations for an undefined time, so no opportunity to use the knowledge acquired in the past workshops is in process.
- The Pilot Plant for Manufacturing Nuclear Fuel is a good opportunity to use and apply the knowledge acquired in the past workshops

Thank you for your attention

