

# PNRI Newsletter

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A newsletter of the Philippine Nuclear Research Institute (PNRI)

## In this Issue

- ✔ Technetium 99m Facility ..... 1
- ✔ Consultation on Commercial Irradiators ..... 2
- ✔ Irradiation Treatment for Mango Pulp Weevil ..... 3
- ✔ Seminar for Teachers on Nuclear S and T ..... 4
- ✔ Phil Science High School won Top Prize in Malaysia ..... 4
- ✔ Bataan Nuclear Power Plant ..... 5
- ✔ IAEA Regional Workshops/ Training Courses ..... 6
- ✔ IAEA Technical Missions ..... 8
- ✔ QCSC General Election ..... 10
- ✔ PNRI Inter-Color Sportsfest and PNRIEU New Officers ..... 11
- ✔ Announcement ..... 12

The PNRI Newsletter is an online publication of the Philippine Nuclear Research Institute (PNRI), a research and development institute of the Department of Science and Technology (DOST).

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## FDA GRANTS THE PNRI LICENSE TO OPERATE TECHNETIUM 99M FACILITY



*Isotope Techniques Section Head Adelina Bulos (extreme left) explains the hot cell process (right photo) during a tour of medical experts inside the Technetium-99m facility.*

Paving the way for cheaper and more available supplies of radiopharmaceuticals in the country, the Food and Drug Administration has granted the Philippine Nuclear Research Institute – Department of Science and Technology (PNRI-DOST) the license to operate the Technetium 99m (Tc99m) Generator Facility.

The facility will save the medical industry up to around 20 percent of the average cost for imported Technetium radiopharmaceuticals.

Technetium 99m is a medical radioisotope generated from Molybdenum 99. With a short half-life of 6 hours, the radioisotope emits penetrating but otherwise harmless doses of gamma radiation which makes it very useful as a tracer in helping to diagnose various physical ailments and abnormalities at the early stages while minimizing the exposure of patients to radiation.

Combined with gamma cameras, the Technetium 99m allows doctors to scan and provide an image of various organs in the body. Over 80 percent of the world's nuclear diagnostic imaging procedures rely on this radiopharmaceutical, with its applications ranging

*continued on page 3*



## From the Director

**Greetings to everyone!**

Midyear is a great time for self-assessment and reflection, to ask ourselves where we have been and where we intend to go. We are proud to say that PNRI is still well on its way in meeting its targets and in making nuclear science and technology more relevant to our partner agencies, our clients and customers, and most especially the general public.

The Food and Drug Administration has given PNRI the license to operate the Technetium 99m Facility. This will be a great boon to the medical industry as it will save expenses for importing radiopharmaceuticals used for diagnostic imaging procedures throughout the country. Also, the quarantine treatment PNRI has developed for the mango pulp weevil pest is well on its way to being officially approved by the United States Department of Agriculture, which will hopefully allow more of our country's mango exports to enter the US.

On a lighter note, high school science teachers and a college faculty graduated from the month-long 38th Seminar on Nuclear Science for High School Science Teachers and the 47th Course on Nuclear Technology for University/College Faculty conducted by the PNRI's Nuclear Training Center. It is our hope that the participants will help us enhance public awareness and advance scientific knowledge from the research institute to the classroom.

Speaking of public awareness, these teachers also joined us along with our friends from the media and PNRI staff in a one-day visit to the Bataan Nuclear Power Plant in May. We had the privilege of being guided inside the plant by our friends from the National Power Corporation and former Congressman Mark Cojuangco.

In the field of regulations, the US Department of Energy continues its partnership with PNRI in developing and improving the Philippines' safety and security of radioactive materials as well as its capabilities in emergency preparedness and response to nuclear and radiological emergencies.

These and more have been accomplished by the Institute this second quarter, and we hope to be able to continue the Institute's mandate as the next half of 2014 begins.

**R & D News****PNRI and PhilMech Conduct Consultation on Commercial Irradiators**

**PNRI Irradiation Services Section Head Luvimina Lanuza and Biomedical Research Section Head Zenaida De Guzman (3<sup>rd</sup> and 4<sup>th</sup> from left, table across) facilitate a focus group discussion with representatives from various industries and institutions at the Department of Agriculture.**

The Department of Agriculture has expressed interest in the applications of radiation technology in agriculture, particularly in the post-harvest treatment of crops. Commercialization of radiation technology will contribute to greater competitiveness of the local industries.

In September 2013, Agriculture Secretary Proceso Alcala formed the Food Irradiation Experts Group with the Philippine Center for Postharvest Development and Mechanization (PhilMech) as Chair and the Bureau of Plant Industry (BPI) as the Vice-Chair. The PNRI-DOST and the University of the Philippines Los Baños (UPLB) are members of this experts group.

A major activity of the experts group is to undertake a techno-economic feasibility study for the establishment of a commercial irradiation facility. The results of this study will greatly affect the decisions of stakeholders and other government agencies on commercial irradiators.

Towards this end, the PNRI and PhilMech conducted a series of focus group discussions with various industries on putting up a viable commercial irradiation facility. The agencies consulted were key representatives of the food & food packaging, medical and pharmaceutical companies.

"Many of them have already experienced our irradiation services; some have even shown interest to put up their own irradiators or partner with the government in

doing so," said Biomedical Research Section Head Zenaida De Guzman, who facilitated focus group discussions with the different sectors along with PNRI Irradiation Services Head Luvimina Lanuza.

The discussions, conducted in three batches – in December 2013, and in January and February this year, yielded valuable inputs to the feasibility study. The discussions dealt on several factors that will affect the construction and profitable operation of a commercial irradiation facility, namely the kind, volume of products to be irradiated, dose, packaging, capacity and the type of irradiator to be used.

According to Ms. De Guzman, a 100-kilocurie (kCi) irradiation facility will cost around three to five million US dollars, to be funded either through a primarily government-sponsored program or, more likely, a public-private partnership. To make the facility economically viable, it needs to be able to irradiate at least 18,000 to 20,000 metric tons worth of products every year.

"The volume may also determine the type of irradiation facility to be put up," said Ms. De Guzman. While gamma rays are generally preferred because radioactive sources need no electricity to emit radiation, there is still the question of whether it will be a multipurpose irradiator or it will be dedicated to a certain type of product.

*continued on page 5*



## Technology in Focus

### PNRI Develops Irradiation Treatment Against Mango Pulp Weevil



Dissection of irradiated and unirradiated mango-pulp weevil-infested mangoes at the PNRI Mango Pulp Weevil Holding Laboratory

To help enhance the export competitiveness of Philippine carabao mangoes, also known as Philippine super mangoes or Manila super mangoes, the PNRI-DOST developed a quarantine treatment using gamma irradiation against the local mango pulp weevil *Sternonchetus frigidus* (Fabr.). The proposed rules on the adoption of the irradiation quarantine protocol were recently published at the United States’ Federal Register.

Quarantine pests such as the mango pulp weevil prevent our country’s mango

exports from entering international markets such as the United States and other countries with strict quarantine regulations. The wasted potential aggravates the economic woes of the local mango growers and exporters who contribute a substantial share of the Philippines’ total agricultural exports.

When approved by the United States Department of Agriculture – Animal and Plant Health Inspection Service - Center for Plant Health Science and Technology (USDA-APHIS-CPHST), Philippine export mangoes will be allowed into the US from both pulp-

weevil-free areas and areas such as Palawan which are using the established dose for mango pulp weevils.

In collaboration with the Department of Agriculture (DA) – Regional Field Unit 4B, researchers from the PNRI Agriculture Research Section experimented on various radiation doses to determine the minimum dose required to sterilize the weevils infesting export-quality Philippine carabao mangoes.

Based on PNRI’s research studies, a minimum radiation dose of 165 Gy is enough to make the adult mango weevil sterile, providing sufficient quarantine security for the Philippine super mangoes.

The collaborative project funded by USDA and the Philippines’ Bureau of Plant Industry (DA-BPI) was completed in 2011 and the results were submitted to the USDA for approval the following year. Consultations with the public as well as representatives from various sectors have been conducted by the USDA-APHIS-CPHST in 2013.

Guimaras Island has a thriving mango industry from which most Philippine mango exports allowed to the US come from. The island boasts a huge annual production of mangoes that are free of mango seed-weevils (*Sternonchetus*

*continued on page 7*

#### FDA grants the PNRI license to operate technetium 99m facility...from page 1

from lung, bone and renal scintigraphy, liver scanning, DMSA and DTPA renal scanning, gastroesophageal reflux, continuous ambulatory peritoneal dialysis, among others.

More than 40 hospitals in the Philippines are equipped with nuclear medicine facilities, which the generator facility will be able to supply when it becomes operational. Proposals to make the Technetium 99m available at subsidized

costs to government hospitals, particularly to charity patients, are also being considered.

PNRI is currently partnering with the Technology Resource Center of the DOST in securing the raw materials needed for the operation of the facility, particularly the Molybdenum 99. As the marketing arm of the DOST, the TRC is also in charge of the marketing and distribution of the Tc99m. The Institute expects the facility to be operational by the second semester of 2014.



The Technetium 99m generator with PNRI’s GammaGen® brand logo



## Nuclear Training Update

### PNRI Holds Seminar for Teachers on Nuclear Science and Technology



The participants engage in a laboratory exercise at the NTC Lecture Room at the PNRI Compound.

The PNRI-DOST through its Nuclear Training Center (NTC) held a five-week training course for secondary and tertiary education faculty from April 16 to May 16.

The 38<sup>th</sup> Seminar on Nuclear Science for High School Science Teachers and the 47<sup>th</sup> Course on Nuclear Technology for University/College Faculty aims to familiarize the participants with the basics of nuclear and radiation science and its applications and be eventually able to integrate these concepts in classroom discussions on science subjects and courses, increasing the youth's knowledge and

awareness in nuclear science and technology.

Twenty-six (26) high school teachers from 18 public high schools and a faculty member from the University of the Philippines – Los Baños participated in the training course.

Scientists and researchers from PNRI's various sections lectured on nuclear physics and radiation chemistry, basic radiation protection, security and waste management, dose calculation, nuclear reactions, neutron activation and the different applications of nuclear and radiation technology in

agriculture, medicine, industry and energy.

Experiments, hands-on exercises, technology demonstrations and laboratory visits were also facilitated by the NTC course coordinators and PNRI experts.

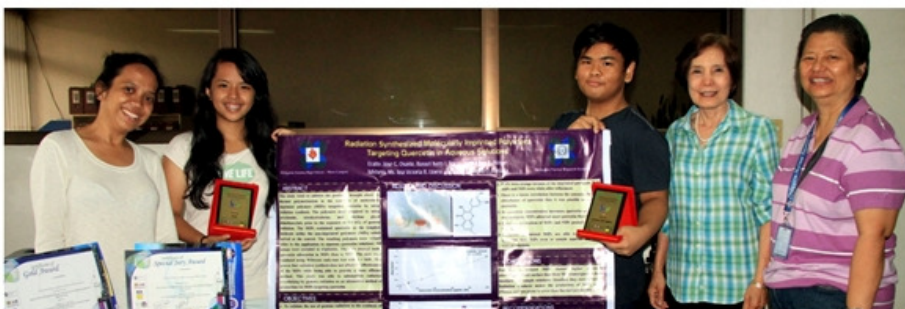
To gauge how much they have learned from the course, the participants were given a long quiz every week and are given an opportunity to prepare teaching modules and case studies on nuclear science topics, which were presented at the end of their respective courses. The modules and case studies may also be applied to their respective classes after the course.

The teachers also joined a tour to the Bataan Nuclear Power Plant on May 3 with PNRI Director Dr. Alumanda Dela Rosa, PNRI staff and members of the media.

The tour was facilitated by the National Power Corporation and sponsored by former Congressman Mark Cojuangco, who advocates restarting the mothballed nuclear plant to alleviate the country's energy problem as well as the soaring costs of electricity.

The PNRI NTC offers these seminars on nuclear science and technology for high school and college faculty every summer.

### Radiation-Related Research by PSHS Won Top Prize in Malaysia



Students from Philippine Science High School (PSHS) Main Campus won the Gold Award and Special Jury Award for their thesis entitled "Radiation Synthesized Molecularly Imprinted Polymers Targeting

Quercetin in Aqueous Solutions" at the Malaysian International Young Inventors' Olympiad 2014 held from April 16 to 20 at Penang, Malaysia. The thesis was authored by Jamika Ann Roque (2<sup>nd</sup> from left), Eraño Jose

Osorio (3<sup>rd</sup> from left) and Russel Avery Roco (not in photo). The results of the study showed that molecularly imprinted polymers demonstrated better adsorption than non-imprinted polymers as tested with the plant pigment quercetin. The students' advisers are Ms. Ana Victoria Lloren of PSHS and Ms. Ma. Llorina Rañada, Science Research Specialist I of the PNRI Chemistry Research Section (extreme left). Also in the photo are PNRI Director Dr. Alumanda Dela Rosa (2<sup>nd</sup> from right) and Chemistry Research Section Head Dr. Lucille Abad (extreme right). This research collaboration was made possible through the thesis/research advisorship program of the PNRI Nuclear Training Center.



## Nuclear Info Dissemination

### Former Congressman Mark Cojuangco Sponsors Bataan Nuclear Power Plant Tour



Former Congressman Mark Cojuangco gave a tour of the Bataan Nuclear Power Plant (BNPP) to the plant visitors composed of PNRI staff, science teachers and members of the media.

Officials and staff of the PNRI–DOST including trainees of the PNRI Nuclear Training Center and members of the media joined a tour of the Bataan Nuclear Power Plant (BNPP) at Napot Point, Morong Bataan on May 3, 2014 with former Congressman Mark Cojuangco.

The National Power Corporation (NPC) facilitated the tour to BNPP, which was opened to tourists in 2008 as part of NPC's information, education and communication program on nuclear power. The tour was sponsored by Cojuangco, who was the

principal author of House Bill 4631 filed during the 14<sup>th</sup> Congress intending to recommission the mothballed nuclear plant to solve the country's energy problems and soaring costs of electricity.

Cojuangco also served as the tour guide for the plant's visitors, mostly teachers participating in the 38<sup>th</sup> Seminar on Nuclear Science for High School Science Teachers and the 47<sup>th</sup> Course on Nuclear Technology for University/College Faculty being conducted by the PNRI Nuclear Training Center.

## PNRI VISITORS PROGRAM

Guided tour of the Institute's facilities, laboratories and viewing of the scientific exhibits, lecture-demonstrations, audio visual presentations are the information services available to students, teachers, researchers, other professional groups and the general public who come to the PNRI for an educational tour. The following are the Guidelines & Policies for Booking of Educational Tours at PNRI:

1. All letters must be addressed to DR. ALUMANDA M. DELA ROSA, PNRI Director. Letters can be submitted thru:

Philippine Nuclear Research Institute  
Commonwealth Avenue, Diliman, Quezon City  
E-mail: information@pnri.dost.gov.ph  
Fax: (02) 920.1646

2. The letter of request must contain the following information:

- Date, time & duration of visit (eg. From 9am-12 noon)
- Name & address of school/institution or company
- Number of visitors (including parents, faculty/staff) for guided tour (Note: The number must not exceed 50.)
- If students, course & year level
- Area/s of interest
- Contact person & contact details (landline number, mobile number and email address)

3. All bookings must be at least two (2) weeks in advance. Available days for the tour are Mondays to Fridays, between 9 AM to 12 Noon and between 1 PM to 4 PM.

4. Strict compliance with the scheduled time of visit is recommended. We emphasize that requestees must book/reserve the time that is most realistic for the group upon consideration of travel time (including allowance for traffic, etc.) from the point of origin to PNRI.

5. Acceptance of bookings is on first come first serve basis.

6. School coordinator or group leader of the tour is advised to contact NIDS-PNRI (Telephone Nos. 920-8787 and 929-6010 to 19 local 286) to confirm PNRI's receipt of their letter especially those sent by mail or fax.

7. Upon arrival at PNRI during the scheduled tour, the school coordinator/group leader must register at the guard's logbook. The school coordinator/group leader must ensure an orderly manner by which the students/visitors are to enter the PNRI facility.

8. School coordinator/group leader must remind all the students about their student's behavior while in the premises of PNRI. Vandalism, loitering, shouting, eating, drinking and other non-desirable behavior inside the audio visual room/laboratories/facilities are strictly prohibited.

### PNRI and PhilMech conducts consultation on commercial irradiators...from page 2

"If, for example, the volume of medical products is large enough to push the facility's commercialization, then it will be an irradiation facility solely for such. But if medical products cannot cover the facility's capacity alone, then it will have to be a multipurpose facility such as what we have at PNRI, both for medical purposes and food irradiation." said the section head.

The problem of volume is not only a question of how much products the facility can handle but also which products – and

how much of each product – are the clients willing to be irradiated.

As a result of the consultations with stakeholders, the companies expressed the great need and enthusiasm for irradiating their products, as it is proven to be more suited to their purposes, if not more efficient, than other methods of product sterilization and processing.

Among these products are spices, dehydrated vegetables, herbal products,

food and medical packaging, pharmaceuticals and Bio-N nitrogen carriers used as fertilizers.

Worldwide, there are over a thousand irradiation facilities that are dedicated to commercial purposes such as food irradiation and sterilization of medical devices. Of these, around 200 are in Asia. The Philippines is one of the few countries in Asia which has no commercial food irradiation facility yet.



## Philippines Hosts IAEA Regional Workshops/Training Courses

### PNRI Hosts IAEA Mission and National Workshop on Uranium Extraction from Phosphates



Seated 1<sup>st</sup> row: IAEA Technical Officer Dr. Harikrishnan Tulsidas (2<sup>nd</sup> from left) with IAEA experts Dr. Tapan Haldar (2<sup>nd</sup> from right) and Professor Julian Hilton (extreme right) joins PNRI Director Dr. Alumanda Dela Rosa (center) in a group picture with the PNRI lecturers and workshop participants.


With more opportunities to access the country's natural resources and minerals, the PNRI-DOST hosted an expert mission and national workshop of the International Atomic Energy Agency (IAEA) on uranium extraction from phosphates.

Uranium, which is commonly used as fuel for nuclear power plants, may also be extracted from alternative sources such as phosphate rocks and phosphoric acid.

Under the IAEA Technical Cooperation Project PHI2010 on "Enhancing National Capacity for Extraction of Uranium, Rare Earth Elements and Other Useful Commodities from Phosphoric Acid," the PNRI aims not only to improve its capacity in rendering services on the processing of uranium and other valuable commodities such as rare earth elements for potential economic gain but also to help lessen the impact on the agricultural soil of continuous use of phosphate fertilizer having radioactive materials.

Experts from the IAEA visited PNRI from May 19 to 23 to help assess the project's progress and to conduct a two-day national workshop on "Situation Assessment for Uranium Extraction from Phosphate for Commercial Industries" which tackled on the various aspects of the extraction process, its place in the overall uranium production cycle, and potential opportunities for the industries involved.

PNRI's Nuclear Materials Research Section has previously conducted preliminary studies on the potential of uranium extraction from phosphates obtained from the Philippine Phosphate Fertilizer Corporation (PHILPHOS) in Isabel, Leyte.

Representatives from PHILPHOS, the DOST – Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD), the Department of Environment and Natural Resources – Environment Management Bureau (DENR-EMB) and the Coal and Nuclear Minerals Division of the Department of Energy – Energy Resource Development Bureau (DOE-ERDB) as well as scientists and researchers from PNRI participated in the workshop. 

### Regional Practical Training Course in Research Reactor Decommissioning and Associated Material and Waste Management



Lecturers and training participants pose together with PNRI Director Dr. Alumanda M. dela Rosa (seated 5<sup>th</sup> from right); Dr. Patrick O' Sullivan, IAEA Technical Officer (seated 5<sup>th</sup> from left); Mr. Kurt Lauridsen, Consultant (seated 4<sup>th</sup> from left); Mr. Gabor Backso, Consultant (seated 3<sup>rd</sup> from left); Ms. Kristina Kristofova, Consultant (seated 4<sup>th</sup> from right); and Ms. Editha Marcelo, PNRI Radiation Protection Section Senior Science Research Specialist.

The purpose of the training course is to provide implementing and regulating organizations with appropriate analytical and project management tools for the implementation and oversight of safe, appropriate and cost-effective strategies for optimizing decommissioning of research reactors and management of the resulting material and waste.



## Regional Meeting on Receptor Binding Assay to Address Red Tide



Left Photo: (Seated 1<sup>st</sup> row from left) PNRI Atomic Research Division Chief Dr. Soledad Castaneda, IAEA Program Management Officer Ms. Jane Gerardo-Abaya, PNRI Director Dr. Alumanda Dela Rosa, IAEA Scientist and Technical Officer Ms. Marie-Yasmine Dechraoui Bottein and PNRI Nuclear Services Division Chief/Officer in Charge, Office of the Deputy Director Dr. Christina Petrache (Standing 2<sup>nd</sup> row, 2<sup>nd</sup> from right) at a group picture with the experts and participants. Right Photo: PNRI Senior Science Research Specialist Mr. Rhett Simon Tabbada tours the experts and participants inside the PNRI Chemistry Research Section HAB Laboratories.

Doing its part to help reduce the impact of Harmful Algal Blooms (HAB) or red tide throughout the Asia-Pacific region, the PNRI-DOST hosted the first coordination meeting of the International Atomic Energy Agency (IAEA) RAS7026 Project, "Supporting

the Use of Receptor Binding Assay (RBA) to Reduce the Adverse Impacts of Harmful Algal Toxins on Seafood Safety" at Eastwood Richmond Hotel in Quezon City from June 23 to 27.

The meeting was attended by 17 participants from Indonesia, Malaysia, the Philippines, Thailand and the Marshall Islands with experts from Institut Louis Malarde (ILM), French Polynesia; Cawthron Institute, New Zealand; and the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (IOC-UNESCO), Denmark. The IAEA which organized the meeting was represented by Dr. Jane Gerardo Abaya, Section Head for the Technical Cooperation Department in Asia and the Pacific and Programme Management Officer, and Ms. Marie Yasmine Bottein, IAEA Technical Officer. Local participants included scientists, researchers and regulators from the University of the Philippines-Marine Science Institute (UP-MSI), the Bureau of Fisheries and Aquatic Resources (BFAR) and PNRI.

The meeting assessed the technical gaps and constraints for each nation's

*continued on page 9*

### PNRI develops irradiation treatment against mango pulp weevil...from page 3

*mangiferae*) and mango pulp-weevils, making them acceptable for US importation. Mangoes from certain areas in Palawan, on the other hand, were deemed infested by the pulp weevils since 1987 and are subject to strict quarantine to prevent the spread of mango pulp weevil to other islands.

The USDA-APHIS Plant Protection and Quarantine (PPQ) Treatment Manual sets the generic irradiation dose for most pests, including the pulp weevil, at 400 gray (Gy). However, PNRI studies determined that the country's mangoes can only tolerate as far as 300 Gy, hence the need for a more practical minimum radiation dose.

"We are lobbying for a radiation dose that is much lower than the generic dose for pests, such that it will be effective against the local weevil without compromising the quality of our mangoes," said Agriculture Research Section head Glenda Obra.

A cooperation agreement late in 2006 between the PNRI, DA-BPI and the USDA began the development of a quarantine treatment which will allow

Philippine mango exports to enter the United States – not only from Guimaras but also from other mango-producing provinces and regions in the Philippines, particularly Palawan.

The mango pulp weevils were mass-reared in selected sites in Palawan and handled according to DA-BPI's strict requirements. The weevil-infested mangoes were then brought to the PNRI's Cobalt-60 Multipurpose Irradiation Facility to be irradiated at various doses, after which they were dissected at a holding laboratory. Adult male and female weevils were paired to mate and the eggs were collected afterward for study.


PNRI seeks an amendment of the APHIS PPQ manual that will set the 165-Gy dose as the minimum irradiation dose for both the mango pulp weevil and fruit fly as the prescribed generic dose for pulp weevils was proven excessive for Philippine mangoes.

"The irradiation dose for mangoes infested with weevils may also cover the treatment for fruit flies, making the

quarantine treatment very adaptable and efficient," said Ms. Obra.

The Philippines also requested the American government to recognize the mango-producing regions of the country as pulp weevil and seed weevil-free areas, except for Palawan, which is currently eliminating the mango pulp weevil infestation.

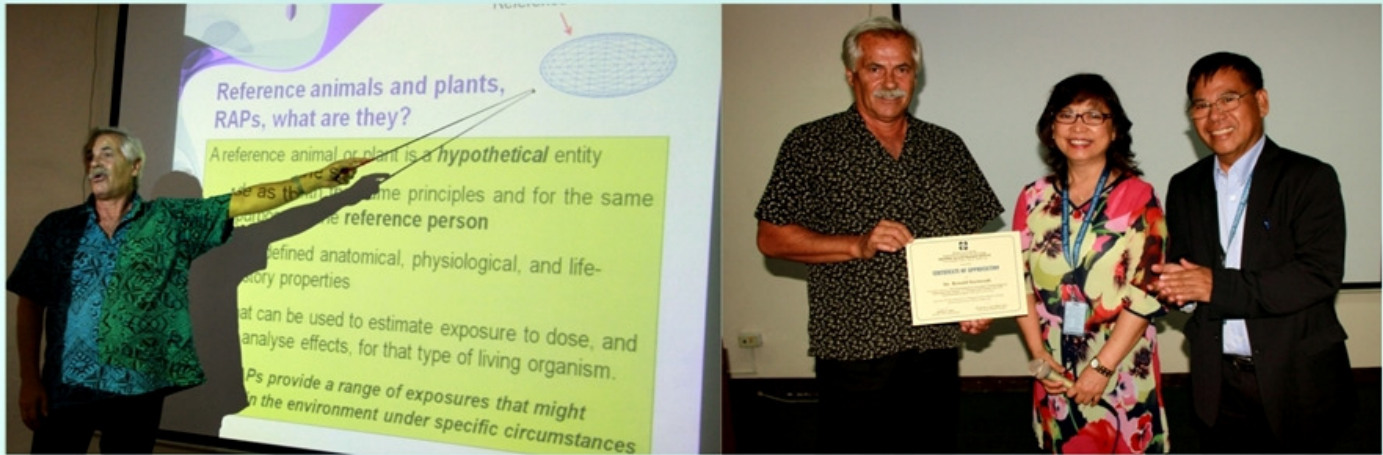
PNRI will also play a major role in implementing the quarantine treatment through the upgrading of its semi-commercial irradiation facility, which already serves hundreds of clients annually through food irradiation and sterilization of medical products, among others. The upgrade will also receive accreditation from the USDA. The DA is also considering proposals to put up its own irradiation facility.

Irradiation as a quarantine treatment is now approved internationally and may provide an alternative to other current treatment methods such as vapor heat treatment, according to Ms. Obra. 



## Technical Experts/Missions

### IAEA Experts Presents Ecological Risk Analysis for Fukushima



International Atomic Energy Agency (IAEA) expert Dr. Ronald Szymczak (left) delivered lectures on radiological risk analysis, marine radioactivity and the 2011 Fukushima Nuclear Accident at the PNRI Atomic Research Division Lecture Series on April 10 and 14. Dr. Szymczak was formerly a radiochemical oceanographer for the Australian Nuclear Science and Technology Organization (ANSTO) and is presently an IAEA consultant and Lead Country Coordinator for RAS 7/021 project "Marine Benchmark Study on the Possible Impact of the Fukushima Radioactive Releases in the Asia-Pacific Region". (Right) Dr. Szymczak is awarded a Certificate of Appreciation by PNRI Atomic Research Division Chief Soledad Castañeda and Health Physics Research Section Head Teofilo Garcia.

### US Department of Energy Strengthens Cooperation with PNRI-DOST on Nuclear and Radiological Emergency Response Capabilities



Left: Seated 1<sup>st</sup> row from left: PNRI OIC, Office of the Deputy Director and Nuclear Services Division Chief Dr. Christina Petrache, NNSA Associate Administrator for Office of Emergency Operations Joseph Krol Jr., Rear Admiral, US Navy (Ret.), PNRI Director Dr. Alumanda Dela Rosa and Mr. Vince McClelland of the NNSA. 2<sup>nd</sup> row from left: Ms. Rica Salcedo of the NNSA, Chemistry Research Section Head Dr. Lucille Abad, Senior Science Research Specialist Cecile De Vera, Finance and Administrative Division Chief Dr. Graceta Cuevas, Inspection and Enforcement Section Head Edgar Racho, Technology Diffusion Division OIC Ana Elena Conjares, Dr. Colin Okada of the NNSA and Kay Greenwell of the US Embassy in Manila. Right: Dr. Okada of the NNSA (2<sup>nd</sup> from right) conducts a demonstration of various radiation detectors on May 7 with members of the PNRI Radiological Emergency Monitoring and Control (REMCON) Teams.

Officials from the United States Department of Energy – National Nuclear Safety Administration (US-DOE-NNSA) met with the officials of the PNRI-DOST to forge further cooperation between the two agencies in the field of emergency preparedness and response to nuclear and radiological emergencies.

The PNRI and the US DOE NNSA signed a Statement of Intent (SOI) on May 6, which includes collaboration on the development of the PNRI Nuclear Response Support Center and community networks, atmospheric plume modeling, risk reduction, incident assessment, joint training and exercises. Both agencies also cooperate with

and support each other under the Global Initiative to Combat Nuclear Terrorism (GICNT), particularly in activities on dealing with radiological dispersal devices (RDD's), radioactive source recovery, nuclear/radiological search and consequence management.



## IAEA Expert Mission in support of the Technical Cooperation Project — Iteration of the Conceptual Design and Performance Assessment of the Proposed Deep Borehole and Near Surface Disposal Facilities in the Philippines



Seated (From Left to Right): Dr. Peter Ormai, IAEA Expert; Dr. Alumanda M. dela Rosa, PNRI Director; Mr. Eric Howell, IAEA Expert and Mr. Teofilo V. Leonin, Jr., NRD Chief.

The International Atomic Energy Agency (IAEA) conducted an Expert Mission from May 10 to 16, 2014 in support of the agency's technical cooperation project with the PNRI – DOST on the establishment of a final radioactive waste repository site. The mission was conducted in collaboration with the members of the interagency technical working group and the project contractors.

The highlight of the mission was the conduct of a site visit that aimed to evaluate the newly drilled 100 meter deep borehole DDH-5 and gained first hand information on the actual site condition and its

surroundings including the status of the other existing four (4) boreholes.

The IAEA experts examined the drilled core from Borehole DDH-5 and drew further analysis based on visual inspection. The mission provided an appraisal of the site data, their quality and their appropriateness to support decisions concerning the co-location of near surface and Borehole Disposal Concept (BDC). The updated information on site data will support further iteration of near field and far field models including the conceptual design of both facilities. The mission further suggested incorporating relevant parameters into a site-specific safety assessment and how they



might be further developed to reduce uncertainties and contribute towards planning for further site investigations. The 2014 TC project implementation, including IAEA inputs in terms of subcontract, fellowships, expert missions, were also discussed and agreed upon during the mission.

A visit to the interim Radioactive Waste Storage Facility located in PNRI was carried out to assess the current status of the facility and discuss further support that the IAEA can provide through the project on the conditioning of other radioactive wastes.

The mission successfully concluded with a debriefing with the PNRI Director, Dr. Alumanda M. dela Rosa, where all findings, suggestions and further support from the agency were discussed and supported upon by both the agency and the project proponent.

### Regional Meeting on Receptor Binding Assay to Address Red Tide...from page 7

marine environment monitoring programs on red tide and the possible cooperative solutions to these problems. Sampling protocols for toxins and strategies to enhance public awareness on the use and acceptance of the RBA as a regulatory tool were among the focus of the discussions.

On the last day, the IAEA experts visited the PNRI Chemistry Research Section HAB laboratories. The institute serves as the IAEA Collaborating Center for the project.

The Philippines is one of the member states participating in the regional project to

promote the radioligand RBA technology for the detection and quantification of HAB toxins in mussels and other shellfishes which prove damaging to the health and business of fishing communities and consumers alike.

"The project starts with a noble purpose which will ultimately benefit our fisher folk and the public at large. It is also very relevant as the HAB problem has not gone away, but has spread to new areas in the Philippines," said PNRI Director Dr. Alumanda Dela Rosa in her welcome address.

The RBA method uses membrane receptors prepared from rat brain which react to the toxins extracted from the shellfish. It was adopted by the Association of Official Analytical Chemists (AOAC) in 2011 as the official method for detecting paralytic shellfish poisoning (PSP).

In the Philippines, PNRI collaborates with the UP-MSI and BFAR in developing a field detection system and in transferring the RBA technology to the regulatory authorities.



## News & Events

### Collector's Ancient Fossils for Elemental Analysis



Renowned collector Larry Gotuaco shares his vast collection of ancient artifacts, rocks and fossils with scientists and geologists from PNRI at his home in Bel-Air Village, Makati City. Mr. Gotuaco also gave PNRI some of the fossil samples, which the Nuclear Analytical Techniques Section (NATA) will subject to elemental analysis. Nuclear Information and Documentation Section Head Rhodora Leonin, Isabella Manjon and Nicole Mariz Deato of SM Lifestyle and Entertainment Inc., Larry Gotuaco, PNRI Director Dr. Alumanda Dela Rosa, Science Research Specialist II Edmundo Vargas of the Nuclear Materials Research Section, OIC, Office of the Deputy Director and Nuclear Services Division Chief Dr. Christina Petrache and Senior Science Research Specialist Raymond Sucgang of the Nuclear Analytical Techniques Section. Ranging from rare seashells (lower left) and centuries-old Chinese ceramics to petrified wood (upper and lower right) and dinosaur remains such as bones (upper left) all the way from the Jurassic Period hundreds of millions of years ago, Gotuaco's collection has been hosted both in national and international exhibits and museums, some of which were donated to PNRI.

### PNRI Hosts 2014 General Election of Quezon City Science Community



From left: Mr. Paul Imjada (QC Government), Dr. Catherine Lagunzad (Ateneo de Manila University), Dr. Jessamyn Marie Yazon (Philippine Science High School System), Dr. Alumanda Dela Rosa (PNRI-DOST), Dr. Bartolome Bautista (PHIVOLCS-DOST), Mr. Jose Ernie Lope (UP), Dr. Julius Lecciones (Philippine Children's Medical Center), Dr. Caesar Saloma (UP Diliman).




As the secretariat of the Quezon City Science Community Foundation Incorporated (QCSCFI), the PNRI-DOST hosted the 2014 General Elections of its Board of Trustees on June 27 at the PNRI compound.

Founded in 1993, the QCSCFI is an organization of scientific, technological, academic and administrative institutions in Quezon City for the purpose of undertaking science and technology ventures to address the needs of the city as well as the country.

The QCSCFI currently has 38 members, including DOST and other government agencies, educational institutions from both secondary and tertiary levels, research institutions, media networks, hospitals and the Quezon City Government.

Former University of the Philippines Diliman Chancellor Dr. Caesar Saloma (extreme right) administered the oath-taking of the newly elected agencies for the Board of Trustees and Sector Representatives: Ateneo de Manila University for President,

QC Government for Vice President, Philippine Science High School System for Secretary and Science Education and Awareness Sector Representative, PNRI for Treasurer, Philippine Institute for Volcanology and Seismology (PHIVOLCS) for Environmental Enhancement and Protection Sector Representative and Philippine Children's Medical Center for Health and Medicine Sector Representative. 



## New 2014 PNRIEU Officers



The newly elected officers of the PNRI Employees Union (PNRIEU) pose with Dr. Alumanda dela Rosa after they took their oath at the Office of the Director on June 27. The oath was administered by PNRI Director Dr. Alumanda Dela Rosa.

### PNRIEU Board Members:

|                                 |                    |
|---------------------------------|--------------------|
| President:                      | Adelina Bulos      |
| 1 <sup>st</sup> Vice President: | Eileen Hernandez   |
| 2 <sup>nd</sup> Vice President: | Haydee Solomon     |
| 3 <sup>rd</sup> Vice President: | Charito Aranilla   |
| Treasurer:                      | Christina Petrache |
| Assistant Treasurer:            | Socorro Intoy      |
| Auditor:                        | Bernard De Lara    |
| PRO:                            | Brenda Pineda      |
| Business Manager:               | Anie Day Asa       |
| Secretary:                      | Janice Mallillin   |
| Assistant Secretary:            | Jennifer Sagum     |

### Directors:

|                      |                         |
|----------------------|-------------------------|
| ARD Level II:        | Celia Asaad             |
| ARD Level I:         | Veriza Rita Cruz        |
| FAD/OD/ODD Level II: | Emma Cancino            |
| FAD/OD/ODD Level I:  | Joanrose Villanueva     |
| NRD Level II:        | Romelda Azores          |
| NRD Level I:         | Allan Flores            |
| NSD Level II:        | Preciosa Corazon Pabroa |
| NSD Level I:         | Eduardo Moog            |
| TDD Level II:        | Christine Singayan      |
| TDD Level I:         | Norma Aliman            |

## PNRI Inter-Color Sportsfest



Proving that they have a sound mind in a sound body, the PNRI Employees Union organized and Inter-Color Sportsfest to encourage sportsmanship and camaraderie among the different divisions.

The overall champion is the Pink Team, followed closely by the Purple Team. The Orange and Apple Green Teams garnered third and fourth place, respectively.

### About Us

The Philippine Nuclear Research Institute (PNRI) is a research and development institute under the Department of Science and Technology (DOST) mandated by law to undertake research and development activities in the peaceful uses of nuclear energy, render nuclear and specialized services and exercise regulatory control in the field of nuclear science and technology. The Institute has been serving the public for the past 55 years, harnessing the beneficial applications of nuclear energy while ensuring the safe use and security of radioactive materials and nuclear facilities for the protection of workers, the general public and the environment.

### PNRI Vision

The PNRI is an institution of excellence in nuclear science and technology propelled by a dynamic and committed workforce in the mainstream of national development.

### PNRI Mission

We contribute to the improvement of the quality of Filipino life through the highest standards of nuclear research and development, specialized nuclear services, nuclear technology transfer and effective and efficient implementation of nuclear safety practices and regulations.



### Editorial Staff

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**Announcement**

**ADMISSION IS FREE**

**2014 NATIONAL SCIENCE & TECHNOLOGY WEEK**

July 24-28, 2014,  
SMX Convention Center, Mall of Asia, Pasay City

**SCIENCE NATION**

Philippines: A Science Nation Meeting Global Challenges  
exhibits events inventions exhibits events inventions exhibits events inventions

**GENERAL PROGRAM OF ACTIVITIES**

| Date                             | Activity                                      | Place/Venue                         |
|----------------------------------|---|-------------------------------------|
| <b>Day 1: 24 July (Thursday)</b> |   |                                     |
| 9:00 - 12:00 nn                  | Opening Ceremonies/Opening of Exhibits        | Main Stage, SMX, Pasay City         |
| 11:00 - 12:30 nn                 | I Am Ready!                                   | Forum Hall 1, SMX, Pasay City       |
| 1:00 - 5:00 pm                   | 9 <sup>th</sup> Knowledge Exchange Conference | Main Stage, SMX, Pasay City         |
| 1:00 - 5:00 pm                   | Scientific Forum on Emerging Technologies     | Forum Hall 1, SMX, Pasay City       |
| 1:00 - 5:00 pm                   | Drugs and Diagnostics Forum                   | Forum Hall 2, SMX, Pasay City       |
| 2:00 - 5:00 pm                   | ASEAN Integration in 2015                     | Meeting Rm 7 & 8, SMX, Pasay City   |
| 2:00 - 5:00 pm                   | PINOY Rice on the Rise                        | Outcome 1 Pavilion, SMX, Pasay City |
| 5:00 - 6:00 pm                   | Speed Networking Session                      | Forum Hall 1, SMX, Pasay City       |
| 5:00 - 7:00 pm                   | Stakeholders' Night                           | Main Stage, SMX, Pasay City         |
| 5:00 - 7:00 pm                   | 3D Tech for EveryJuan™                        | Forum Hall 2, SMX, Pasay City       |
| <b>Day 2: 25 July (Friday)</b>   |   |                                     |
| 8:00 - 12:00 nn                  | E-Gov Forum                                   | Main Stage, SMX, Pasay City         |
| 8:00 - 5:00 pm                   | Technology Investment Forum                   | 2nd Floor, SMX, Pasay City          |
| 8:00 - 5:00 pm                   | 3 <sup>rd</sup> ERDT Congress                 | 3rd Floor, SMX, Pasay City          |
| 9:00 - 11:00 am                  | Hayop ni Juan Dala'y Kabuhayan                | Outcome 1 Pavilion, SMX, Pasay City |
| 10:00 - 12:00 nn                 | TRC Forum: Magsimula Ka!                      | Forum Hall 1, SMX, Pasay City       |
| 10:00 - 12:00 nn                 | Radiation: May Benepisyo Itol! (PNRI)         | Forum Hall 2, SMX, Pasay City       |
| 1:00 - 3:00 pm                   | Awarding of SETUP Adoptors                    | Main Stage, SMX, Pasay City         |
| 1:00 - 5:00 pm                   | In Touch with Excellence                      | Midas Hotel, Roxas Blvd, Pasay City |
| 1:00 - 5:00 pm                   | Blue Productivity Technologies                | Forum Hall 1, SMX, Pasay City       |
| 1:00 - 5:00 pm                   | Rural Impact Sourcing and e-Commerce          | Forum Hall 2, SMX, Pasay City       |
| 3:00 - 5:00 pm                   | Forum on Smart Innovations                    | Main Stage, SMX, Pasay City         |
| 5:00 - 6:00 pm                   | Speed Networking Session                      | Forum Hall 1, SMX, Pasay City       |
| 5:00 - 7:00 pm                   | Scholars' Night                               | Main Stage, SMX, Pasay City         |
| <b>Day 3: 26 July (Saturday)</b> |   |                                     |
| 8:00 - 10:00 am                  | eHealth Forum                                 | Main Stage, SMX, Pasay City         |
| 8:00 - 10:00 am                  | S&T Post eBook Launch                         | Forum Hall 2, SMX, Pasay City       |

| Date                           | Activity   | Place/Venue                         |
|--------------------------------|--|-------------------------------------|
| 8:00 - 12:00 nn                | Innovative and Strategic STEM Education                                    | PSHS Campus, Quezon City            |
| 8:00 - 5:00 pm                 | Bio Camp   | Forum Hall 1, SMX, Pasay City       |
| 9:00 - 11:00 am                | Makabagong Teknolohiya para sa Nagbabagong Panahon                         | Outcome 1 Pavilion, SMX, Pasay City |
| 10:00 - 12:00 nn               | Food Safety Forum  | Forum Hall 2, SMX, Pasay City       |
| 1:00 - 3:00 pm                 | Forum on Packaging Innovation  | Forum Hall 2, SMX, Pasay City       |
| 1:00 - 5:00 pm                 | Niyog ni Juan Huwag Pabayaang, Nang Kasaganaan ay Makamtan                 | Main Stage, SMX, Pasay City         |
| 3:00 - 5:00 pm                 | Nutrition Tools & Food Tech Forum  | Forum Hall 2, SMX, Pasay City       |
| 5:00 - 6:00 pm                 | Speed Networking Session   | Forum Hall 1, SMX, Pasay City       |
| <b>Day 4: 27 July (Sunday)</b> |  |                                     |
| 7:30 - 9:00 am                 | Health & Wellness  | Forum Hall 1, SMX, Pasay City       |
| 8:00 - 12:00 nn                | NICE Awarding Ceremonies   | Main Stage, SMX, Pasay City         |
| 8:00 - 12:00 nn                | Alternative Election System Forum  | Forum Hall 2, SMX, Pasay City       |
| 9:00 - 5:00 pm                 | Gulayan sa Kamaynilaan   | Outcome 1 Pavilion, SMX, Pasay City |
| 10:00 - 12:00 nn               | Forum on Community Empowerment Through S&T                                 | Forum Hall 1, SMX, Pasay City       |
| 1:00 - 5:00 pm                 | IT-BPM Careers   | Main Stage, SMX, Pasay City         |
| 1:00 - 5:00 pm                 | Science Journalism Writeshop   | Forum Hall 1, SMX, Pasay City       |
| 1:00 - 5:00 pm                 | Natural Dyes: "Dito Mabubuhay Ka"  | Forum Hall 2, SMX, Pasay City       |
| 5:00 - 6:00 pm                 | Speed Networking Session   | Forum Hall 1, SMX, Pasay City       |
| <b>Day 5: 28 July (Monday)</b> |  |                                     |
| 8:00 - 10:00 am                | Beep...Beep...FEA Nandito Na! Ligtas Na Sasakyang Pamasada, Aarangkada Na! | Forum Hall 1, SMX, Pasay City       |
| 10:00 - 12:00 nn               | Ang Kalawang, Ayaw ni Juan, DOST May Paraan (MIRDC)                        | Forum Hall 1, SMX, Pasay City       |
| 8:00 - 5:00 pm                 | iGovPhil Forum   | Forum Hall 2, SMX, Pasay City       |
| 8:00 - 5:00 pm                 | Robotics Challenge   | Main Stage, SMX, Pasay City         |
| 1:00 - 5:00 pm                 | SciDev Forum   | Forum Hall 1, SMX, Pasay City       |



**DEPARTMENT OF SCIENCE AND TECHNOLOGY**

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