Documentation Experiences for the Jamaican SLOWPOKE-2 Research Reactor Conversion from HEU to LEU

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Introduction

The Jamaican SLOWPOKE-2 (JM-1) is a 20 kW research reactor operating since March 1984, at the University of the West Indies in Kingston, Jamaica. The tank in pool reactor, with its highly enriched uranium (HEU) core, is the only nuclear reactor in the English-speaking Caribbean and has been primarily used for Neutron Activation Analysis in environmental, agricultural, geochemical, health-related studies and mineral exploration.

Figure 1: SLOWPOKE-2 (JM-1) Research Reactor housed at ICENS, Jamaica

Under the Reduced Enrichment for Research and Test Reactors (RERTR) and Global Threat Reduction Initiative (GTRI) programs, the IAEA is supporting the HEU to low enriched uranium (LEU) core conversion for JM-1.

The experiences in documentation for the project are examined, together with the issues and the challenges encountered.

Issues and Challenges

The issues and challenges encountered are summarized as follows:

1. The research reactor facility has operated for the last 30 years without radiation protection legislation or a local regulatory body—only just enacted July 7, 2015.
2. Jamaica previously had no formal plan to manage it's research reactor spent fuel
3. Documentation activities for the conversion involved varying organizations in different countries
4. Formation of the Regulatory Body and training of regulators

Documentation Structure

The HEU to LEU core conversion Quality Management System (QMS) has a document hierarchy that shows that there must first be established, the Quality Policy (philosophy) for the organization, through the Quality Assurance Manual. Following this document, general policies are developed to reflect the overarching goals for every area of operation during the conversion process (Procedure Manual).

Forms and records used to document the results and activities of day-to-day operations provide evidence of the work and represent the proof of compliance with the IAEA and local standards.

Figure 2: Document Hierarchy at JM-1

Documentation Approach

Under the project, documentation exercises were quite comprehensive, covering all activities to be undertaken. The Quality Assurance Manual for the Conversion of JM-1 provided policy guidance for other documentation.

Documents were prepared by entities responsible for undertaking particular aspects of the project. For example, fuel fabrication documentation was undertaken by the laboratory at which the LEU fuel was fabricated.

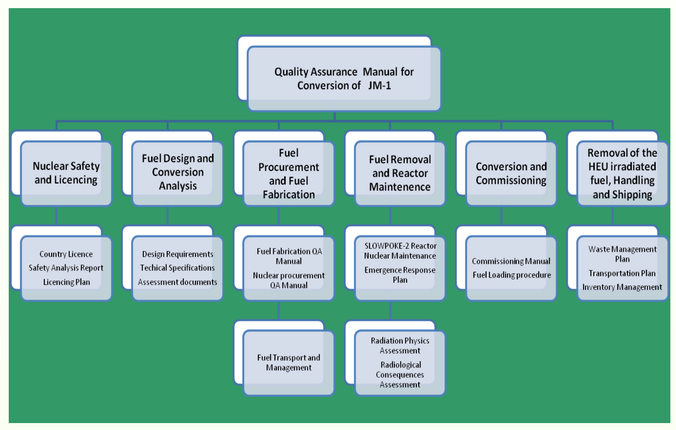

Figure 3: Conversion Activities and Associated Documents

Summary of Documentation Activities

Varying levels of documentation are required for different aspects of the Conversion process. Depending on the nature of the activity, the list of documents covering records, procedures, plans and reports can be quite exhaustive.

Essential to the process is the management of information, subject to frequent regulatory reviews based on local and international standards. A summary of the approximate percent distribution of the required documentation is presented in Figure 4.

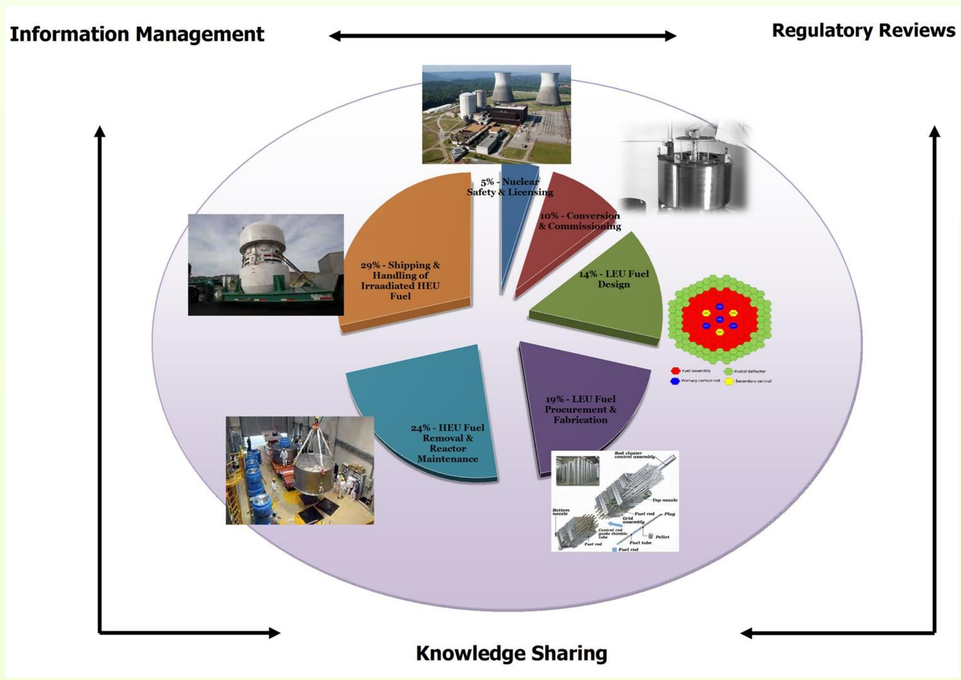

Figure 4: Documentation Summary

Conclusion

The major challenge of the conversion activities came with the absence of any previous regulatory framework in Jamaica. The overall documentation format adhered to IAEA applicable regulatory standards and guidance documents. Proper recording, documenting and archiving information, coupled with document reviews and assessment of plans, equate to an superior experience.

References

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