Regional Workshop on Safety of Research Reactors Decommissioning Activities: Project Planning, Management, Regulatory Review and Safety Assessment

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Philippine Nuclear Research Institute

- A research and development institute, under the Department of Science and Technology, which also exercises nuclear regulatory functions
- Formerly the Philippine Atomic Energy Commission, created through Republic Act 2067, the Science Act of 1958.

PNRI Mandate

- Conduct of research and development on the application of radiation and nuclear materials, processes and techniques in various fields
- Undertake the transfer of research results to end-users including technical extension and training services;
- Operate and maintain nuclear research reactors and other radiation facilities;
- License and regulate activities relative to production, transfer and utilization of nuclear and radioactive substances

PNRI Organization

The Philippine Research Reactor I

- Obtained under the USA Atoms for Peace Program
- Started operation in 1963
- The reactor was a major facility of the PAEC – an important element in the development of nuclear science in the country, especially in its early stages

Policy basis for the decommissioning of PRR-I

- Recommendation of the PRR-I Strategic Plan Committee, constituted in 2001 to study options for the reactor, which had been in extended shut-down since 1988.
- Approval by the DOST Secretary in November 2005 of the PNRI proposal to decommission PRR-I and host the R2D2 project
- Creation of the PRR-I Decommissioning Plan Task Force through a PNRI Special Order in January 22, 2007

Scope of work of the Decommissioning Plan Task Force

1. Perform a hazards characterization survey to determine the nature, location and quantity of radiological and other hazards in the reactor and its immediate vicinity. Output: Hazards Characterization Report
2. Prepare a PRR-I decommissioning plan and have it reviewed and approved through the PNRI Regulatory Control Program. Plan is the basis for obtaining funding and other resources and actual implementation of the decommissioning.

Scope of work of the Decommissioning Plan Task Fotce

3. Implementor of the DOST GIA project: Program for the Development of a Decommissioning Plan for the PRR-I
4. Serve as project counterpart of the IAEA TC project: Preparation of a Decommissioning Plan for the Philippine Research Reactor
5. Serve as PNRI counterpart of the IAEA R2D2 project.

Terms of Reference of the Decommissioning Plan Task Force

1. The HCP and PRR-I decommissioning plan shall comply with the applicable requirements and shall follow the applicable guides of the Code of PNRI Regulations (CPR), the IAEA Safety Standards, and the PNRI RCP for Nuclear and Radiation Facilities.
2. In directly working with radioactive materials, the Decommissioning Plan Task Force shall comply with the applical requirements of the CPR, the IAEA Safety Standards, and the PNRI RCP.

Terms of Reference of the Decommissioning Plan Task Force

3. End-point of the PRR-I decommissioning will be the full release from nuclear regulatory control and unrestricted use of the reactor building including the east and west wings and the immediate grounds. (Planning for the conversion of the building to some other function after release is not included.)
4. All radioactive waste generated by PRR-I decommissioning as well as radioactive materials not considered as waste shall be stored at the PNRI RWMF.

Personnel (Decommissioning Plan Task Force)

- All personnel of the Reactor Operations Group are assigned to the Decommissioning Task Force
- Personnel from the other PNRI Units may be assigned to the PRR-I Decommissioning Plan Task Force
- To preserve effective independence of the PNRI Regulator, no personnel of the NRLSD may be assigned to the task force
- Assigned personnel shall not be required to work exclusively for the PRR-I Decommissioning Task Force but shall give it priority.

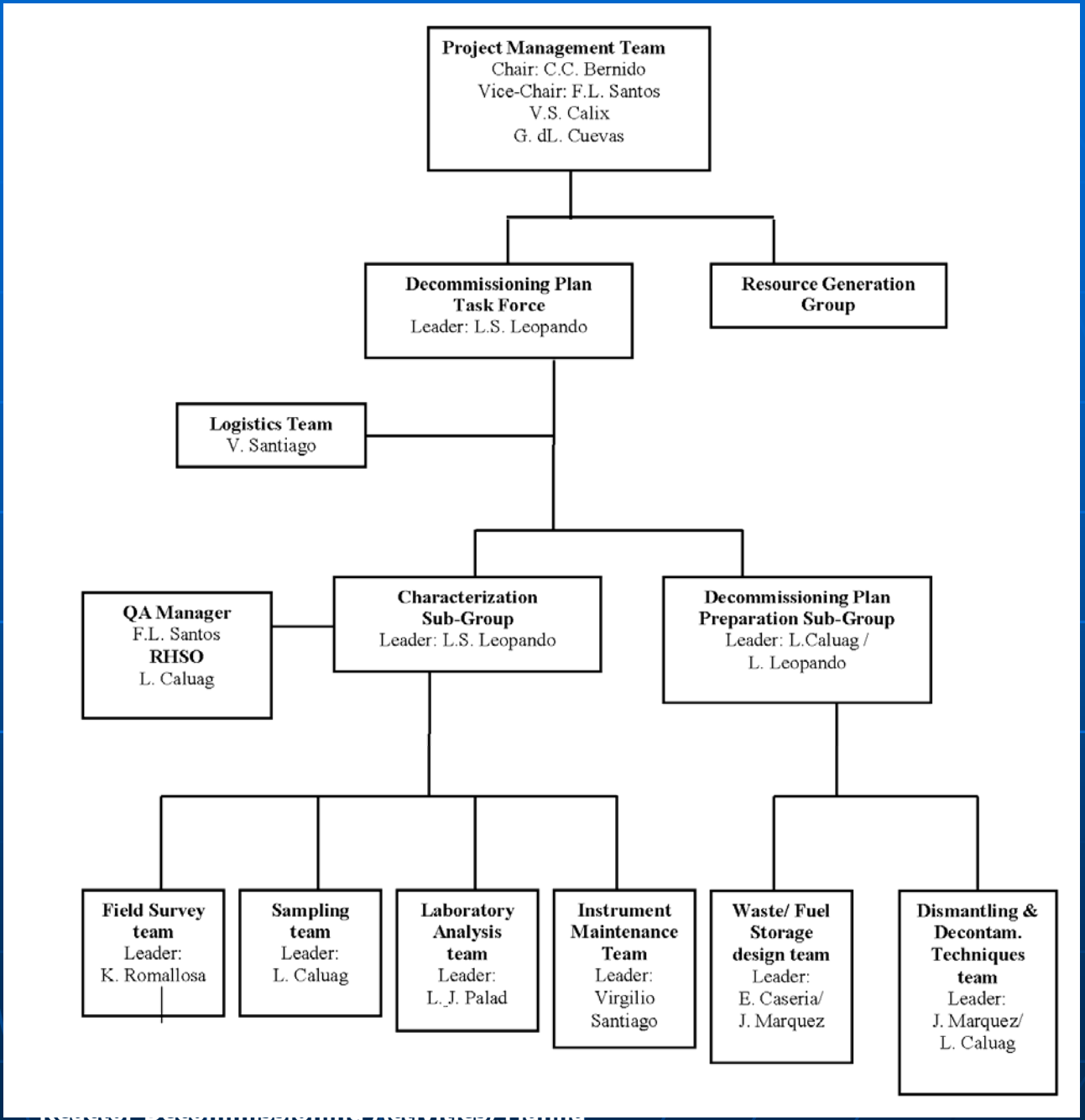
Initial Schedules (as of January 2007)

- Completion of the Hazards Characterization Survey by the First Quarter 2008
- PRR-I Decommissioning Plan to be ready for review and approval through the PNRI RCP no later than the 3rd quarter 2008 subject to the availability of needed resources.

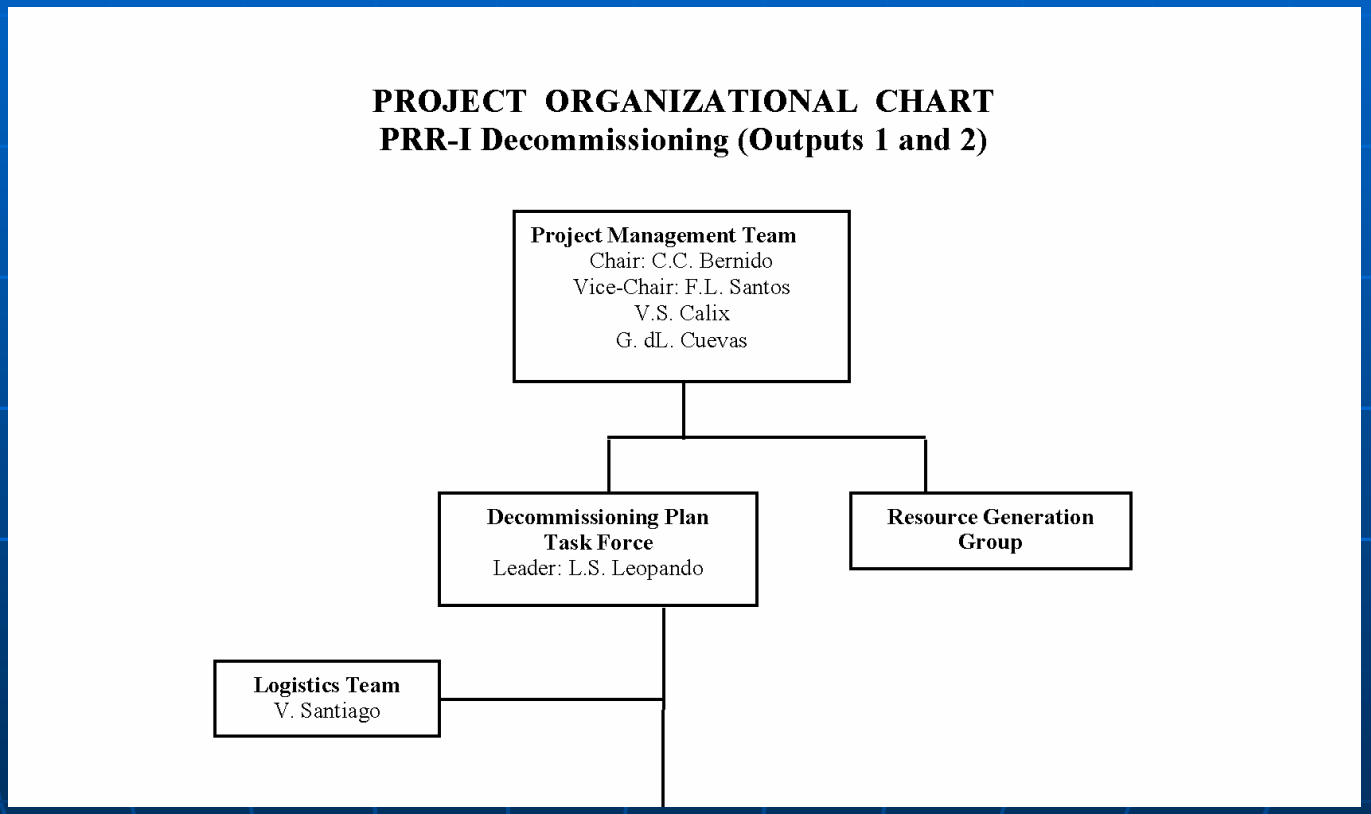
Creation of the Project Management Team (July 5, 2007)

- Composition: Deputy Director, as Chair
- Members: Chiefs of the Atomic Research Division, the Nuclear Services and Training Division and the Finance and Administration Division
- Decommissioning Plan Task Force Leader as resource person; NRLSD Chief not included for effective regulatory independence

Organizational Chart, March 2008



Organizational Chart, March 2008



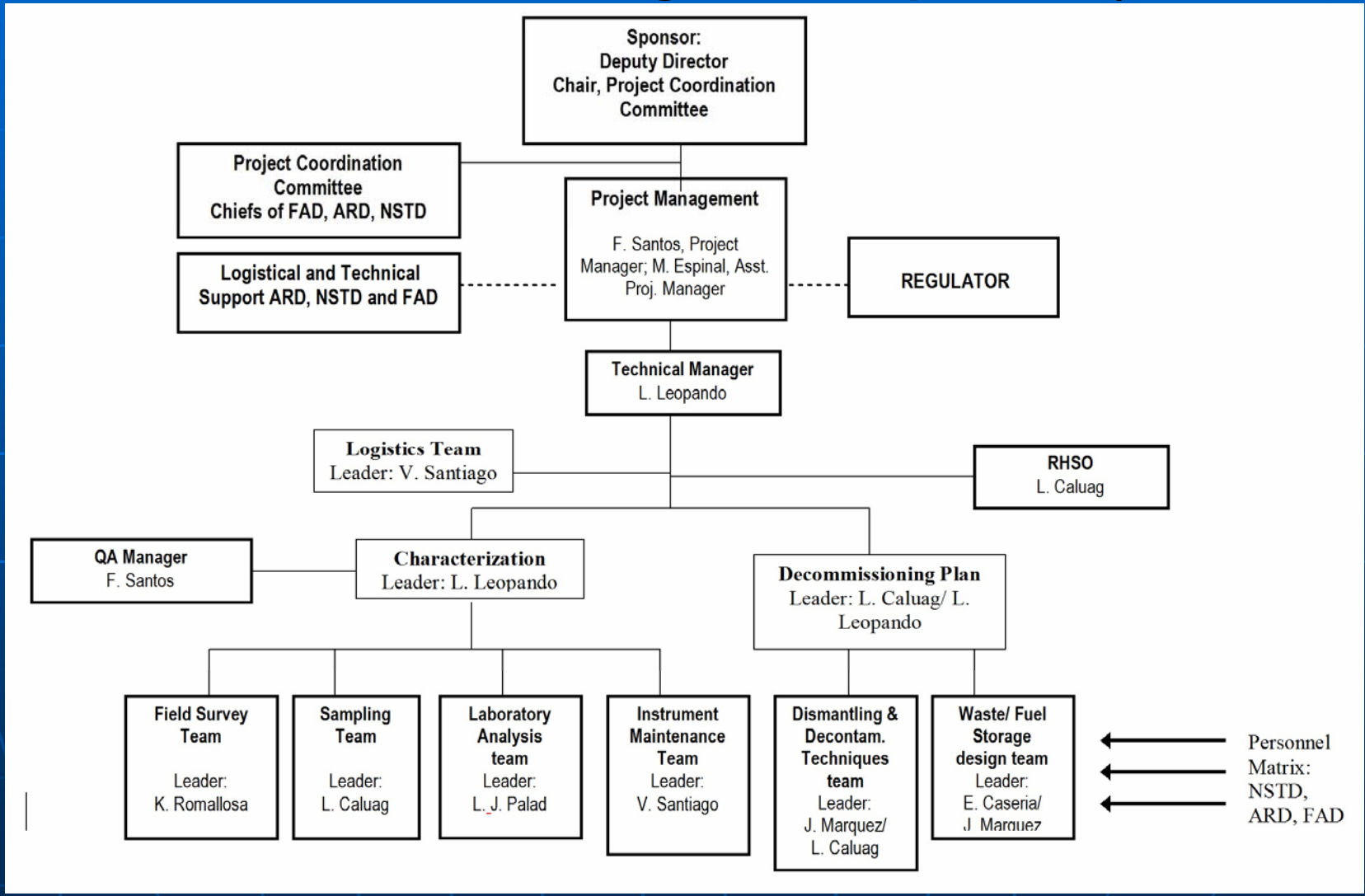
Key Documents generated by the Project Management Team

- Initial organizational chart
- Logical Framework Matrix
- Gantt Chart or project implementation schedule

Adoption of the Project Management Concept, April 2008 after P. McIntyre's Expert Mission

- Designation of Ms. Flora Santos as Project Manager
- Designation of Ms. Mylene Espinal as Assistant Project Manager

Organizational Chart of Decommissioning Project: Outputs 1 and 2 (Characterization Survey and Decommissioning Plan Preparation)



Roles and Functions: Project Coordination Committee

- Provides advice to sponsor and project manager
- Monitors progress
- Considers proposed major changes in the project
- Provides forum for project manager to seek resolution of inter-division issues, e.g. resourcing
- Seeks sources of funding for the Decommissioning Project

Roles and Functions: Project Manager

- Provides logistical support for the delivery of the product, as defined by Project documents such as the Characterization Survey Plan, the decommissioning plan, etc.
- Chairs the weekly Project Management Meetings
- Ensures that necessary services/inputs to the project are provided efficiently to optimize project delivery
- Liaises with the Regulator regarding regulatory requirements
- Liaises with the IAEA and other stakeholders

Roles and Functions: Assistant Project Manager

- Assists the Project Manager in the administrative details of the project
- Records the minutes of the Project Management Meetings
- Performs day to day coordination with Project Leaders and monitoring of project activities to anticipate problems and recommend solutions

Roles and Functions: Technical Manager

- Responsible for the technical planning and implementation of the Decommissioning Project
- Responsible for the day to day planning, implementation and monitoring of the activities of the different teams
- Prepares progress report for submission to the Project Manager

Roles and Functions: Characterization Project Leader

- Prepares and implements the Characterization Survey Plan
- Responsible for the day to day planning, implementation and monitoring of the activities of the different Characterization teams

Roles and Functions: Decommissioning Plan Project Leader

- Responsible for submission of the Decommissioning Plan to the Regulatory Group and Project Coordination Committee

Roles and Functions: Quality Manager

- Ensures realization of the product according to set quality standards as defined by the project documents, e.g. Decommissioning Plan, Characterization Survey Plan.
- Ensures compliance with Management Systems for quality and safety
- Responsible for preventive and corrective actions pertaining to quality and safety

Roles and Functions: Radiation Health and Safety Officer

- Responsible for radiological safety of operations and personnel
- Responsible for radiological emergency preparedness
- Prepares the safety documents for complying with Regulatory requirements

Roles and Functions: Field Survey Team

- Prepares the required procedures.
- Plans and grids the areas for radiation survey
- Conducts systematic radiation survey and monitoring as part of Characterization activities
- Prepares the survey reports defining areas of contamination for submission to the Characterization Project Leader
- Coordinates with the Sampling Team for taking of samples for laboratory analysis

Roles and Functions: Sampling Team

- Prepares the required procedures.
- Takes samples from contaminated areas (swipes, drill cores, etc.) for counting by the Laboratory Analysis Team
- Prepares the samples into forms suitable for counting
- Performs numbering and identification of samples; keeps appropriate forms and records

Laboratory Analysis Team

- Performs radiological analysis of samples submitted by the sampling team
- Keeps records of all analysis
- Submits results to the Characterization Team Leader

Instrument Maintenance Team

- Performs preventive maintenance and repair of nucleonic counting equipment

Decommissioning Plan Project Leader

- Responsible for preparation of the the Decommissioning Plan and submission to the Regulatory Group and Project Coordination Committee
- Gets inputs from the Dismantling & Decontamination Techniques Team,
- Provides estimates of costs in connection with the Decommissioning Project

Dismantling & Decontamination Techniques Team

- Plans and recommends dismantling and decontamination techniques, with the associated equipment to be used, as well as costing estimates

Waste/Fuel Storage Design Team (Division and PNRI concern)

- Designs and provides estimates for the cost of the Triga fuel storage to be located at the PNRI Radwaste Facility
- Performs calculations on the volume of waste to be produced from decommissioning
- Designs and provides cost estimates for the trenches to store the radioactive wastes from decommissioning
- Provide cost estimates for the volume reduction, conditioning and packaging of wastes from decommissioning

Decommissioning end point

- Release from regulatory control for unrestricted future use of the building and the immediate grounds.
- *The building will be preserved, having an architectural and historical value.*
- Future use of building: Establishment of an information center for nuclear science with access by the public
- A business case is required that examines the reuse options and the associated costs and opportunities

PNRI Internal regulatory control

- PNRI Policy Instruction No. 2, dated February 20, 2001 established the regulatory control program for PNRI Nuclear and Radiation facilities and laboratories was established.
- The NRLSD implements the internal regulatory control program. The process of authorization is independent of the PNRI management.

PNRI Internal regulatory control

- The PNRI Radiation Safety and Security Board (RSSB) performs preliminary review of all applications for authorization on the operator side.
- The RSSB is made up of the heads of PNRI nuclear and radiation facilities:
  - Reactor Operations Section
  - Gamma Irradiation Facility
  - Isotope Techniques Section
  - Radiation Protection Section
  - Nuclear Materials Research Section
  - Health Physics Research Section

Legal and Regulatory Tenets, contd.

- IAEA Safety Standards
  - Safety Series No. 115, *International Basic Safety Standards for Protection Against*
    Ionizing Radiation and for the Safety of Radiation Sources. February 1996. STI/PUB/996
  - Safety Standards Series No. WS-R-2, *Predisposal Management of Radioactive Waste,*
    Including Decommissioning. July 2000. STI/PUB/1089
  - Safety Standards Series No. WS-R-5, *Decommissioning of Facilities Using Radioactive Material*. October 2006. STI/PUB/1274
- Safety Guides, Safety Reports, and Technical Reports
- Administrative Limits

  Adoption of administrative limits on the radiation exposure of workers – in the spirit of ALARA

Major outputs of the decommissioning task force – from the log frame

- Output 1: Characterization survey completion
- Output 2: Preparation of the decommissioning plan
- Output 3: Construction of additional storage to accommodate PRR-I decommissioning waste
- Output 4: Decommissioning of the PRR-I (Decontamination and dismantling as needed)
- (New) Output 5: Construction of a dry storage vault for TRIGA fuel – (slightly irradiated and fresh fuel)

Project Schedule – Output 1-Hazards Characterization Completed

Activity	Status	Target date
1. Preparation of characterization Survey Plan	Partially done, documented procedures incomplete	EO October 2008
2. Field Survey	On-going	EO December
3. Request for authorization for sample collection	Phased, by site	

Project Schedule – Output1

Activity	Status/condition	Target date
4. Removal of Co-60 sources	Arrangements completed, authorization pending	EO September from March 2008*
5. Removal of spent fuel	Storage facility should be ready	July 2009
6. Sample collection and analysis	Completion of labs and equipment set-up required	July 2009 from December 2008*

Project Schedule – Output 2 – Decommissioning Plan preparation

Activity	Status/condition	Target date
Writing of Decommissioning Plan	On-going/ dismantling options identified	Completed December 2009 from EO 2008
Submission for authorization	Phased, submissions for authorization to start second half 2009	(Feedback from Teams required)

Project Schedule – Output 3 – Construction of additional radwaste storage

Activity	Status/condition	Target date
Calculate volume of waste	Started	EO 2008
Design "trenches" for decommissioning waste	Started	EO 2008
Construct trenches		To be ready by EO 2009

Project Schedule – Output 4 – Decommissioning completed

Activity	Status/condition	Target date
Obtain funding for decommissioning	Costs required	2009* (Budget request for 2010)
Obtain authorization for decommissioning		To start second half of 2009, full authorization middle of 2010
Bidding of decommissioning	Identify phases to be contracted out	Last qtr 2009* Middle of 2010

Project Schedule – Output 4 – Decommissioning completed

Activity	Status/condition	Target date
Start Decommissioning		Start last quarter 2009* 3rd Quarter 2010
End of decommissioning		EO 2012
Verification		3rd quarter 2012* 1st quarter 2013
Apply for clearance		2nd quarter 2013

Important benefits of present organizational structure

- Facilitate communication between Task Force and upper management
- Improved interdivisional communication – burden taken away from Technical Manager
- Enhanced support to working teams – e.g. Field Survey Team

Present phase

- Characterization survey
- Decommissioning plan preparation – options of dismantling technologies identified
- To be done:
  - Work breakdown structure (Tom McCool has done a sample)
  - Costing
  - Completion of requirements to apply for authorization including safety assessment

Project requirements

- Personnel for characterization
  - Core personnel from the Reactor Operations and the Radiation Protection Sections, NSTD
  - Additional personnel with relevant experience from the Atomic Research Division
- Funding
  - Technical Assistance (Experts, Equipment)
  - DOST-GIA
  - National Budget

Ongoing Activities

- Regular Meetings – since April 2008
- Meetings with regulators – 2
- Regulators invited to project management meeting – launching of Characterization survey, presentation of decommissioning plan
- Procedures-Writing – 2 writeshops conducted
- Setting up of Equipment, Counting Room
- Preparation for Co-60 transfer
- Conceptual Design of Vault for Fuel Storage
- Radiological Protection Survey – West Wing, East Wing (next: Reactor Bay)

PRR-I, a retrospective