

Safety and Security Interface in the Philippine Research Reactor – 1 (PRR-1) Facility

A Country Report Presented at:
Regional Workshop on Managing the Interface Between Safety and Security for Research Reactors

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Rafael Miguel M. Dela Cruz | Eugene S. Gregorio
DOST-Philippine Nuclear Research Institute
Nuclear Services Division | Nuclear Reactor Operations Section



Contents

- Brief history PRR-1 and PRR-1 SATER facility
- The facility's safety and security interfaces
- Problems encountered
- Future improvements



Brief History PRR-1 Facility

1955 | Philippines entered the atomic age



1984 | Upgraded to 3MW TRIGA reactor

1988 | Facility shutdown

2005 | Considered for decommissioning

2014 | Alternative endpoint considered as subcritical assembly

Initial proposal to use PRR-1 fuel for subcritical assembly

2016 | Capacity building for regulators, operators, and users

2018 | PRR-1 structure rehabilitation commenced

2020 | PRR-1 SATER structures completed



2021 | I&C system installation & commissioning

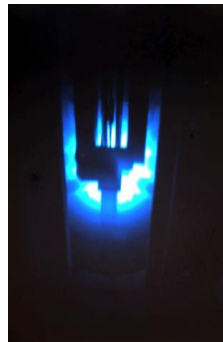
2022 | Completion of commissioning

1960 | Laying of foundation



1963 | Attained first criticality as MTR type

1964 | First operated at 1 MW



Canadian Project of 2015: Physical Protection System Upgrades to Philippines Research Reactor

- DOST-PNRI signed a memorandum of agreement with Canadian Department of Foreign Affairs, Trade and Development (DFATD)
- Established a framework that aims to strengthen the capacity to defend against radiological and nuclear threats.
- Provided physical protection security system upgrades to the PRR-1 facility

Project

Physical Protection System Upgrades to Philippines Research Reactor

This project provided physical protection security upgrades to the Philippines Nuclear Research Institute's (PNRI) research reactor facility.

RISK AREA(S) COVERED

Nuclear

ACTIVITIES

Infrastructure/Equipment Support

BENEFICIARY COUNTRIES

Philippines

BENEFICIARY REGIONS

Southeast Asia

BUDGET

1207677 CAD

STATUS

Completed

Start Date: January 1, 2015

End Date:

ASI DATABASE RELEASE

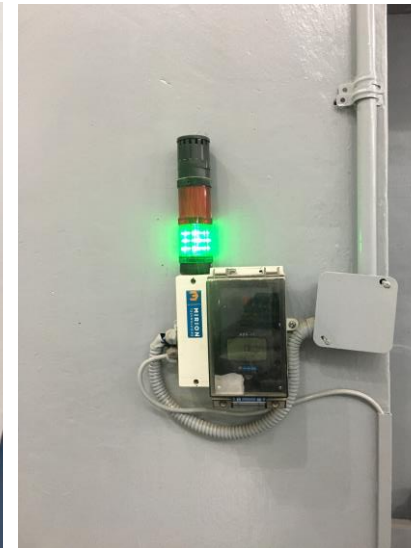
Providers and Implementers ?

Role	Organization	Type
Provider	Canada	State
Implementer	Canadian Commercial Corporation (CCC)	Industry/Private Sector
Implementer	Global Affairs Canada	State
Implementer	Philippines Nuclear Research Institute (PNRI)	State



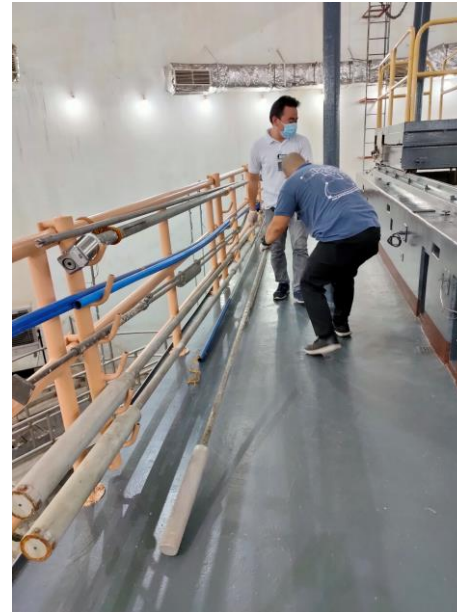
The Facility's Safety and Security Interfaces

- Radiation Area Monitor (RAM)
- Emergency access doors
- Access controls and procedures (Two-man rule, survey meter, biometrics, etc.)
- Personnel dosimeters
- Emergency Scenario Exercise
- Security buttons



The Facility's Safety and Security Interfaces

- An identified fission chamber was transferred to a more secure storage
- Emits a small amount of radiation
- The platform is now classified from controlled to supervised area



The Facility's Safety and Security Interfaces

- Emergency Plan, Security Plan and Radiation Protection Program
- QMS Procedures
 - Security
 - Safety and Radiation Protection

<p>PHILIPPINE NUCLEAR RESEARCH INSTITUTE Nuclear Services Division Nuclear Reactor Operations Section PRR-1 Site Security Plan</p> <p>DOCUMENT CODE: PRR-1-SSP-01 REVISION: 1 PAGE NO: 1 of 36 DATE: 30-Apr-2022</p> <p>Philippine Research Reactor-1 SITE SECURITY PLAN</p> <p>Prepared by: Nuclear Reactor Operations Section* Nuclear Services Division</p> <p>Prepared by: Nuclear Reactor Operations Section* Nuclear Services Division Philippine Nuclear Research Institute</p> <p>April 2022</p> <p>* Gatchalian, R.U. Oliveros, J.M. Marquez, R.M. Dela Cruz, Johnson, E.S. Gorgorio</p>	<p>PHILIPPINE NUCLEAR RESEARCH INSTITUTE Nuclear Services Division Nuclear Reactor Operations Section PRR-1 Emergency Plan</p> <p>DOCUMENT CODE: PRR-1-EP-01 REVISION: 1 PAGE NO: 1 of 36 DATE: 30-Apr-2022</p> <p>PRR-1 Emergency Plan</p> <p>Prepared by: Nuclear Reactor Operations Section* Nuclear Services Division</p>	<p>PHILIPPINE NUCLEAR RESEARCH INSTITUTE Nuclear Services Division Nuclear Reactor Operations Section PRR-1 RADIATION PROTECTION AND SAFETY PROGRAM</p> <p>DOCUMENT CODE: PRR-1-RPSP-01 REVISION: 1 PAGE NO: 1 of 36 DATE: 30-Apr-2022</p> <p>PRR-1 RADIATION PROTECTION AND SAFETY PROGRAM</p> <p>Prepared by: Nuclear Reactor Operations Section* Nuclear Services Division Philippine Nuclear Research Institute</p> <p>April 2022</p> <p>* Gatchalian, R.U. Oliveros, J.M. Marquez, R.M. Dela Cruz, Johnson, E.S. Gorgorio</p>
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<p>DEPARTMENT OF SCIENCE AND TECHNOLOGY PHILIPPINE NUCLEAR RESEARCH INSTITUTE</p> <p>DOCUMENT CODE: PRR-1-SSP-01 REVISION: 1 PAGE NO: 1 of 36 DATE: 30-Apr-2022</p> <p>PROCEDURES MANUAL</p> <p>SECTION: OPERATION SUBJECT: MANAGEMENT OF PRR-1 SECURITY</p> <p>1.0 Objective: To ensure that activities related to the Philippine Research Reactor-1 (PRR-1) nuclear safety and security are implemented effectively.</p> <p>2.0 Scope: This procedure covers all nuclear security activities involving nuclear materials and radioactive materials in the PRR-1 facility of risks associated with the process and resulting output documented procedure on Risk and Opportunity Management.</p> <p>Specifically, the following procedures are included: A. Access to PRR-1 building B. Information protection C. Maintenance of PRR-1 security system D. Notification of activities and reporting of incidents</p> <p>3.0 Definition of Terms: • Activity – any event, task, project, and/or work done in the scope of the PRR-1 authorization • Authorization – means a permission granted in a document (Nuclear Security Plan) to a natural or legal person who has submitted radioactive material or a radiation or a nuclear facility • Incident – any unintended event, including operating errors, equipment failures, initiating events, accident precursors, near misses or other act, malicious or non-malicious, the consequences or potential are not negligible from the point of view of protection and safety • Radiation protection (radiological protection) – protection of exposure to ionizing radiation, and the means for achieving it • Reactor Security and Safeguards Manager (RSSM) – safeguards procedures involving PRR-1 are implemented • Reactor Security Officer (RSO) – the personnel designated PRR-1 the security plan is kept up to date, implement the nuclear security aspect of the RSSM's in unavailability of the personnel • Nuclear security – prevention of, detection of, and response unauthorized acts involving or directed at nuclear material, associated facilities, or associated activities • Source – anything that may cause radiation exposure by emitting ionizing radiation or material</p> <p>4.0 Records: • Facility access record • NROS incident report</p> <p>Prepared by: Head NROS Reviewed by: Chief NSD Approved by: _____</p>	<p>DEPARTMENT OF SCIENCE AND TECHNOLOGY PHILIPPINE NUCLEAR RESEARCH INSTITUTE</p> <p>DOCUMENT CODE: PRR-1-SSP-01 REVISION: 1 PAGE NO: 1 of 36 DATE: 30-Apr-2022</p> <p>PROCEDURES MANUAL</p> <p>SECTION: OPERATION SUBJECT: MANAGEMENT OF PRR-1 SAFETY AND RADIATION PROTECTION ACTIVITIES</p> <p>1.0 Objective: To ensure that the management of Philippine Research Reactor-1 (PRR-1) nuclear safety and radiation protection activities achieves the fundamental safety objective of protecting people and the environment from harmful effects of ionizing radiation.</p> <p>2.0 Scope: This procedure covers all activities concerned with maintaining control over radiation sources (safely), and controlling exposure to radiation and its effects (radiation protection) in normal operational states during the entire lifetime of PRR-1, including the consideration of risks associated with the process and resulting output based on the PRR-1 and documented procedure on Risk and Opportunity Management Process.</p> <p>Specifically, the following procedures are included: A. Access to supervised and controlled areas B. Calibration of radiation detection instruments C. Inventory of nuclear materials and radioactive sources D. Personnel dose monitoring E. Radiation and contamination area monitoring F. Radioactive waste management G. Notification of activities and reporting of incidents</p> <p>3.0 Definition of Terms: • Activity – any event, task, project, and/or work done in the PRR-1 facility that is within the scope of the PRR-1 authorization • Area monitoring – a form of workplace monitoring in which an area is monitored by taking radiation and contamination measurements at different points in that area • Authorization – means a permission granted in a document by the Nuclear Regulatory Division (NRD) to a natural or legal person who has submitted an application to manage radioactive material or a radiation or a nuclear facility • Calibration – measurement of or adjustment to an instrument, component, or system to ensure that its accuracy or response is acceptable • Dose limit – the value of the effective dose or the equivalent dose to individuals from controlled practices that shall not be exceeded • EPD – Electronic personal dosimeter • Incident – any unintended event, including operating errors, equipment failures, initiating events, accident precursors, near misses or other malfunctions, or unauthorized act, malicious or non-malicious, the consequences or potential consequences of which are not negligible from the point of view of protection and safety • OSL – Optically Stimulated Luminescence detector • Personal / Individual monitoring – monitoring using measurements by equipment</p> <p>Prepared by: Head NROS Reviewed by: Chief NSD Approved by: CHIR</p>
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Problems Encountered

- Fewer emergency exits due to security reasons
- Some exit routes are long during emergency

Future Improvements

- Dual purpose doors
- Rerouting of emergency routes
- Installation of portal monitor (optional)
- Installation of additional CCTV camera



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Presented in	RW on Managing the Interface between Safety and Security for Research Reactors	Location	Virtual	Duration	08 June 2022	Author	Rafael Miguel M. Dela Cruz Eugene S. Gregorio
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