Nuclear Forensics – An Integral Part of the Philippines' National Response Plan for a Nuclear Security Event

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Since the dropping of the first atomic bombs in Hiroshima and Nagasaki on August 1945, quoting the famous phrase, "the world has lived under the shadow of nuclear threat". This was heightened by the Chernobyl nuclear accident in 1986 and magnified by the September 11, 2001 terrorist attack of the World Trade Center in the USA. Although the attack (more popularly termed as 911 attack) was not nuclear or radiological in manner, it imparted a worldwide chilling effect that such an act that is nuclear or radiological armed can be a possibility causing major damage and massive disruption. While the threat is global, nuclear security is a national responsibility. It is in this light that the Philippine Nuclear Security Plan was formulated by the Philippine Nuclear Research Institute (PNRI) specifically to address nuclear security and terrorism with nuclear forensic as an integral part of the plan.

Prior to the 911 attack, the Philippines was confronted by three (3) major internal security concerns: the local communist movement, the southern Philippines secessionist groups, and the home-grown and transnational kidnap for ransom groups such as the Abu Sayyaf Group. To deter and overcome these threats, a 'Strategy of Holistic Approach' focusing on "Winning the Peace" theme was adopted under the National Internal Security Plan. However, after the 911 attack, the word 'terrorism' drastically changed the course of global and national security. The Philippines created its own definition and perspective on terrorism with the passage of **Republic Act No. 9372 on March 6, 2007, An Act to Secure the State and Protect Our People from Terrorism, otherwise known as "The Human Security Act of 2007". Included in this law as an act of terrorism is the use of any biological and/or chemical agent, radioactive or nuclear material, explosives, firearm or other weapons, with the intent to endanger, directly or indirectly, the safety of one or more individuals or to cause great damage to property.** With this new law, the National Plan to Address Terrorism and its Consequences was developed. Unfortunately, this plan was designed to cover hostage taking, bombing, sabotage, hijacking and piracy, but did not cover biological, chemical, radiological, nuclear & cyber terrorism.

PHILIPPINE NUCLEAR SECURITY PLAN

Strategy 1 — PREVENTION (1st Line of Defense)

PROGRAMS	ACTIONS	TIME LINE	Participating Organization	Lead Organization
1.1 NATIONAL THREAT ASSESSMENT	1.1.1 Initial Security Survey Inspection	2007-2016	PNRI/DOST, NICA, NSC, PNP, NBI	NICA
	1.1.2 Initial SSI	Q1- 2008	PNRI, NICA, NSC, PNP, NBI, Licensees	NICA
	1.1.3 Periodic SSI	Annually	NICA, PNP, PNRI	NICA
	1.1.4 Design Basis Threat	2011-2016	PNRI/DOST, DOH, OTS, NICA, NSC, PNP, NBI	NICA, PNRI, PNP
	1.1.5 Periodic Assessment	Quarterly	PNRI/DOST, DOH, OTS, NICA, NSC, PNP, NBI	NICA, PNRI, PNP
1.2 NATIONAL INVENTORY	1.2.1 National Registry (RAM) using RAIS	2007-2016	PNRI	PNRI
1.3 ACCOUNTING AND PHYSICAL PROTECTION	1.3.1 State System for nuclear material accountancy and control	In-place	PNRI	PNRI
	1.3.2 Acquisition, Movement, Storage, Use and Disposal	In-place	PNRI	PNRI
	1.3.3 Physical Protection System based on IAEA guidelines	In-place	PNRI	PNRI
	1.3.4 Security Survey Inspection (SSI)	Annually	PNRI, NICA, PNP	PNRI, NICA
1.4 SECURITY TRAINING AND EDUCATION	1.4.1 Identify training needs/rationalize/ formulate training programs	2007-2016	PNRI, PNP, OTS, NICA	PNRI, NICA
	1.4.2 Formulate National Nuclear Security Training (NSTP) Program	2007-2016	PNRI, PNP, NICA, OTS	PNRI
	1.4.3 Implement NSTP	2007-2016	PNRI	PNRI
1.5 ADVOCACY	1.5.1 Identify audience/classify information	2007-2016	PNRI, NALECC, OSETC	PNRI
	1.5.2 Design Advocacy Program	2007-2016	PNRI, NALECC, OSETC	PNRI
	1.5.3 Implement Advocacy Program	2008-2016	PNRI, NALECC, OSETC	PNRI
	1.5.4 Review and Assess Program	Annually	PNRI, NALECC, OSETC	PNRI
1.6 LEGISLATION	1.6.1 Create working group to review laws & amendments	In-place	PNRI, DOJ, PNP, NBI	PNRI, DOJ
	1.6.2 Strict implementation and enforcement of RA 5207, RA 6969 and RA 9372 "Human Security Act 2007"	2008-2016	PNRI, DOJ, NBI, PNP, AFP, NICA	PNRI, DOJ
1.7 INTERNATIONAL COOPERATION	1.7.1 Strengthen and foster international cooperation	2007-2016	DFA, PNRI, DND	DFA, PNRI

Strategy 2 — DETECTION (2nd Line of Defense)

PROGRAMS	ACTIONS	TIME LINE	Participating Organization	Lead Organization
2.1 BORDER CROSSING DETECTION	2.1.1 Support the Megaports initiative	In-place	PNRI, BOC, PPA/ Port Terminals	PNRI/BOC
	2.1.2 Provide portable Scanners/sensors to border patrols	In-place	PNRI, BOC	PNRI/BOC
	2.1.3 Operation of Megaports Initiative	continuing	PNRI, BOC, PPA, Terminal Operators	PNRI/BOC
2.2 REPORTING/ NOTIFICATION SYSTEM	2.2.1 Establish EEI (essential elements of notification)	ASAP	PNRI, PNP, DILG, NICA	NICA/PNRI
	2.2.2 Interagency MOA	2007-2016	All Agencies concerned	PNRI
2.3 INVESTIGATION	2.3.1 International cooperation, domestic intelligence	2007-2016	PNP, AFP, BOC, PNRI, NICA, NBI	NICA/PNRI
2.4 TRAINING & EDUCATION	2.4.1 Training on Nuclear Security	2007-2016	PNRI, PNP, NICA,BOC, NBI	PNRI

Strategy 3 — RESPONSE (3rd Line of Defense)

PROGRAMS	ACTION	TIME LINE	Participating Organization	Lead Organization
3.1 EMERGENCY RESPONSE & SEC.	3.1.1 Security drills	ASAP	PNRI, PNP, BFP, NDCC	PNRI
3.2 EMERGENCY PLANS, PROCEDURES AND EQUIPMENT	3.2.1 Revise RADPLAN	ASAP	RADPLAN Members	PNRI
	3.2.2 Acquire adequate equipment	ASAP	PNRI, NDCC	PNRI
	3.2.3 Ensure immediate response to emergencies	As needed	NDCC, PNRI, LGU, PNP, AFP	PNRI/NDCC
	3.2.4 Regular drills and dry runs	Quarterly	NDCC, PNRI	NDCC/PNRI
3.3 FORENSIC AND INVESTIGATION	3.3.1 Acquisition of required forensic equipment	As needed	NBI, PNRI, PNP, AFP	PNRI/NBI
	3.3.2 Organization of investigation unit	As needed	NBI, PNRI, PNP, AFP	NBI
3.4. ARREST AND SEIZURE	3.4.1 Arrest of violators of pertinent laws		PNP	PNP
	3.4.2 Seizure of RAM/NM		PNP, PNRI, BOC	PNP/PNRI

NATIONAL NUCLEAR SECURITY PLAN (2010 – 2016)

Program	Action	Timeline	Responsible Entity
A. Legislative and Regulatory Framework			
1. Proposal to create an Independent regulatory body	a. Create a technical working group to draft the comprehensive nuclear law b. Submit the bill on the proposed "Comprehensive Nuclear and Radiation Regulatory Act"	2010 2011	PNRI
2. Development of regulations relating to nuclear security.	a. Adopt IAEA nuclear security recommendations & guides b. Amend or develop additional regulations in areas relevant to nuclear security c. Request expert assistance in reviewing/drafting nuclear securityregulations	2011 - 2016	PNRI
3. Adherence to implement Relevant international instruments for Strengthening Nuclear Security	a. Convention on the Physical Protection of Nuclear Material (CPPNM) b. Additional Protocol to Safeguards Agreement c. 2005 Amendment to the CPPNM d. International Convention for the Suppression of Acts of Nuclear Terrorism e. Submit report to UNSC 1540	In-force Feb. 1987 In-force 26 Feb. 2010 Signed Sep.2005	DFA, PNRI & other relevant organizations
B. PREVENTION			
1. Defining Design Basis Threat (DBT)	a. Organize and implement national workshop on threat assessment b. Implement national DBT	2011- 2012	PNRI, NICA, PNP
2. Review level of security arrangements for category 1 and 2 radioactive sources with relevant facilities	a. Implement security upgrades in 12 facilities with high risk radioactivesources b. Implement security upgrades in PNRIs Radwaste facility, Multi-purpose Irradiation Facility and Secondary Standard Dosimetry. c. Implement facilities'security plan d. Review security measures for Category 2 sources e. Implement transport security plan forCat.1 sources vis-à-vis safe transport regulation	Completed Completed 2011 2011-2012 2011-2012	PNRI
3. Phil. system for nuclear material accountancy & control	a. Implement system of accounting for and control of all the Country's nuclear materials b. Acquisition, movement, storage, use and disposal	In-place	PNRI
4. Establishment of national registry of radioactive sources	a. Implement IAEA Regulatory Authority Information System (RAIS) b. Complete inventory of all radioactive sources in the country using RAIS	2010 – 2011 2011 - 2013	PNRI
5. Development of orphan source search capabilities	a. Conduct study on national strategy for regaining control of orphan sources b. Establish plan for searching orphan sources c. Locate and secure orphan sources	2010 - 2012	PNRI, PNP
6. Security Survey & Inspection	a. Conduct SSI to critical facilities semi-annually	2011 - 2016	NICA, PNP
7. Strengthening intl. cooperation	a. Continuing cooperation with IAEA, US DOE, ANSTO & EU	On-going	PNRI, DFA
8. Security training & education	a. Formulate National Nuclear Security Training Program (NSTP)	2010 - 2016	PNRI, PNP, NICA
C. DETECTION			
Program	**Action**	**Timeline**	**Responsible Entity**
1. Development of national detection strategy for detection of illicit trafficking in nuclear/radioactive sources	a. Evaluate types and locations of border monitoring equipment in thePhils. b. Installation of Radiation Portal Monitors at Port of Manila. c. Support the US Megaports Initiative and its operation d. Creation of Mobile Expert Support Team (MEST)	2010 – 2016 1st Q 2011 On-going	PNRI/Terminal operators (ATI & MICT) PNRI, BOC & PPA
2.Reporting Notification System	a. Develop procedures in the detection of alarms b. Assessment and evaluation of alarms c. Identification of stakeholders and defining responsibilities d. Intelligence and investigation	On-going	Interagency MOA Interagency MOA NICA, PNP
3.Maintenance of radiation detection equipment	a. Provide arrangement to maintain periodically calibrate handheld detection equipment to ensure, reliable and accurate operation	On-going	PNRI
4. Identification of training needs	a. Front line officers on measures related to detection of radiation b. Other trainings to be included in the training program	2010-2016	PNRI
D. Response			
Program	**Action**	**Timeline**	**Responsible Entity**
1. Development of plan and procedures to respond to incidents involving nuclear and other radioactive material including seizure of such material by law enforcement authorities	**a. Prepared response plan should cover : Detection and response, Verification of presence of nuclear and radioactive material, Communication between involved organization including emergencyresponders, Obtaining nuclear forensics support,** Transporting of nuclear and other radioactive material, Storage of nuclear/radioactive material **b. Integration of response plan with national emergency response plan** c. Expert assistance to review response plan to be requested toIAEA	2010-2016 2011-2012	PNRI, PNP & other relevant organizations PNRI
2. Establish forensic and investigation Unit	**a. Create an organization of nuclear forensic and investigation unit** b. Strengthen intelligence and investigation c. Seek assistance to IAEA, US DOE and Japan	2011-2016	NBI, PNP, PNRI
3. Establishment of reporting and notification system	a. Participation to the IAEAs Illicit Trafficking Database (ITDB) b. Promote advocacy and awareness	In-place	PNRI
E. Human Resource Development			
Program	**Action**	**Timeline**	**Responsible Entity**
1. Implementation of a National Nuclear Security Training Programme	a. Identify necessary resources to implement the training programme b. Identify personnel to be trained and classification of required training c. Identification of priority areas: legal framework, radiation awareness, physical protection, security culture, threat assessment and other areas identified in the program. **d. Implement training programme taking existing IAEA offers and other organizations.**	2010-2016	PNRI

As such, the Philippine Nuclear Security Plan (PNSP) was developed covering three (3) strategy components of prevention, detection and response. Under response strategy, a program to establish a forensic and investigation unit is included, as well as the development of plan and procedures to respond to incidents involving nuclear and radioactive material, including seizure of such material by law enforcement authorities. The Nuclear Materials Research Section (NMRS) of PNRI was thus given the added function to "develop nuclear forensic analysis capabilities in support of nuclear material protection process so that in the event of an interdiction by Philippine law enforcement agencies involving illegal use or movement of radioactive material this capability may be used to develop and build a legal case against the perpetrators". To date, several NMRS staff has undergone training on nuclear forensics taking advantage of offers from the International Atomic Energy Agency and other international organizations as part of the human resource development program of PNSP.

Meanwhile, in 2003, the Megaports Initiative was established by the United State Government through the United State's Department of Energy / National Nuclear Security Administration – Office of Second Line of Defense (USDOE/NNSA-SLD). The purpose of which is to screen container-cargoes for nuclear and other radiological materials being transported through the global maritime shipping network. In the Philippines, with financial and technical support from the USDOE/NNSA-SLD, radiation portal monitoring systems were installed at the Port of Manila, specifically at the South Harbor and Manila International Container Terminal. This will reduce the risk of illicit trafficking and thus preventing the acquisition and malevolent use of these nuclear and other radiological materials by terrorists.

Megaports Initiative Projects

Under a Memorandum of Intent signed by U.S. (Dept. of Energy-National Nuclear Security Administration)and Philippines, PNRI in coordination with Bureau of Customs & Phil. Ports Authority continued their active participationin the Megaports InitiativeProject. The project involvedthe detection of illicitshipmentof nuclear and radioactivematerialsthrough Radiation Portal Monitors installedat the Port of Manila.

Radiation Portal Monitors

Radiation Portal Monitor

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WikiLeaks bares uranium smuggling in PH

By Jerry E. Esplanada
Philippine Daily Inquirer
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MANILA, Philippines?An alleged smuggling incident involving uranium?a radioactive metal used in the production of nuclear power?took place in the Philippines in 2007, according to a cable from the US Embassy in London that was released by the WikiLeaks

Quoting an unidentified source, the unclassified embassy memo said the uranium ?formerly belonged to the US.?

The same embassy source had allegedly ?worked with divers in the Philippines previously and was recently contacted by them with information that they had found five to six uranium bricks at an underwater wreck.?

In the Nov. 21, 2007 cable to the US State Department, then US Ambassador to the United Kingdom Robert H. Tuttle did not disclose the location of the wreck.

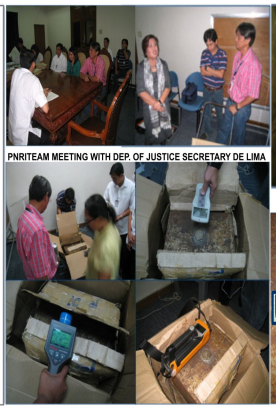
But Tuttle said the informant?s contacts had ?expressed a desire to sell the bricks for profit.?

The same embassy source had earlier informed the US Central Intelligence Agency about the ?possible nuclear smuggling incident,? but ?as yet had not received a response,? said Tuttle.

In the cable, the envoy described as ?unknown? the supplier, transport status and the intended destination of the alleged nuclear materials.

On the mission?s assessment of the likelihood that appropriate authorities would secure the materials, Tuttle said ?UK and Philippine authorities have not yet been notified.?

Tuttle attached ?nine photos of the substance in question? to the embassy cable.



In late 2011, PNRI staffs were instructed to inspect a suspected radioactive material that was seized during an operation by a government investigative agency since there had been reported news of smuggling incidents involving uranium in the Philippines as early as 2007. It was unfortunate however, that the suspected material was brought to the room where the PNRI staffs were planning on how to go through with the inspection at the crime scene. Fortunately, the yellowish metallic box bearing a U235 marking registered very low radioactivity. Evidently, there is a need for strengthening and reorientation of persons that will be involved in in radiological crime scene investigations on the unique characteristics and required safety measures in handling radioactive materials, and more importantly, by equipping PNRI with basic instrumentation and skills in building the nuclear forensics capabilities of the Country.