

Message from the Director



On behalf of the officials and staff of the Philippine Nuclear Research Institute (PNRI), I have the honor to present our agency's Annual Report for 2007. I would like to cite some highlights of the Report.

National nuclear institutions worldwide are now confronted with the need to preserve nuclear knowledge accumulated over the past 50 years which may otherwise be lost due to the natural process of attrition and succession within their organizations. To address this concern, the PNRI has embarked on its nuclear knowledge management program which aims to institutionalize nuclear knowledge management through knowledge generation, knowledge transfer and sharing, knowledge codification and mapping, knowledge preservation and repositories, and communities of practice and networking, thereby ultimately ensuring the availability of trained manpower in nuclear science and technology. As a strategy to implement this program, the PNRI has enhanced its Linux-based Intranet and developed an on-line, web-based nuclear knowledge portal called the PNRI Web Center for Nuclear Knowledge Resources. The PNRI has made use of its participation in several nuclear networks, to enrich its knowledge pool and to foster knowledge transfer and sharing.

In the area of nuclear agriculture, the PNRI has closely collaborated with the Department of Agriculture (DA) in addressing outstanding technical concerns in using irradiation technology as a phytosanitary treatment for the export of our mangoes. Towards this end, pilot-scale studies were undertaken which confirmed that the maximum dose that can be tolerated by our mangoes is 300 Gray. Further, following stringent requirements of the Bureau of Plant Industry in the handling of the mango pulp weevil (MPW) which attacks mangoes in Palawan, the PNRI and DA scientists conducted the first study on the radiosensitivity of this insect with the encouraging results showing that the adult MPW treated with 100 Gy did not lay eggs. The results of an advocacy program on food irradiation conducted in 11 regions in Luzon and the Visayas augur well for the acceptance of the food irradiation technology.

The PNRI is steadily developing its technical capability in isotope techniques for the protection and management of water resources. The detection limit of methods used influence the success of such techniques. Tritium, one of the environmental radiotracers used to characterize groundwater, is present in such low quantities that good radioanalytical techniques are essential to be able to accurately detect it. PNRI has attained uncertainties of ± 0.2 tritium units (TU) which is comparable to the detection limits obtained by the Isotope Hydrology Laboratory of the International Atomic Energy Agency (IAEA), the Reference Laboratory. The acquisition of a new Isotope Ratio Mass Spectrometer (IRMS) would enable the PNRI to undertake stable isotope analyses within the country and will spur tremendously its work in this area.

The PNRI has fostered its collaboration with the IAEA, the US Department of Energy and the Australian Nuclear Science and Technology Organization in the area of nuclear safety and security with the following outputs. The bill providing for the creation of a separate nuclear regulatory body was submitted to the DOST for inclusion in the legislative agenda of the President. The capabilities of PNRI in the search and security of lost/disused sources and in radiological emergency preparedness have been augmented through training and provision of new equipment. These were put to test in the participation of the PNRI team in the IAEA-organized Ukraine exercise which tested several national field monitoring teams in real radioactive environment. The Philippines performed well relative to the other participating countries.

The assistance and enthusiasm of our collaborators, stakeholders and the public at large, for which we are very grateful, encourage us to set our standards of performance even higher in the service of the Filipino people.

Alumanda M. Dela Rosa, Ph.D.
Director



Diffusion of Knowledge and Technologies

The PNRI continued to familiarize various sectors, as well as the public, with the beneficial uses of nuclear science and technology through the continuing conduct of its nuclear training program and the implementation of its information, education and communication activities using various strategies.

ADVOCACY PROGRAM ON FOOD IRRADIATION

An Advocacy Program on Food Irradiation, which consisted of seminars, press conferences, consultative meetings and consumer acceptance surveys, was undertaken in 11 regions in Luzon and in the Visayas. The Institute's Biomedical Research Group implemented the program in collaboration with the regional directors of the Department of Agriculture, policy makers, industry, academe, and stakeholders. The seminars were participated in by 1,147 representatives from government and private sectors in the regions and the press conferences were attended by 94 representatives from radio, television, print and cyber media. Consultative meetings were held with representatives of the food sector and cooperatives to discuss the possibility of putting up a commercial irradiation facility. The results of the surveys showed willingness of the participants, as consumers, to accept the food irradiation technology provided that they are given factual and accurate information about it.



PNRI CONDUCTS ADVOCACY SEMINAR ON FOOD IRRADIATION

In addition to this year-long activity, PNRI scientists and an expert from the United States Department of Agriculture facilitated the training of 32 Philippine Quarantine Officers from Luzon, Visayas and Mindanao on the monitoring, certification and inspection of irradiated food commodities for local and international trade.

NUCLEAR TRAINING

The Institute's Nuclear Training Center conducts training courses on nuclear science and technology annually to develop human resources in the nuclear field. In 2007, a total of 664 participants from private and government institutions participated in the 35 training courses conducted by PNRI. These courses were on radioisotope techniques for medical applications; nuclear science for high school science teachers and college faculty; radiation safety in the use of nuclear equipment/devices and medical radiopharmaceutical facilities; and nondestructive testing (NDT). The NDT courses conducted by PNRI, in cooperation with the Philippine Society of Nondestructive Testing (PSNT), were on Radiographic Testing, Ultrasonic Testing, Eddy Current Testing, and Surface Methods. The participants to the 35 training courses were composed of medical practitioners, educators, researchers, engineers, and technicians. (Please refer to Appendices, Table 1 on page 32 for list of PNRI Training Courses conducted in 2007).

As part of PNRI's apprenticeship program for undergraduates, PNRI arranged/coordinated on-the-job training for 60 high school and college students from 17 schools/universities; and three students from one school for thesis advisorship. These students were assigned to the various PNRI laboratories and worked under the supervision of PNRI researchers. (Please see Appendices, Table 2 on page 33).



PNRI CONDUCTS TRAINING COURSES ON NUCLEAR SCIENCE AND TECHNOLOGY

INFORMATION SERVICES

The PNRI continued to increase awareness and enhance knowledge and understanding of the public and different stakeholders on safe and beneficial applications of nuclear energy through PNRI's various information, education and communication activities.

Development/Distribution of Information Materials. The Institute developed and produced the 2006 PNRI Annual Report and brochures on nuclear energy applications. Copies of these materials, together with those of existing brochures, were distributed to around 11,800 clients. Four posters/banners were likewise produced. Two posters dealt with "Regulating the Uses of Nuclear Materials" and "Ensuring Safety and Security of Sealed Radioactive Sources in the Philippines" while the rest featured the "PNRI-Its Mission and Vision" and the interactive multimedia CD entitled "The Atom, Radiation, and Radioactivity". These posters were exhibited during national science and technology fairs and other events.



POSTERS ON NUCLEAR REGULATIONS AND SAFETY / SECURITY OF SEALED RADIOACTIVE SOURCES IN THE PHILIPPINES

Educational Tours and Nuclear Awareness Seminars. About 5,100 students, teachers, and researchers from government and private institutions came to PNRI for an educational tour. The visitors were provided with guided tours of the Institute's facilities and laboratories; lecture-demonstrations and audio-visual presentations on nuclear science and technology. A total of 1,076

students and teachers were also made aware of nuclear science and technology through 19 seminars that the PNRI conducted in ten government and private secondary schools and colleges in Metro Manila and in other regions. These included the nuclear awareness seminars that the PNRI conducted in Lal-lo,



HON. MARIA OLIVIA B. PASCUAL, MAYOR OF LAL-LO, CAGAYAN, DELIVERS HER MESSAGE AT THE OPENING CEREMONIES ON NUCLEAR AWARENESS SEMINAR AT THE DUPAYA SPORTS COMPLEX, LAL-LO, CAGAYAN



Celebration (NSTW) on July 17 - 19 at the PAGASA Science Garden, Agham Road, Quezon City; (3) Science, Technology and Innovation to Progress, September 27 - 28 at the Justice Cecilia Muñoz Palma High School, Payatas, Quezon City; (4) San Isidro Pahiyas Festival, Lucban, Quezon, 15 May 2007; and (5) the 35th Atomic Energy Week celebration on December 10-14 at the PNRI in Diliman, Quezon City. The number of clients to these events was around 9,500.

Nuclear S & T Promotion Through Media Linkages. Through the print, broadcast and cyber media, the public were made aware of various nuclear science and technology activities in the country. This year, the following PNRI technologies and services were featured: nuclear power for sustainable development, PNRI projects in agriculture, food irradiation, and Atomic Energy Week activities.



THE PNRI EXHIBIT DURING THE PAHIYAS FESTIVAL IN LUCBAN, QUEZON

Cagayan in September and at the Mariano Marcos State University in Batac, Ilocos Norte in October.

Participation in Special S & T Events. PNRI featured the beneficial applications of nuclear science and technology in five special science and technology related events, namely (1) Annual Science Exhibit at Diliman Preparatory School on February 1 at Diliman, Quezon City; (2) Quezon City Science Community - National Science and Technology Week



A MOTORCADE PARTICIPATED IN BY QUEZON CITY-BASED DOST AGENCIES WAS ONE OF THE ACTIVITIES OF THE QCSC NSTW CELEBRATION



PNRI DIRECTOR DR. ALUMANDA M. DELA ROSA GIVES A MESSAGE AT THE OPENING CEREMONIES OF THE QUEZON CITY SCIENCE COMMUNITY CELEBRATION OF NSTW



DOST PRESS CONFERENCE ON NUCLEAR POWER FOR SUSTAINABLE DEVELOPMENT AT SULO HOTEL IN JUNE 2007. IN PHOTO ARE (L-R) CHRISTINA A. PETRACHE, PNRI FOCAL PERSON ON NUCLEAR POWER (PNRI), PNRI DIRECTOR ALUMANDA M. DELA ROSA, DOST UNDERSECRETARY GRACIANO P. YUMUL, JR AND DOST ASSISTANT SECRETARY CAROL M. YOROBÉ



LIBRARY SERVICES

The PNRI Library staff assisted a total of 2,725 clients (mostly students) in accessing and retrieving information on various topics about nuclear science and technology.

To further support research requirements and to enhance its library collection, the PNRI continued to participate/contribute to the following: (1) International Nuclear Information System (INIS) database. INIS maintains a database containing 2.9 million bibliographic references and abstracts worldwide on nuclear technology and which could be accessed through the Internet (<http://www.iaea.org/inisnkm>); (2) DOST Science and Technology Information Network or SCINET-PHIL (<http://www.scinet.dost.gov.ph>), a network of S & T libraries in the DOST system; and (3) the Philippine e-Library (<http://www.elib.gov.ph>) project.

USE OF OPEN SOURCE WEB DEVELOPMENT TOOLS IN IMPROVING THE NUCLEAR KNOWLEDGE PORTAL FOR THE PNRI

The Computer Services Group designed and developed an on-line web-based nuclear knowledge portal using open source tools. The portal, named "The PNRI Web Center for Nuclear Knowledge Resources" (<http://www.pnri.dost.gov.ph/km>), is an on-line repository capable of supporting the capture, storage, retrieval and utilization of nuclear knowledge that may be shared with other commercial and/or research organizations involved in the field of nuclear technology.

The following are the knowledge fields targeted in this project: national and international nuclear regulations and standards; knowledge acquired by participants of national, regional and international trainings, seminars or workshops in the nuclear field; knowledge gained in participation and collaboration with national, regional and international projects; processes and procedures used in the conduct of routine work in the Institute; outcomes and results of research projects; lessons learned from all these venues; a list of owners of certain knowledge, expertise and competencies; and links to other knowledge bases.





Generation of New Knowledge and Technologies

Through its research and development activities, the PNRI continues to advance the safe and beneficial applications of nuclear science and technology in the country. It has generated significant accomplishments in the field of food and agriculture; human health and medicine; radiation technology and processing; industry; protection and management of water resources; and in environmental protection and management.

Basic Research

HIGH TECHNOLOGY MATERIALS DEVELOPMENT

Development and Applications of X-Ray Spectroscopic Techniques in the Characterization of Advanced Materials

The PNRI is undertaking research and development studies on the use of X-ray spectroscopic techniques for characterizing advanced thin film materials, especially organic nanometer thin films. These studies are aimed at developing PNRI capability to prepare mono and multilayer organic thin films for novel applications such as molecule-specific sensors, and super absorbent surfaces for immobilizing (trapping) molecules, pollutants, water impurities and aerosols, among others. Through these studies, PNRI aims to develop and refine its capability to

perform nanometer film characterization by X-ray reflectometry and X-ray standing wave spectroscopy to determine film properties such as thickness, roughness, density and others.

Development of Rare Earth Garnets for Very High Frequency Application

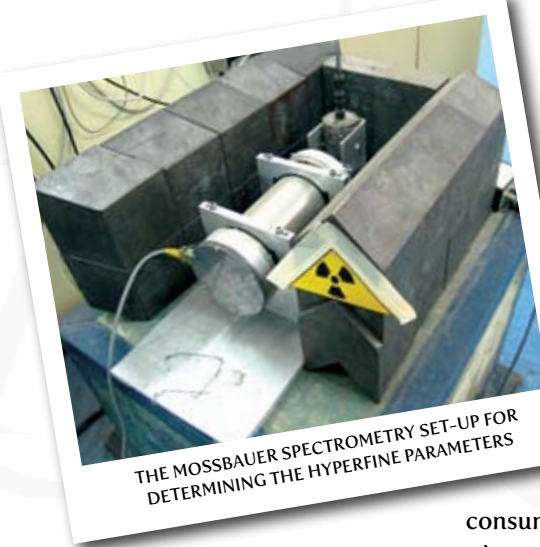
The Applied Physics Research Group has an on-going study on developing rare-earth garnets ferromagnetic materials for very high frequency applications, $Y_2Fe_{5-x}Al_x$ into $x=0, 0.25, 0.5, 0.75, 1.25$ and 1.5 by the oxide sintering method.

The various substitutions of the Fe^{+3} by Al^{+3} resulted in changes in the occupancy of the tetrahedral and octahedral sites causing changes in the values of the internal magnetic field. Mossbauer effect spectrometry and X-ray diffraction were used to determine site occupancy and measure the resulting internal magnetic field.

The data obtained from the study can be used to study the influence of substitution on magnetic properties and phase composition of these very important materials.

Kinetics of Paralytic Shellfish Poisoning (PSP) Uptake in Mussel

How fast the PSP toxins are taken up and released by



THE MOSSBAUER SPECTROMETRY SET-UP FOR DETERMINING THE HYPERFINE PARAMETERS

shellfish are important information for implementing a PSP monitoring scheme aimed at safeguarding public health while at the same time minimizing the losses of the shellfish industry.

A radioassay method, i.e. the Receptor Binding Assay (RBA) and a chemical method, High Performance Liquid Chromatography (HPLC) were used for studying the uptake of PSP toxins in the green bay mussel *Perna viridis* highly consumed in the Philippines. Uncontaminated mussels were introduced in Juag Lagoon, a body of water that is experiencing recurrent natural blooms of *Pyrodinium bahamense* var *compressum* (PBC).

The RBA method enabled measurements of low level of toxicity in mussel induced by feeding at low PBC cell density ($\sim 10^2$ - 10^3 cells/L) that is representative of early stages of toxic algal blooms. The results indicated that within 16 hours, toxicity is taken up by green mussel confirming its suitability as an indicator organism for paralytic shellfish toxicity in bivalves during the early stages of the bloom. Results also demonstrated that smaller mussels take up more toxins per body weight than the bigger ones.

Potential Application of Carboxymethyl-k-carrageenan Hydrogels as Wound Dressing

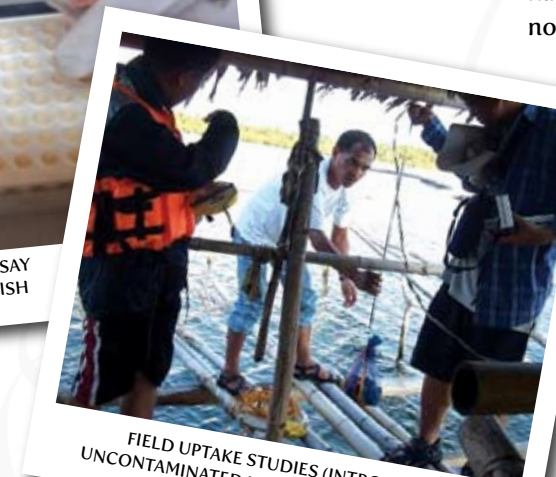
The Institute has been undertaking research studies on hydrogels based on natural polymers, especially polysaccharides such as carrageenan, as potential wound management aids. Selected carboxymethyl-k-carrageenan hydrogels successfully crosslinked via gamma irradiation at PNRI were further evaluated for its potential application as wound dressing. The hydrogels were evaluated in terms of the following:

Mechanical strength. A hydrogel wound dressing must have an appreciable mechanical strength and should not disintegrate during and after use in order to prevent small gel debris to be left in the wound area. The tested carrageenan hydrogels, which were irradiated with gamma radiation doses of 20, 30 and 50 kGy, showed increase in tensile strength. CMκC-3s gave higher tensile strength than CMκC-2s due to higher gel fraction and crosslink density in its network.

Swelling in pseudo extracellular fluid (PECF). An ideal wound dressing is able to absorb wound fluid to prevent a secondary infection of bacteria. The hydrogels were able to absorb exudates more than



RECEPTOR BINDING ASSAY FOR PARALYTIC SHELLFISH POISONING TOXINS



FIELD UPTAKE STUDIES (INTRODUCING UNCONTAMINATED MUSSELS IN THE STUDY SITE)

30 times its weight after eight hours of soaking in PECF solution. CM κ C-2s continuously absorbed even after 48 hours while CM κ C-3s reached equilibrium after 24 hours.

Acidity and conductivity studies. Wound healing is promoted when the pH of skin (4-6.8) and wound area are maintained at slightly lower pH, hence aqueous extracts of hydrogels having pH in this region should be an advantage. Extracts from the hydrogels were in slightly acidic range because of the incorporation of sol part which contains acidic groups. In terms of conductivity, CM κ C-3s has a higher conductivity compared to CM κ C-2s. The higher the conductivity is, the higher the analgesic effect.



A PNRI CHEMISTRY STAFF UNDERTAKES STUDIES ON PROPERTIES OF CARBOXYMETHYL K-CARRAGEENAN AT THE T QUANTUM BEAM SCIENCE DIRECTORATE IN JAPAN AS PART OF HER ON-THE-JOB TRAINING.

Nuclear Applications in Food and Agriculture

INDUCTION OF BENEFICIAL MUTATION THROUGH IRRADIATION FOR CROP IMPROVEMENT

Rice – As part of the cooperative project with the Forum for Nuclear Cooperation in Asia (FNCA), the PNRI initiated a project on the development of rice mutants with desirable agronomic traits and good eating quality (low to intermediate amylose content) and high protein content. This year, field experiments were conducted at the PNRI to determine the effects of different doses of gamma radiation on yield, amylose and protein contents of the rice variety, IR-72, (a high yielding variety with high amylose content). Analysis of results is in progress.



ONE OF THE MUTANT MUNGBEAN VARIETIES STUDIED AT PNRI IS THE 2917A VARIETY

MUTANT RICE VARIETIES ARE PLANTED AT THE PNRI EXPERIMENTAL RICE FIELD FOR FURTHER STUDIES

Soybean – PNRI, in collaboration with the Bulacan National Agricultural State College, continued its mutation breeding studies in soybean to (1) develop drought tolerant varieties, and (2) to collect, identify and utilize germplasm of drought tolerant crops for national and regional breeding program in agricultural research institutions. The soybean varieties being studied by PNRI included irradiated varieties from Vietnam (DT-95, DT-84, and AKO-6) and Philippine varieties (BPI-Sy-4, NSIC, PSB-Sy5 and PBS-Sy-4). In 2007, the sixth and seventh generations of selected drought tolerant mutant lines were planted at the PNRI experimental field for further evaluation, seed selection and multiplication. This project is being undertaken as part of the Multilateral Research Program of the FNCA.

Mungbean – A new project on development of new and improved varieties of mungbean was started at PNRI under IAEA / RCA. This project aims to address the problems associated with (1) crop quality (such as protein, ash, fibers, carbohydrates, fats, minerals or vitamin contents) and (2) stress tolerance of mungbean particularly to drought, high temperature, salinity and soil acidity which adversely affect overall production in the country.

For this project, five radiation-induced mungbean mutant varieties with high yield potential were tested and evaluated in the field to select and identify mutant lines with desirable crop qualities. These varieties, which were obtained from previous studies, included Psj-B-II-17-6, NM51xVC1973A, 2917A, KPS 2 and Psj-S-31. Analysis of results is in progress.

Mangosteen and Cashew – PNRI, in cooperation with other research institutes, continued its mutation breeding studies to develop these high value crops with increased yield, improved quality of fruits, short stature (dwarf) to facilitate harvesting, early maturity and non-seasonal fruit production.

This year, the irradiated mangosteen seeds given to farmer cooperators in Lucban, Quezon in 2006 were maintained for further evaluation. Another batch of seedlings obtained from Davao and Lucban, Quezon irradiated at 5 to 50 Gy were also grown and maintained at the PNRI greenhouse and in the field together with the unirradiated ones for selection of desirable mutants. Tissue culture studies were also undertaken to facilitate the mass propagation of irradiated seedlings. Results showed that all one-half and one-third cotyledon seed explants inoculated in all the medium treatments used produced root or shoot forms and callus-like growth at 30 Gy, four weeks after germination. Further studies will be conducted to confirm this result.

In cashew, a total of 87 from the original 99 seedlings of Makiling variety irradiated with 100 to 300 Gy dose of gamma radiation in March 2006 were maintained at the cooperator's orchard in Morong, Bataan. Majority of plants obtained from seeds treated with 300 Gy were short-statured while most of those obtained from seeds exposed to 100 Gy were similar to the control (unirradiated) plants. At the PNRI field, a total of 55 irradiated and unirradiated plants were maintained. Two plants from 100 Gy and one plant from 400 Gy flowered at different periods but did not bear any fruit. The unirradiated plants, on the other hand, did not produce any flower.



CASHEW PLANT AT FLOWERING STAGE

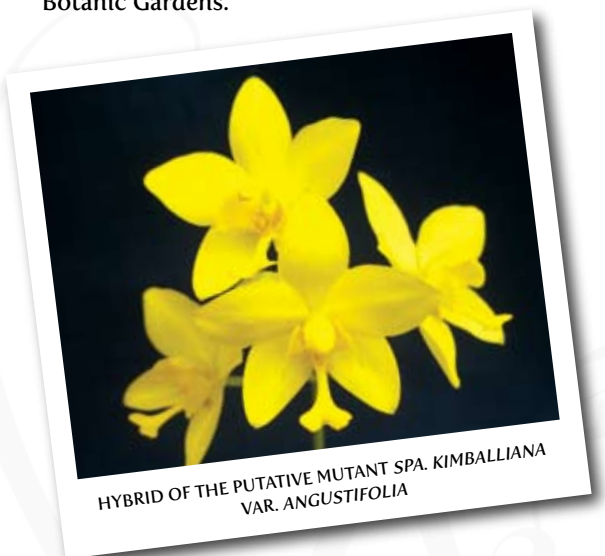
ORNAMENTALS

PNRI researchers are using gamma radiation, coupled with tissue culture technique and related biotechnology, for genetic improvement of ornamental crops.

Chrysanthemum. Chrysanthemum shoots in the ninth generation, which were previously irradiated with 20 Gy gamma radiation and were planted in soil, had the most number of transplanted plants that survived. These shoots also exhibited dwarfism (stunted growth) as compared to the unirradiated ones and with those irradiated at 10 Gy. However, prolific flower bud formation was observed in plants irradiated with 10 Gy. All plants with different dose treatments (10Gy, and 20Gy) and the unirradiated ones flowered at the same time.

Spathoglottis Orchids. PNRI implements this DOST Grants- in- Aid funded project with five cooperators from the private sectors who are commercial growers of ornamental plants.

This year, the PNRI determined the effects of gamma radiation on embryos, protocorms or germinated embryos and seedlings of the common ground orchid, *Spathoglottis plicata*. Results showed that the irradiation of embryos at 10 Gy enhanced growth and root elongation. The seedlings of the narrow-leafed yellow ground orchid, *Spa. kimballiana* var. *angustifolia*, whose protocorms have been irradiated were likewise studied and observed to be lacking in pigments (albinism), have purple pigmentation or anthocyanin production, forked leaves, split seedlings or furcation, and multiple branching. The selected putative mutant from irradiated *Spa. kimballiana* var. *angustifolia* was used to produce the hybrid *Spa. 'Lion of Singapore'* with *Spa. vanoverberghii* as male parent. This hybrid differed completely from the variety registered by the Singapore Botanic Gardens.



HYBRID OF THE PUTATIVE MUTANT SPA. KIMBALLIANA VAR. ANGUSTIFOLIA

Other Orchids. Waling-waling (*Vanda sanderiana*) orchids grown individually in pots from *in-vitro* cultures produced 223 plantlets (167 unirradiated plantlets and 56 irradiated ones). For *Cattleya* sp. orchids, 487 seedlings survived out of the 570 compotted plantlets, with 10 Gy irradiated plantlets giving the most number of plantlets that survived. A total of 815 orchid plantlets (*Vanda* and *Cattleya* sp.) from 973 planted in compots survived in the screenhouse five months after compotting. These are being grown for flowering. *Cattleya* orchids previously pollinated and grown *in-vitro* and *in-vivo* at the PNRI Agricultural Research produced flower three years from *in-vitro* germination.

IMPROVEMENT OF STERILE MALE PERFORMANCE OF ORIENTAL FRUIT FLY FOR STERILE INSECT TECHNIQUE PROGRAMS

The PNRI continued to conduct research studies in improving mating competitiveness of sterile *Bactrocera philippinensis* for the Sterile Insect Technique (SIT) Program. SIT is an area-wide method of insect control which involves mass rearing, sterilization with gamma radiation and release of sterile fruit flies into the target areas to control reproduction in the field. As part of this project, field cage mating tests using sterile male fruit flies exposed to methyl eugenol, one of the major natural attractants of *Bactrocera*, were conducted. Adult diets, with or without protein, were also evaluated to determine the effects of protein on survival / longevity and on the mating competitiveness of sterile male *B. philippinensis*.

IMPROVEMENT OF MASS REARING METHODS FOR ORIENTAL FRUIT FLY

The Institute continued its studies on the improvement of mass rearing technologies for Oriental fruit fly, *Bactrocera philippinensis*, as part of the Sterile Insect Technique (SIT) program for the control of fruit flies. These studies included the evaluation of the different bulking agents such as sugar cane bagasse, rice straw and powdered corn to replace sweet potato in the larval diet. The introduction of the new formulated liquid diet as a larval substrate showed positive results.

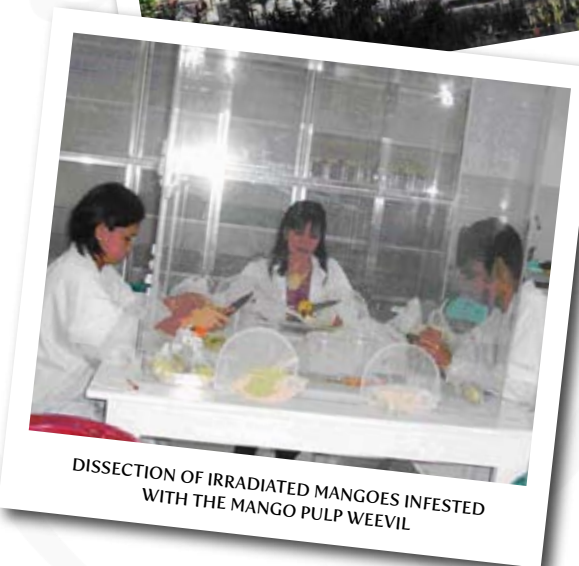
ESTABLISHMENT OF RADIATION DOSE FOR QUARANTINE TREATMENT OF MANGO PULP WEEVIL IN PHILIPPINE CARABAO MANGOES

PNRI, in collaboration with the Department of Agriculture Region IV-B, is using gamma irradiation as a

treatment method for the sterilization or prevention of the reproduction of the mango pulp weevil. This is being carried out under the program entitled "Enhancing the Export Competitiveness of the Philippine Super Mangoes" funded by the United States Department of Agriculture. The results of these studies will serve as a basis in allowing mango exports to the U.S., not only from Guimaras Island, but also from other areas of the Philippines.

Based on initial results obtained by pairing 50 males and 50 females per treatment and irradiating at doses ranging from 25 to 400 Gy, adult mango pulp weevils treated with 100 Gy or higher did not lay eggs.

THE MANGO PULP WEEVIL HOLDING LABORATORY AT PNRI



ASSESSMENT OF SOIL EROSION IN CRITICAL WATERSHEDS USING FALL-OUT RADIONUCLIDES

A nuclear technique using the fallout isotope present in most soil surfaces – cesium-137 (Cs-137) - has been used by PNRI in estimating soil erosion rates in agricultural areas. The technique involves the measurement of Cs-137 in soil samples using a high purity Germanium detector. These measurements

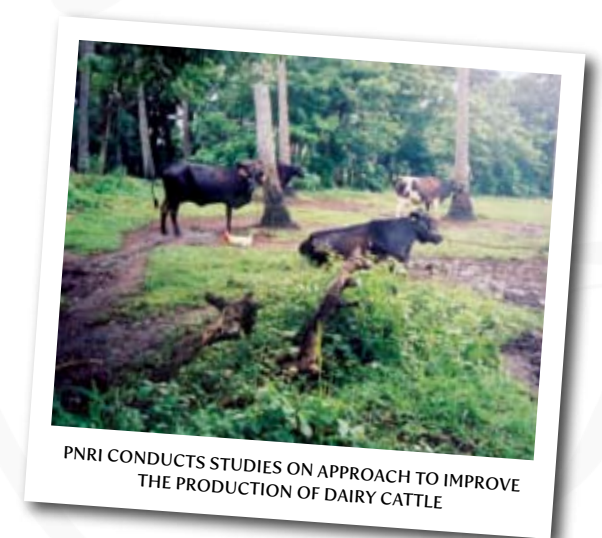
are then converted to estimates of soil erosion/ sedimentation rates using calibration models. Data obtained from this study are useful in formulating measures in soil conservation, crop planning and land-use management. The soil erosion rate data will also provide a basis for a sediment management plan for a dam.

In 2007, PNRI applied the Cs-137 tracer technique to measure erosion and sedimentation rates in specific sites in Inabanga Watershed in Bohol and Angat Watershed in Bulacan. The Inabanga Dam supplies water mostly for agricultural use while Angat Dam supplies water for both agricultural and domestic use. Results of the studies showed that erosion rates in Inabanga, Bohol range from 2 to 11.3 tons per hectare per year. The erosion is expectedly lesser in the forested areas than in cultivated cassava fields. The erosion rate values obtained from the Angat watershed are greater in magnitude (Range 1.1 to 34.7 tons per hectare per year), where erosion was greater in the mango orchard and least in the grasslands.



INTEGRATED APPROACH TO IMPROVE CATTLE PRODUCTION USING INDIGENOUS RESOURCES

PNRI has been helping dairy cattle farmers in improving the breeding and nutritional management of dairy cattle through radioimmunoassay (a nuclear technique of measuring reproductive hormone) and the use of urea molasses mineral block as food supplement. For 2007, PNRI conducted a study on decreasing discharges from cattle manure into the environment by utilizing the manure as organic fertilizer to increase crop yield. A stable isotope, nitrogen-15, was used to assess the available nutrients in the manure, and to calculate the appropriate application rates to ensure that the nutrients (nitrogen and phosphorus) needed for the crop are met. Available data for this project is being analyzed.



Human Health and Medicine

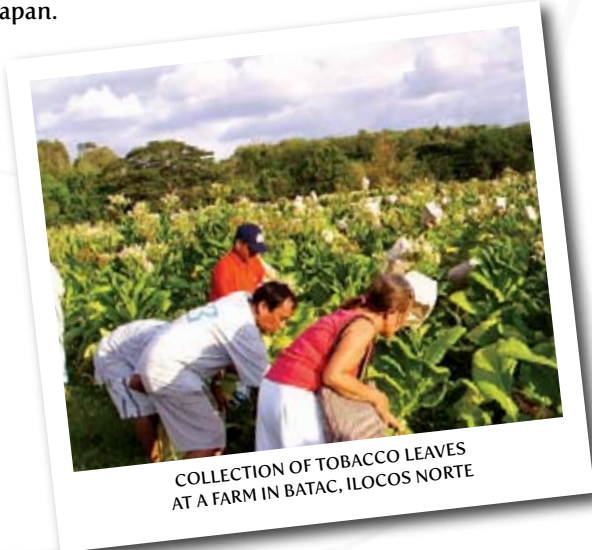
DEVELOPMENT OF STERILIZED HONEY DRESSING FOR HEALTH CARE MANAGEMENT

This project involves the development of wound dressing from honey sterilized by gamma radiation for health care management. This year, the Biomedical Research Group conducted testing of the radiation-sterilized dressing in animals in cooperation with Fatima University. Analysis of results is in progress.

ANALYSIS OF CIGARETTES FOR POLONIUM-210 CONCENTRATIONS

The Health Physics Research Group analyzed the levels of polonium-210 (Po-210) in tobacco of different brands of imported and locally-manufactured cigarettes and in leaves of tobacco grown in farms at the Ilocos region. This was done as part of PNRI's radiation monitoring and surveillance program for the health and safety of the public. Tobacco and cigarettes are known to contain naturally-occurring radioactive elements, particularly Po-210. Polonium-210 emits alpha radiation, a type of ionizing radiation which is hazardous to health when ingested or inhaled such as in smoking.

Results of the analysis of Po-210 content in 51 cigarette samples obtained from major sources namely, the Philippines, Japan and the USA, showed that the average Po-210 activity concentrations of cigarette from the three countries were comparable with the Po-210 concentrations reported in other countries. Analyses of these cigarette samples for Po-210 was done by PNRI project leader at the National Institute of Radiological Sciences (NIRS) in Chiba, Japan as part of the Nuclear Researchers Exchange Program of the Nuclear Research Safety Association – Ministry of Education, Culture, Sports, Science and Technology of Japan.



COLLECTION OF TOBACCO LEAVES AT A FARM IN BATAV, ILOCOS NORTE

Radiation Technology and Processing

SEMI-COMMERCIAL PRODUCTION OF PVP-CARRAGEENAN HYDROGEL AS DRESSING FOR BURNS, WOUNDS AND BEDSORES

Semi-commercialization activities for the PVP-carrageenan hydrogel- a product that can be used as dressing for burns, wounds and bedsores - are now

being undertaken by the PNRI, in partnership with an investor. This is to test the capability of the newly constructed pilot plant, to promote/ introduce the new product to the market, and to fast-track the commercialization of this product.

The pilot plant and equipment was set up in the PNRI premises with a floor area of 60 square meters. The estimated capacity of the plant was determined in the initial trial production. The production of hydrogel was estimated to be 1,000 pieces for 8" x 8" or 4,000 pieces for 4" x 4" per day based on eight hours a day production.



PNRI HAS DEVELOPED HYDROGELS FROM CARRAGEENAN AND POLYVINYL PYRROLIDONE, A SYNTHETIC POLYMER THAT CAN BE USED AS DRESSING FOR BURNS, WOUNDS AND BEDSORES.

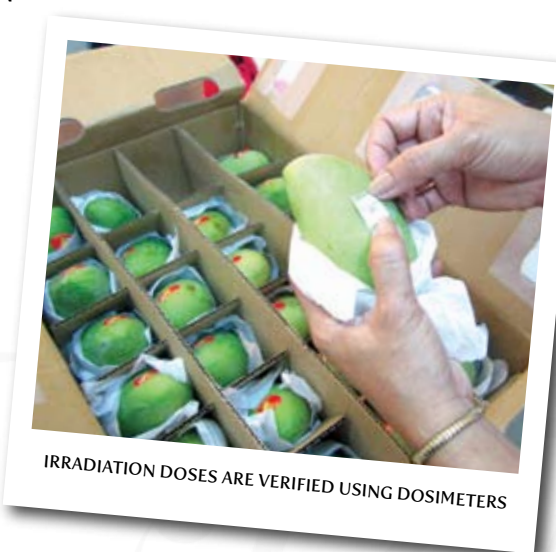
RADIATION MODIFICATION OF CARRAGEENAN AND CHITOSAN FOR BIOMEDICAL APPLICATIONS

A cheap injectable hydrogel implant from shellfish wastes has been developed at PNRI through radiation crosslinking technology. This implant is made from polyvinyl pyrrolidone (PVP) and chitosan - a polymer found naturally in the shells of crabs, shrimps, and other crustaceans. The hydrogel implant will be used for the cure of vesicoureteral reflux - the most common urologic defect in children which is commonly associated with urinary tract infection.

The PNRI collaborated with the University of Sto. Tomas Hospital (UST) -Department of Surgery, Section of Urology for this study. Preliminary studies were conducted by UST on the effects of injectable gel on rabbits. Results indicate that the gel did not show signs of dissolution after being injected subcutaneously in the animal within a period of two months. Protocol is now being developed for the conduct of clinical testing of the injectable hydrogel.

IRRADIATION STUDIES ON QUALITY EVALUATION OF PHILIPPINE SUPER MANGOES AT MAXIMUM TOLERABLE DOSE

The effects of different doses of gamma radiation on the quality of Philippine Super mangoes were evaluated. Based on the pilot-scale studies, sensory and physical tests conducted by the Biomedical Research Group, a maximum radiation dose of 300 Gy was considered as the tolerable dose for the mangoes. Further studies will be conducted to validate this result, including another trial of acceptability of the irradiated fruits by mango exporters and consumers.



IRRADIATION DOSES ARE VERIFIED USING DOSIMETERS

Nuclear Techniques in Industry

RADIOTRACER AND SEALED SOURCE APPLICATIONS IN INDUSTRY

The feasibility studies on the use of americium-241 to measure wood density were carried out by the PNRI Isotope Techniques Research Group. Three sets of measurements were done by monitoring gamma ray attenuation for different source-to-detector distance and wood thicknesses.

SURVEY FOR NUCLEAR AND OTHER INDUSTRIAL MINERALS

The PNRI has been undertaking geochemical surveys which aim to delineate potential indigenous nuclear raw materials and other associated mineral resources including rare earths in the country. This year, the Nuclear Materials Research Group conducted gamma-ray spectrometric survey, including soil and rock sampling, in the known Dinkidi copper- gold porphyry deposit situated within the Didipio mineralized district in Nueva Vizcaya. This deposit is owned and operated by Oceana Gold Ltd. The survey covered a 1.6 x 1.8

square kilometer area centered on the Dinkidi deposit. A total of 183 sampling stations were covered in which 915 gamma-ray readings for potassium (K), uranium (U) and thorium (Th) were measured and 183 soil samples were taken. Fifteen rock samples were likewise obtained within and around the survey area to determine mineral and alteration assemblages.

Initial results of the survey show very exciting radiometric signatures (high K, high K/Th and high total natural radioactivity) over the Dinkidi gold-rich porphyry copper deposit. These three radiometric signatures combined could be used as the model for searching gold-rich porphyry copper deposits in the Philippines. A less distinct high K/U signature over the deposit is also seen and this may be an added radiometric indicator.



GAMMA RAY SPECTROMETRIC SURVEY BEING CONDUCTED WITHIN THE VICINITY OF DINKIDI DEPOSIT IN NUEVA VIZCAYA

Isotope Techniques for Protection and Management of Water Resources

ISOTOPE APPLICATIONS IN DELINEATING RECHARGE OF BACOLOD CITY GROUNDWATER SYSTEM

The project involves the application of isotope-based techniques to identify the recharge zones of the tapped aquifers in Bacolod City in order to delineate the areas that shall need concentrated effort for forest preservation and restoration within or outside the reservation area of the watershed. The project also covers the assessment of vulnerability to pollution of the aquifers from the anthropogenic activities brought about by urbanization. Benchmark isotope and chemical data which will be used for assessment of water resources at present and in the future are available for the period 2005- 2007.

This year, the PNRI Analytical Measurements Research Group conducted field investigations which included collection of samples from shallow and deep groundwater, surface water and precipitation. The Group also accomplished the following: (1) determined the major ionic composition of the waters to assess the evolution of groundwater in the basin; (2) determined tritium concentrations of water samples by electrolytic enrichment followed with liquid scintillation counting. Uncertainties of ± 0.2 tritium units (TU) were obtained which is comparable to the detection limits obtained by the International Atomic Energy Agency Isotope Hydrology Laboratory in Vienna, Austria; and (3) integrated chemical and isotopic data in the analysis to obtain better understanding of the process of salinization of groundwater in the area and in the estimation of groundwater residence time.



GATHERING OF FIELD DATA FOR GROUNDWATER ASSESSMENT

ASSESSMENT OF TRENDS IN FRESHWATER QUALITY USING ENVIRONMENTAL ISOTOPES AND CHEMICAL TECHNIQUES FOR IMPROVED RESOURCE MANAGEMENT

This project is part of a regional effort to assess freshwater quality trends in critical areas in the Asia-Pacific region. In the Philippines, Metro Manila is being studied particularly to assess the impacts of urbanization and waste disposal to water sources. The potential use of naturally-occurring isotopes as indicators of contamination of surface and groundwater from waste disposal sites has been identified in the study.

The results of the study of contamination from the Montalban landfill have heightened the interest of the Manila Water Company Inc., and firmed up continued collaboration to further investigate freshwater trends in the Marikina Valley.

Field investigations were conducted in the fourth quarter of 2007. Samples were collected from rivers possibly affected by the landfill leachate, shallow and deep groundwater / springs and leachate run-off from the Montalban landfill and Payatas dumpsite. Sediments were also collected for heavy metal analysis. Physico-chemical data and major ionic compositions were determined. Tritium analysis was undertaken



MEASUREMENT OF TRITIUM CONTENT FROM COLLECTED WATER SAMPLES

Environmental Protection and Management

URBAN WASTE MANAGEMENT

PNRI has been undertaking studies on the possible movement of leachate from the San Mateo landfill in ground and surface waters with the aid of radioactive tracer techniques to determine the suitability and efficiency of waste disposal systems.

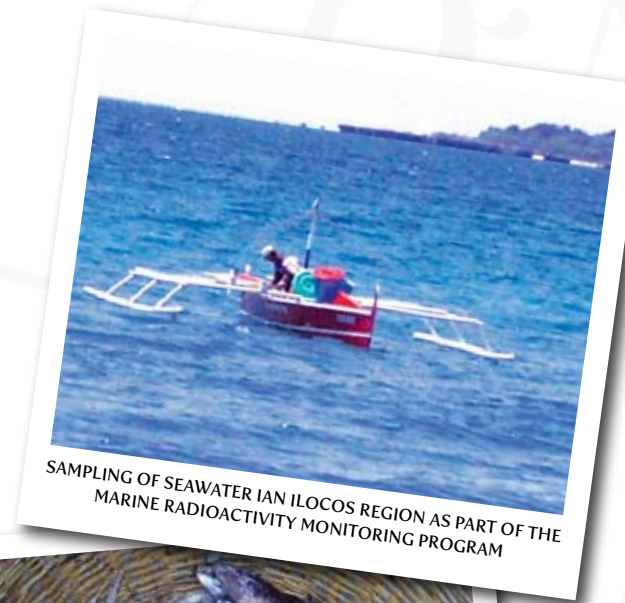
In 2007, the Isotope Techniques Research Group collected and analyzed 12 water samples from designated monitoring points. Eleven years after the injection of the radioactive tracer into the landfill, the groundwater samples were found negative of the tracer, an indication that the groundwater contains insignificant or undetectable levels of leachate.

MARINE RADIOACTIVITY MONITORING PROGRAM

This project aims to develop and strengthen the marine radioactivity monitoring program in the Philippines and to contribute to the updating of the expanded regional database – the Asia-Pacific Marine Radioactivity Database or ASPAMARD.

The activities undertaken for the year were the following: (1) establishment of a national project team consisting of PNRI Health Physics Research staff,

(2) project planning for sampling and analysis of marine samples, and (3) collection of samples in Currimao, Ilocos Norte in November 2007 for analysis.



SAMPLING OF SEAWATER IN ILOCOS REGION AS PART OF THE MARINE RADIOACTIVITY MONITORING PROGRAM



COLLECTION OF MARINE BIOTA FOR RADIATION MEASUREMENTS

NATURALLY-OCCURRING RADIOACTIVE MATERIALS AND TECHNOLOGICALLY-ENHANCED NATURALLY-OCCURRING RADIOACTIVE MATERIALS IN THE PHILIPPINE ENVIRONMENT

Many industries which process naturally-occurring radioactive materials (NORM) and technologically-enhanced naturally-occurring radioactive materials (TENORM) operate without realizing that their operations could give rise to NORM and TENORM wastes. This project aims to assess the presence of NORM and TENORM in coal-fired thermal power plants and in phosphate fertilizer plant.

Radiological Surveillance in Masinloc Coal-Fired Thermal Power Plant. For this project, external radiation measurements were conducted using the SAM-935 portable survey meter in 11 sites within the power plant and five sites within 22 kilometers offsite. The exposure rates in the 16 sites surveyed showed a range of 13.40 to

101.21 nSv/h. The mean dose rates observed inside the perimeters of the plant was 36.73 \pm 26.18 while outside the plant, mean dose rates was 18.3 \pm 5.3 nSv/h. Higher dose rates were observed in the bottom ash bin and in fly ash silo, with dose rates readings of 101.21 nSv/h and 71.19 nSv/h respectively. These results indicate that there are no readings above normal background radiation level found in the plant.

Collection and analysis of the following samples were also carried out for radioactivity analysis: (1) water samples consisting of raw waste water, treated waste effluent, river water and sea water; (2) solid samples (feed coal, bottom ash, fly ash, soil near ash pond,) and (3) soil samples from Barangay Bani and Barangay Palauig. Analysis of samples is currently being done at PNRI.



COAL (RAW ORES) AS FUEL FOR COAL-FIRED POWER PLANT

TENORM Studies in PHILPHOS Fertilizer Plant in Isabel, Leyte - Phosphogypsum - a technologically enhanced naturally-occurring radioactive material (TENORM)- is considered a by-product in the production of phosphate fertilizer at PHILPHOS. Studies of the Health Physics Research Group on assessment regarding release of radioactive materials (radium-226 in particular) from phosphogypsum ponds leaching into the water system surrounding the PHILPHOS Fertilizer plant showed that the radium-226 (²²⁶Ra) activity in the Philippine phosphogypsum is distributed in a range from 91.5 to 93.5 Bq/kg. As much as 5 percent of ²²⁶Ra can be leached from *Philippine phosphogypsum* with deionized water. *In vitro* soil leach experiments suggest that soil in the phosphate fertilizer plant area would be able to deter the intrusion of ²²⁶Ra into the water table. Compared to reported values of natural groundwater levels of ²²⁶Ra, the concentration of this radionuclide in Isabel, Leyte groundwater suggest that there is no ²²⁶Ra intrusion brought about by the presence of phosphogypsum ponds in the area.

MANAGEMENT OF CTBTO STATIONS IN THE PHILIPPINES

The Philippines, through the PNRI, has been actively involved in the management of an international monitoring system to verify compliance to the Comprehensive Nuclear Test Ban Treaty which was ratified by the Philippine Senate in 2001.

As part of this commitment, PNRI and PAGASA staff continuously operated (24/7) and maintained the Comprehensive Nuclear Test Ban Treaty Organization (CTBTO) radionuclide monitoring station (RN52) and the National Data Center (NDC-137). The RN52 station is co-located at PAGASA's Weather Station in Tanay, Rizal while the NDC-137 is located at the PNRI compound in Diliman, Quezon City. The data generated from these stations were transmitted continuously to the CTBTO International Data Center via VSAT (very small aperture terminal) for global monitoring of radiation in the environment.



A PNRI RESEARCHER REPLACES AIR FILTERS IN THE CTBTO RN52 SNOW WHITE AIR SAMPLER

ENVIRONMENTAL SURVEILLANCE (RADON MONITORING)

The Nuclear Materials Research (NMR) Group has an on-going project on monitoring the concentrations of radon in soil and water in 20 stations established along the eastern and western Marikina Valley Fault System and at the PNRI compound. The concentration of radon, a naturally-occurring radioactive gas, may serve as indicator of a seismic activity or as a possible tool to predict an earthquake. Evaluation of the results of radon measurements indicated relatively low concentration of the gas which suggest the absence of subsurface activity that may initiate possible ground movement.

RECEPTOR BINDING ASSAY OF SAXITOXIN FOR RED TIDE MONITORING

The facilities and manpower capabilities for doing the receptor binding assay (RBA) of saxitoxin, one of the paralytic shellfish poisoning (PSP) toxins, was established at PNRI. Because of this accomplishment, PNRI is recognized as an IAEA/RCA Regional Resource Unit for RBA. The assay method is now being tested for routine monitoring of PSP toxins in red tide areas in cooperation with the Bureau of Fisheries and Aquatic Resources (BFAR).

This year, a seminar-workshop was conducted to introduce RBA to BFAR field workers through lectures and demonstrations. Work is also being done on developing an iodinated and conotoxin compound to replace the currently used imported and unstable tritium-radiolabeled reagent for RBA. A radioactive analog of conotoxin has been isolated in small quantities and tests are being performed to characterize the product and test bioactivity.



SEMINAR-WORKSHOP ON RECEPTOR BINDING ASSAY FOR TOXICITY OF MUSSEL SAMPLES

HISTORICAL PROFILE OF HARMFUL ALGAL CYSTS AND ANTHROPOGENIC INPUTS IN SEDIMENT USING ISOTOPIC TECHNIQUES

Isotopic tracers have been used as a tool in gaining information on geochemical processes affecting the red tide bloom and in proving the history of toxic algal bloom in areas affected by the red tide. One such tracer is lead-210 (^{210}Pb), a naturally-occurring radioactive element which can date sediment layers deposited in the last 100 years.

This year, PNRI Chemistry Research Group used the lead-210 dating method as a tool to understand the occurrence of harmful algal bloom (HAB) in Malampaya Sound in Palawan, Bolinao in Pangasinan and Juag lagoon in Sorsogon by establishing sediment chronology in these areas.



LOADING OF SAMPLES IN ALPHA PARTICLE COUNTER FOR LEAD-210 DATING ANALYSIS

SEDIMENTATION STUDIES IN ASSESSING IMPACTS OF TSUNAMI AND OTHER NATURAL DISASTERS

Although the Philippines is not one of the countries devastated by the 2004 Indian Ocean Tsunami, it has its share of tsunami events in the world history of tsunami, e.g. 1994 Calapan, Mindoro Tsunami (~80 dead, ~4430 injured). The PNRI Chemistry Research Group has been conducting studies to assess the impact of tsunami sediment redistribution along the coastal area of WaWa, Calapan, Mindoro by studying the historical profile of sediment cores collected in the area and the surrounding agricultural soil. The concentrations of the radionuclides lead-210 and cesium-137 are being used to give a clue to the sediment redistribution patterns resulting from tsunami and even other natural disasters like typhoon and flood.

Initial results of the studies confirmed the association of lead with the muddy fraction of the coastal sediment in Baco, Oriental Mindoro.

MONITORING OF PARTICULATE MATTER TO IDENTIFY MAJOR SOURCES OF AIR POLLUTION

As part of the on-going project on the characterization of major pollution sources, the PNRI's Analytical Measurements Research Group continued to collect air samples from three sampling sites in Metro Manila (Ateneo de Manila University [ADMU], POVEDA, and Valenzuela) using the Gent dichotomous air samplers. The air particulates collected were analyzed for mass loading by gravimetry, black carbon by reflectometry, and for elemental content by nuclear and related analytical techniques such as the X-ray fluorescence spectrometry and the particle-induced X-ray emission.

Results of the analyses showed that PM10 long-term levels for all sampling sites are in compliance with the PNAQA guideline values of $60 \mu\text{g}/\text{m}^3$ while PM2.5 long-term levels exceeded the United States Environment Protection Agency (US EPA) guideline values of $15 \mu\text{g}/\text{m}^3$. Black carbon averages range from 30 to 55 percent from the three sites, with the highest average at ADMU.



COLLECTION AND ANALYSIS OF AIR PARTICULATE SAMPLES





Provision of Quality S & T Services

Thousands of clients from industrial, medical, business, academic, research and government institutions have benefitted from the numerous applications of nuclear science and technology through the various services of the PNRI

Nuclear and Allied Services

GAMMA IRRADIATION SERVICES

Various samples from 57 clients were irradiated at two PNRI irradiation facilities for microbial decontamination, medical products sterilization and for research purposes. This year, a total of 2,749 samples from 27 clients, (mostly students), were irradiated using the Gammacell-220 for research purposes. Samples irradiated included fruit fly pupae, pulp weevil eggs, mice, ornamental plants, fruits, seeds, cuttings, banana



LOADING OF PRODUCTS IN TOTE BOXES FOR IRRADIATION

meristem and sucker, calamansi cuttings, cashew seeds, chlorella cultures, corn inbreds and seeds eggplant seeds, mangoes, mangosteen seeds, mice, mungbean seeds, onions, palay seeds, pineapple crowns, pumpkin anthers, rice seeds, sorghum, tomato seeds, tuba-tuba seeds and spawns.

At the PNRI Multipurpose Irradiation Facility (MIF), a total of 4,907 samples from 30 clients (25 from industry, three from hospitals, two students/researchers) were irradiated from January to the third week of July. From July to December 2007, the MIF was scheduled for upgrading. Products irradiated for industry (for decontamination and sterilization) included ethanol, amnion membrane dressing, frozen bone graft, orthopedic implant, cosmetic raw materials and accessories, spices, and dehydrated vegetables, frozen fruits, and nuts. Samples irradiated for research purposes were carabao mango, honey, carrageenan, hydrogel wound dressing, injectable gel, eye dropper bottles, chitosan, and fresh seaweeds.

RADIATION PROTECTION SERVICES

Radiation protection services were provided to authorized users of radioactive materials and radiation in medical, industrial, commercial and research institutions throughout the country. This is to ensure that workers occupationally exposed to radiation, as well as the general public, will not receive undue exposure to radiation.

This year, the Institute rendered the following services through the Radiation Protection Services:

- 1) monitoring of radiation exposures of 6,827 personnel from 2,560 institutions through the national film badge service and thermoluminescent dosimetry services;
- 2) calibration of radiation monitoring instruments at the PNRI Secondary Standards Dosimetry Laboratory: 29 contamination meters, 395 survey meters, 227 pendosimeters from 49 institutions;
- 3) leak testing of sealed radiation sources from 155 institutions: 43 from PNRI, 67 non-PNRI, and 90 outside of Metro Manila; and 374 swipe samples;
- 4) collection and management of the following: 44 disused radiation sources; 0.60 cubic meters solid wastes; and 30 liters liquid wastes generated by licensed users of radioactive materials; and
- 5) other services such as radiation hazards evaluation of radiation facilities.

NUCLEAR-BASED ANALYTICAL SERVICES

These services were provided to 51 clients for the determination of radioactivity in food products and in water as basis for certifying conformance to standards of non-radioactivity.

This year, the following analyses were undertaken: (1) gammametric analysis of food product samples (consisting of canned tuna, milk, fresh green banana, desiccated coconut, crushed pineapple, snack pellets, prawn cracker pellet, cocoa powder, seafood, pre-mixed baking products, fruit flavors and juices, coconut essence and flavors, metal scrap, carrageenan, tobacco, solid waste; used carbon, nickel rabbit, resin sludge); (2) gross-beta analysis of bottled water and well water samples; (3) evaluation for acetic acid adulteration in vinegar by carbon-14 assay; (4) particulate mass determination of air as part of PNRI's air pollution studies and (5) elemental analysis of samples such as soil and paints using the liquid scintillation counter; (6) multi-element analysis of samples such as food and agricultural products, soil, water and solutions using X-ray fluorescence spectrometry; and (7) collection of X-ray diffraction data, where the clients were supplied with a diffractogram of their sample and a file of the raw data.



ANALYSIS OF MAJOR IONS FOR COLLECTED WATER SAMPLES



THE SECONDARY STANDARDS DOSIMETRY LABORATORY

CYTOGENETIC ANALYSIS

This service was extended to seven clients who were referred to PNRI by medical doctors. Of the seven clients, five were evaluated for genetic disorders (such as Down's Syndrome and Turner Syndrome) while two clients were assessed for their exposure to radiation while working in a company abroad. As a requirement for rehiring, the two clients were referred by St. Patrick's Health Care Systems Inc. to PNRI for evaluation of their radiation exposure.

COMPUTER SERVICES

The PNRI Computer Services Group expanded the coverage of PNRI's wireless network by installing new equipment to most of the offices located at the PNRI Atomic Research building. The Group also accomplished the following: (1) maintained and improved the PNRI Website, Web Mail and Intranet system, (2) developed an on-line registration system for prospective participants of PNRI nuclear training courses; (3) acquired new servers for upgrading of the Database server, Web server, Domain Name System server and the Intranet server; (4) maintained and improved the Payroll Information System, and (6) developed support application programs for the following: collection/ deposit database and reporting program for the Cash Unit; database for GSIS and PAGIBIG remittances; and database and reporting program for the Accounting Unit. The Group likewise provided technical support to PNRI staff via the Help Desk.

ENGINEERING SERVICES

Engineering support services were provided to PNRI and non-PNRI clients (mostly from the medical and industrial sectors) in the repair of nuclear and related instruments/equipment. Some of the instruments repaired included the liquid scintillation counter, air sampler for air pollution studies, moisture density meter, among others. Refurbishment of the convection oven at the PNRI Health Physics Research Laboratory was carried out, thus saving the PNRI approximately Php350,000 for services. Repair and fabrication works of equipment and facilities used for nuclear research and extension of nuclear and allied services were continued.

Support in the implementation of the Megaports Initiative project was also carried out through active participation in the conduct of training for customs personnel/employees for the Central Alarm System (CAS) operator, manning the mirror CAS at PNRI office and maintenance of Megaports equipment at the Philippine Ports Authority.

Regulatory Services

STANDARDS DEVELOPMENT

The Standards Development Section (SDS) continued to develop and update regulations, regulatory guides, rules of procedures, standards and criteria relative to the safety and security of radioactive materials.

This year, SDS initiated the development and facilitated the publication of two Codes of PNRI Regulations (CPR) and one Administrative Order (AO) in the Official Gazette. The CPRs and the AO were:

- CPR Part 26, "Security of Radioactive Sources"
- CPR Part 0, "PNRI as Regulatory Authority for Radioactive Materials in the Philippines"
- AO No. 1 Series of 2007, "Adoption of IAEA Safety Guide No. RS-G-1.7, Application of the Concepts of Exclusion, Exemption and Clearance and IAEA Safety Report Series No. 44, Derivation of Activity Concentration, Values for Exclusion, Exemption and Clearance"

The following CRPs were likewise updated, revised and subjected to the approval process:

- CPR Part 11, "Licenses for Industrial Radiography and Radiation Safety Requirements for Radiographic Operations"
- CPR Part 12, "Licenses for Teletherapy Application"
- CPR Part 25, "Licenses for Commercial providers of Nuclear technical Services (To include App. A. PNRI Criteria for Accreditation of Training providers)"

LICENSING REVIEW AND EVALUATION

Applications for authorization to use, sell and import radioactive materials were evaluated by the Licensing Review and Evaluation (LRE) Section. Based on the



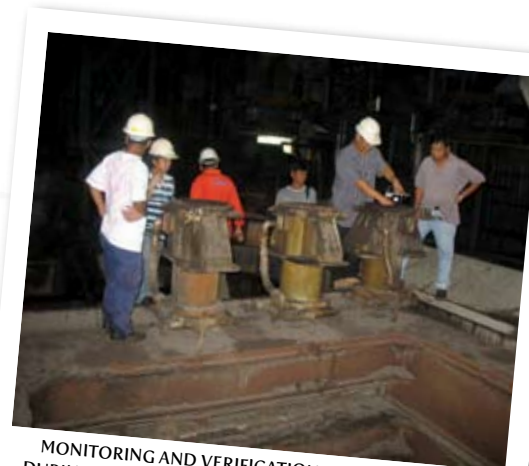
PNRI ENGINEERING SERVICES STAFF CHECKS THE RADIATION PORTAL MONITOR INSTALLED AT PORT AREA, MANILA

evaluation process, PNRI issued a total of 280 licenses (14 new, 219 renewed, and 47 amended). A total of 397 Evaluation Reports were generated in support of this activity. The LRE conducted eight verification pre-licensing inspections to validate the commitment and submissions of the applicant relative to the application for authorization. Moreover, the PNRI issued 533 Certificates of Release for the Bureau of Customs to release imported radioactive materials to licensed users of radioactive materials.

INSPECTION AND ENFORCEMENT

The Inspection and Enforcement (IE) Section conducts regular and unannounced inspection and audit of licensed radioactive materials and facilities to assess licensee's compliance with the PNRI regulations and specific conditions of the license issued. The IE inspected and audited a total of 173 licensed radioactive materials and facilities out of the 203 that were planned for regular inspection and audit in 2007. Unannounced inspection and audit of six radiography companies and one industrial company were undertaken to verify compliance with the PNRI regulations on the security of radioactive sources and safety of radiation workers, among others. The IE also conducted follow-up inspection of 20 licensed facilities to ensure that corrective measures are implemented to address inspection findings.

Other activities undertaken in 2007 were: (1) preparation of 173 inspection reports and 64 evaluation reports of licensees' responses outlining corrective actions to address non-compliance findings during inspections; (2) issuance of "Notice of Violations" to two licensees found to have significant safety-related violations of regulatory safety requirements; (3) issuance of a total of 2,700 "Authority to Transport" certificates to licensees for the transport of radioactive materials to various authorized locations in the country; and (4) pre-authorization inspection of all PNRI facilities and laboratories in support of the PNRI Internal Regulatory Control Program.



MONITORING AND VERIFICATION OF CO-60 SOURCE DURING REGULATORY INSPECTION AT BACNOTAN STEEL INDUSTRIES CORPORATION

SAFEGUARDS AND SECURITY

The Safeguards (SG) Section pursued its role of coordinating the implementation of the Megaports Initiative Project which involves the installation and operation of radiation portal monitoring detection system at the Ports of Manila, among others. This project is being undertaken as part of the Second Line of Defense Program of the United States.

This year, SG carried out the following activities: (1) collaborated with the Megaports Training Team and Pacific Northwest National laboratory trainers in the conduct of the Operational Readiness Training for Port Operators for 212 participants from the Bureau of Customs (BOC), Asian Terminals, Inc. (ATI) and Manila International Container Terminal (MICT); (2) coordinated the investigation and inspection of a cargo of scrap metals found to contain a radioactive source (Cs-137). The radioactive source was detected through the radiation portal monitoring system at MICT in October; (3) participated in the planning and preparation for flow-through of the PNRI-US Department of Energy project on security upgrades for PNRI and medical facilities utilizing high-risk sources under the Radiological Threat Reduction Program, renamed Global Threat Reduction Program.

SG, together with an IAEA safeguards inspector, conducted physical inventory verification and design information verification inspections at the Philippine Research Reactor in October. This activity is being undertaken under the safeguards agreement of the Philippines with the International Atomic Energy Agency (IAEA). Three reports of nuclear materials accounting were submitted to the IAEA in December.

RADIOLOGICAL IMPACT ASSESSMENT

The Radiological Impact Assessment (RIA) Section participated in the activities of the Internal Regulatory Control Program Task Force in the review of application for authorization, verification and inspection of PNRI facilities and provision of inputs/comments to response of authorized operators. RIA also assessed the potential public health and safety concerns of an orphan americium-241 (Am-241) beryllium (Be) source which was recovered at Cattle Creek Country Club in Novaliches, Quezon City. RIA also accomplished the following:

(1) drafted PNRI Administrative Order No. 01, Series on 2007 entitled "Adoption of IAEA Safety Guide No RS-G-17, RS-G-1.7 "Application of the Concepts of Exclusion, Exemption and Clearance" and Safety Series No. 44 "Derivation of Activity Values of Exclusion,

Exemption and Clearance”; and (2) led and participated in the radiological assessment of Coleman Mantle, a PNRI licensee authorized to produce gas mantle using thorium nitrate.

RADIOLOGICAL EMERGENCY PLANNING AND PREPAREDNESS

The Radiological Impact Assessment (RIA) Section continued to coordinate activities of the International Atomic Energy Agency (IAEA) Model Projects on Radiological Emergency Response and in the Core Group on Medical Radiological Emergency Preparedness and Response Plan (RADPLAN). RIA also participated in the activities of the Technical Working Group of the National Disaster Coordinating Council (NDCC) which included the conduct of emergency response training and practical exercises for first responders and for the different sectors of the public.

In support of the activities being implemented under the National Radiological Emergency Preparedness and Response Plan (RADPLAN), RIA coordinated and participated in two IAEA exercises, namely, (1) the international emergency exercise (CONVEX2a) conducted by the IAEA’s Incident and Emergency Centre on 23 January 2007, in conformity with the “Proposal for a Revised Convention Exercise Regime”; and the (2) IAEA Emergency Exercise in Ukraine on 18 May 2007 involving the PNRI field teams, the national emergency center and the IAEA. This exercise was organized under the RCA project on Sustainability of Radiation Protection Infrastructures.

The Ukraine exercise was designed to test field monitoring teams in a real radioactive environment from 5 – 21 May 2007. Based on the IAEA report on the overall assessment of the Ukraine exercise, the PNRI field monitoring team performed quite well compared to the other participating countries. The Philippine team was one of five national teams found qualified to



TEAM MEMBERS OF THE PNRI EMERGENCY RESPONSE TEAM UNDERGO FIELD DRILLS IN SUBIC TO ENHANCE SEARCH AND SECURE CAPABILITIES FOR RADIOACTIVE SOURCES.

participate in this exercise out of 17 RCA Member States invited to participate.

REGULATORY INFRASTRUCTURE SUPPORT (RIS) PROGRAM (US-DOE AND ANSTO SUPPORTED)

The Comprehensive Nuclear Law, which was drafted by PNRI, through its Nuclear Regulations, Licensing and Safeguards Division, has been commented on by legal experts on two separate missions of the International Atomic Energy Agency and has gone through a series of consultation process among concerned stakeholders in the country.

The Law essentially will regulate the nuclear safety and security aspects in the peaceful utilization of ionizing radiation sources through the creation of an independent regulatory body. It proposes to merge the regulatory arm of the PNRI and the Bureau of Health Devices and Technology. The proposed Law also reflects recent developments in nuclear safety, radiation risk management, environmental protection, nuclear security and issues concerning non-proliferation. It also ensures that the Philippine national legislative and regulatory framework is consistent with the nation’s obligations under relevant international instruments and as a member of international organizations. Further, it provides the basis for the further development of nuclear technology for peaceful purposes.

The drafting of this Comprehensive Law and several other several activities are being implemented by PNRI through the Nuclear Regulations, Licensing and Safeguards Division (NRLSD) under the general framework of the Radiological Threat Reduction program of the US Department of Energy in cooperation with the Australian Nuclear Science and Technology Organization Regional Project on Security Sources.

DEVELOPMENT OF NEAR SURFACE RADIOACTIVE WASTE REPOSITORY IN THE PHILIPPINES

Detailed investigation of the preferred site to confirm its suitability for the proposed near surface radwaste repository is continuously being undertaken. This year, the Radiological Impact Assessment Section supervised the operation and maintenance of piezometer wells and measured groundwater level, in support of hydrogeological characterization of the preferred site. The observed data will be used to compare and determine whether the calculated values obtained from modeling studies with the use of the GMS-Modflow software come in agreement with the

observed values. An evaluation of the potential impact of human intrusion scenario was also undertaken. This scenario describes the projected radiological dose that will be incurred if there will be an inadvertent intrusion into the disposal system. In support of the preliminary conceptual design of the proposed facility, regulatory criterion has been prepared and will be used in conjunction with the Code of PNRI regulations Part 23, “Licensing Requirements for Land Disposal of Radioactive Waste”.

Continuous coordination with the Department of Foreign Affairs was carried out by RIA regarding the ratification of the Joint Convention on the Safety of Radioactive Waste and Safety of Spent Fuel. A country report following the reporting format of the Joint Convention was presented during the ANSTO RW Topical Group Meeting held in Sydney, Australia on 3 – 7 September 2007.

RIA, in cooperation with the PNRI Information Services Group, conducted a nuclear awareness seminar –workshop within the vicinity of the preferred site. The seminar aimed at increasing the level of awareness of participants on radiation safety, radioactive waste management and the beneficial uses of nuclear science and technology, among others. Around 200 participants composed of students, educators, administrators and employees of local government unit attended the seminar. The participants represented 26 towns/ municipalities in the province of Cagayan.

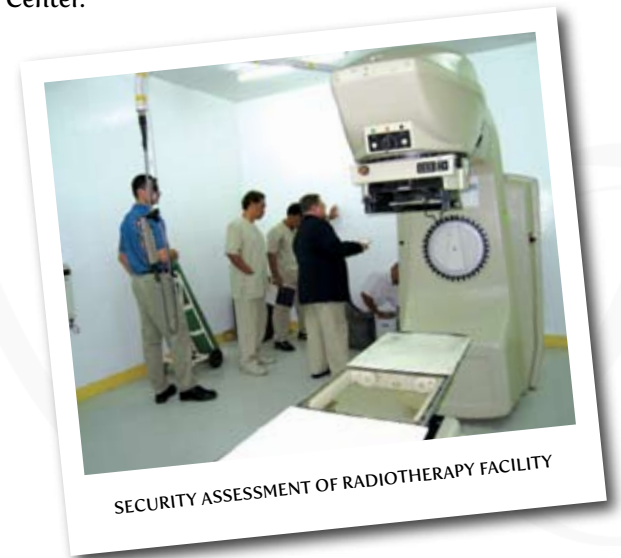
REGULATORY INFRASTRUCTURE SUPPORT (RIS) PROGRAM

As part of its program to enhance the security of radioactive sources in the country to ensure the safety of members of the public from exposure to ionizing radiation, the Philippine Nuclear Research Institute (PNRI) participated in the Regional Security of Radioactive Sources (RSRS) Project of the Australian Nuclear Science and Technology Organization (ANSTO). Among the activities of the project were (1) training program on the use of radiation detection equipment which has been provided by the US National Nuclear Security Administration, (2) Orphan Source Search fellowship program for the PNRI staff to develop its skills on the methods, instrumentation and techniques on orphan source searches, (3) Train-the-trainers training course for the development and implementation of training that is tailored to the needs of the Institute, the output of which was a national workshop held at Subic on April 2007 and (4) support for the conduct of an actual orphan source search at Bacnotan steel manufacturing company in Batangas in May 2007.

GLOBAL THREAT REDUCTION PROGRAM

The Global Threat Reduction Program (GTRP) is an initiative of the US Department of Energy/National Nuclear Security Administration (US DOE/NNSA) commissioned to reduce the threat of an incident involving a radiological dispersion device, also known as “dirty bomb”. GTRP seeks to identify the location and type of high risk radioactive sources that could be used as dirty bomb components, and subsequently, secure the sources.

In November 2007, a three-man GTRP Team representing the US DOE/NNSA and PNRI conducted physical protection assessments at PNRI facilities, including the PNRI Radioactive Waste Management Facility, Multipurpose Irradiation Facility and Secondary Standards Dosimetry Laboratory (SSDL). In addition, the GTRP Team assessed radiation facilities at the National Kidney and Transplant Institute, Veterans Memorial Medical Center and Dee Hwa Liong Foundation Medical Center.



INTERNAL REGULATORY CONTROL PROGRAM

The Nuclear Regulations, Licensing and Safeguards Division (NRLSD) implements this program for PNRI facilities and laboratories in the interest of public health and safety and to ensure PNRI workers’ safety and security in the workplace. This year, NRLSD undertook the following internal regulatory control activities: (1) monitored compliance to specific conditions of authorization of PNRI facilities; (2) processed applications for amendments and modification of initial authorization of PNRI facilities; (3) prepared a summary of inspection findings on compliance to specific conditions of authorization of PNRI facilities; and (4) prepared schedule of inspection and audit of PNRI facilities for 2008.



S & T Linking and Networking

To further advance the safe and peaceful uses of nuclear science and technology in the Philippines, the PNRI continued to maintain and forge new linkages through implementation of collaborative projects with both local and international organizations.

This year, PNRI undertook studies on nuclear science and technology with support from the following agencies/institutions: • Department of Science and Technology • Philippine Council for Aquatic and Marine Research and Development (PCAMRD) • Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD) • Philippine Council for Advanced Science and Technology Research and Development (PCASTRD) • Philippine Council for Industry and Energy Research and Development (PCIERD) • Department of Agriculture-Bureau of Plant Industry • Office of the Special Envoy on Transnational Crime (OSETC) [See page 47]

The PNRI strengthened its ties with its international partners and collaborators. Under the framework of one of its foremost partners -- the International Atomic Energy Agency -- the PNRI and other entities had the opportunity to actively participate in regional, interregional and national projects on the peaceful uses of nuclear science and technology.



Cooperative links with the following institutions were likewise nurtured:

- Regional Cooperative Agreement (RCA) for Research, Development and Training Related to Nuclear Science and Technology for Asia and the Pacific, Vienna, Austria
- Forum for Nuclear Cooperation in Asia (FNCA), Japan
- Comprehensive Nuclear Test Ban Treaty Organization (CTBTO), Vienna, Austria
- Australian Nuclear Science and Technology Organization (ANSTO)
- United States Department of Energy (US-DOE)
- United States Department of Agriculture (USDA)
- Ministry of Science, Technology, Education, Culture and Sports (MEXT) of Japan
- Nuclear Safety Research Association (NSRA) of Japan.



Development of S & T Human Resources

The PNRI continued to develop PNRI human resources in the field of nuclear science and technology in support of the research and development activities, nuclear regulatory functions, and provision of nuclear and allied services to various sectors.

LOCAL

In 2007, a total of 664 professionals from government and private agencies/institutions participated in the 35 training courses conducted/coordinated by the PNRI Nuclear Training Center. (see Appendices, Table 1, page 32).

Under the human resources development in the undergraduate level, the PNRI accepted 60 students for on-the job training in the different laboratories and facilities of the Institute and three students for thesis advisorship. (see Appendices, Table 2, on page 33).

PNRI personnel were likewise provided with the opportunity to participate in 15 locally-sponsored/conducted training

DISTRIBUTION BY PERSONNEL

BY GENDER		
Male	M	104
Female	F	118
		222
BY STAFF CATEGORY		
Managerial	M	6
Technical	T	160
Administrative	A	56
		222
BY STAFF ACTIVITY		
R&D	R&D	71
S&T Services	STS	59
S&T Education	STET	6
Regulatory	REG	24
Administrative	GASS	62
		222
BY EDUCATION		
Ph.D.	P	5-7
MS/MA	M	27
BS/BA	B	143
Below BS	U	47
Total as of EO 2007		222

courses, seminars, workshops, meetings and symposia as part of the Institute's program. See Table 10 on page 43.

The Institute also provided support to PNRI employees pursuing graduate degrees whether on scholarship or on their own.

- On Scholarship - 4 PhDs in Chemistry and Environmental Science; and 4 MS degrees in Physics, Chemistry and in Engineering). See Table 11 on page 45.
- Self-Financed Studies - 4 PhDs in Environmental Science and 6 MS/MA degrees in Physics, Engineering Microbiology and Education). See Table 11 on page 45.

Foreign. The Institute's ties with international organizations and nuclear science and technology institutions in other countries have significantly helped in building PNRI's capabilities by training manpower, among others, in the different aspects of nuclear science and technology. This year, PNRI was able to avail of 133 training/fellowship grants for PNRI staff and non-PNRI personnel. Fellowship grants ranged from on-the job training, participation in training courses, seminars/workshops/and scientific visits. See Appendices, Tables 8 to 9, pages 38 to 43.

PNRI RECOGNITION AWARD

- PNRI MODEL EMPLOYEE 2007
Lynette B. Cayabo
Senior Science Research Specialist
Licensing Review and Evaluation Section
Nuclear Regulations, Licensing and Safeguards Division



LYNETTE B. CAYABO,
2007 PNRI MODEL EMPLOYEE



PNRI DIRECTOR ALUMANDA M. DELA ROSA (EXTREME RIGHT), FAD CHIEF GRACETA DL. CUEVAS (EXTREME LEFT) AND PNRI PRAISE CHAIRPERSON LINDA L. LEOPANDO POSE WITH THE PNRI MODEL EMPLOYEE (THIRD FROM LEFT, REPRESENTED BY THELMA ARTIFICIO) AND THE DIVISION AWARDEES.

PROFILE OF R&D PERSONNEL BY POSITION IN 2007

CATEGORY	NUMBERS	% DISTRIBUTION
Total Number of R&D Personnel*	73	33%
By Position		
Scientists and Engineers	54	70%
Technicians	7	10%
Auxiliary Personnel	12	20%

PROFILE OF SCIENTISTS AND ENGINEERS

CATEGORY	NUMBERS	% DISTRIBUTION
Total Number of Scientists and Engineers	54	70%
By Sex		
Male	19	40%
Female	35	60%
By Age Group		
20 years old and below	-	0%
21-30	6	10%
31-40	9	20%
41-50	15	30%
51-60	17	30%
61 years old and above	7	10%
By Educational Attainment		
With PhD	3	6%
MS/MA	18	33%
Post BS/BA	-	0%
BS/BA	32	59%
Post High School	1	2%
High School and below	-	0%
By Field of Research		
Natural Sciences	37	69%
Engineering and Technology	5	9%
Agricultural Sciences	11	20%
Medical Sciences	1	2%
Social Sciences	-	0%
Humanities	-	0%

* Includes 2 personnel on detail from DOST

- SPECIAL COMMENDATIONS Certificate of Recognition for exemplary performance of duties in their respective divisions.
(SHOWN IN PHOTO, 4TH TO 7TH FROM LEFT)
Luvimina G. Lanuza (Senior Science Research Specialist, NSTD)
Emma L. Cancino (Medical Officer IV, Finance and Administrative Division)
Justina S. Cerbolles (Information Officer II, NSTD)
Elvira Z. Sombrito (Head, Chemistry Research Group, Atomic Research Division)

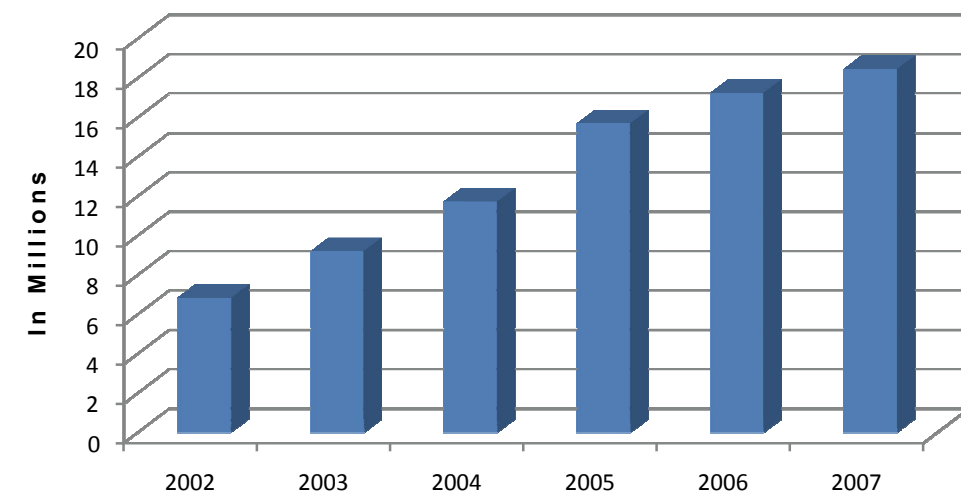
Financial Statements

INCOME FROM PNRI SERVICES. 2007	
NUCLEAR AND ALLIED SERVICES	
Name of Service	Income Generated (in Pesos)
Gamma Irradiation Services	
(Multipurpose Cobalt -60 Irradiation Facility and Gammacell 220)	583,862.00
Radioisotope Dispensing Services	
(Sale of radioactive sign stickers, use of dose calibrator diagnostic instrument)	2,800.00
Radiation Protection Services	
• Personnel Monitoring	12,026,747.35
Film badge service	
Thermoluminescent dosimetry	
• Calibration of Radiation Detection Instruments	881,575.00
Survey meter	
Pen dosimeter	
Contamination meter	
Dose calibrator	
Teletherapy output calibration	
• Radiation Control Services	370,328.00
Leak testing of sealed sources	
Radiological support for non-PNRI clients, radiation monitoring and hazard evaluation	
• Radioactive Waste Management	331,100.00
Solid waste	
Liquid waste	
Spent sealed sources	
Teletherapy sources	
• Special Services	159,080.00
Rental of survey meter	351,000.00
Swipe sample counting	
Engineering Services	
Repair of nuclear instruments and	10,100.00
Assembly of survey meter	
Analytical Services	
• Analytical Measurements Research	917,145.00
Gammametric analysis	
Gross alpha-beta analysis of water samples	
Elemental analysis by X-ray Fluorescence Spectrometer (XRF)	
Vinegar adulteration	
Other services such as use of the Liquid Scintillation Counter (LSC)	
• Applied Physics Research	33,240.00
Structural analysis using X-ray Diffraction (XRD) spectrometer	
Cytogenetic Service/Microscopy Services	13,200.00
Microbiological Test	116,750.00
Bioburden Analysis	
Sterility Test and total plate count	

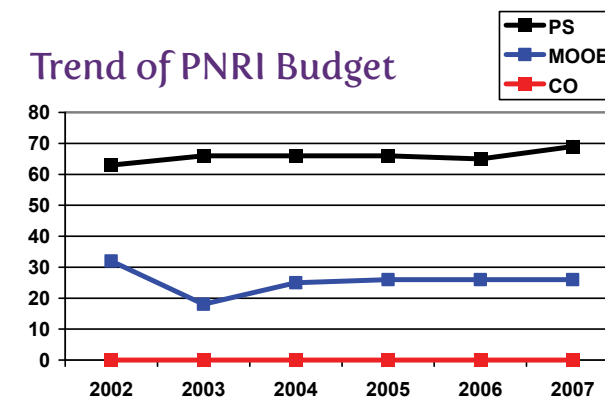
Sub-Total: Php 15,796,927.35

INCOME FROM PNRI SERVICES. 2007	
NUCLEAR REGULATORY SERVICES	
Name of Service	Income Generated (in Pesos)
Licensing Review and Evaluation	
Licensing Fees	1,040,342.50
Certificate of Transport Fee	798,850.00
Certification of Release (shipments of radioactive material)	180,345.00
Inspection and Enforcement	
Inspection Fee	611,440.00
Surcharge Fines/Penalties for Permits/Licenses	23,950.00
Standards Development	
Sale of CPR (Code of PNRI Regulation) Compilation for Specific Parts and Infopacs (Information Packages)	2,510.00
Sub-Total: 2,657,437.50	
OTHER BUSINESS INCOME	
Sale of Journal	1,020.00
Sub-Total: 1,020.00	
GRAND TOTAL: Php 18,455,384.85	

Income 2002-2007



Trend of PNRI Budget



PS (Personnel Services), MOOE (Maintenance and Other Operating Expenses), and CO (Capital Outlay)

Additional Resources Generated from External Sources in 2007

GRANT	AMOUNT
Local	Php 28,902,899.07
Foreign	
Cooperation Agreements	7,403,773.00
IAEA Technical Cooperation Projects	22,902,952.80
IAEA Research Contacts	2,844,000
TOTAL: Php 62,053,624.87	

Note: See Appendices, Table 13 on page 46 for list of grants.

35th Atomic Energy Week Celebration

10 - 14 December 2007

The PNRI led in the celebration of the Atomic Energy Week (AEW) on December 10 to 14, 2007 with the theme "Nuclear Science and Technology: Opportunities, Challenges and Prospects". This celebration aims to generate awareness of the Filipino people on the beneficial uses of nuclear technology in different areas as in food and agriculture, health and medicine, energy and industry, and the environment.

WREATH LAYING AT THE MONUMENT OF THE LATE GEN. FLORENCIO A. MEDINA



OPENING CEREMONIES

Philippine Nuclear Research Institute cordially invites you to the *Opening Ceremony* of the 35th Atomic Energy Week **NUCLEAR SCIENCE AND TECHNOLOGY: OPPORTUNITIES, CHALLENGES, AND PROSPECTS**

AT THE AEW OPENING CEREMONIES, PNRI DIRECTOR ALUMANDA M. DELA ROSA ACKNOWLEDGES THE PRESENCE OF MS. VIRGINIA S. CALIX, 2007 AEW EXECUTIVE COMMITTEE CHAIRPERSON, DOST UNDERSECRETARY FORTUNATO T. DELA PEÑA, CONGRESSMAN EMILIO A. ABAYA, (AEW KEYNOTE SPEAKER) AND PNRI NUCLEAR SERVICES AND TRAINING CHIEF, FLORA L. SANTOS



MS. ZORAYDA RADAM, A REPORTER OF NBN4, BRIEFS CONGRESSMAN EMILIO A. ABAYA, DOST UNDERSECRETARY FORTUNATO T. DELA PEÑA AND PNRI DIRECTOR ALUMANDA M. DELA ROSA REGARDING THEIR TELEVISED LIVE INTERVIEW OVER NBN4.



ONE OF THE HIGHLIGHTS OF THE CELEBRATION IS THE CONDUCT OF TECHNICAL SESSIONS AT THE PNRI COMPOUND IN DILIMAN, QUEZON CITY.

THE TOPICS AND RESOURCE PERSONS FOR THE SEMINAR ON ADVOCACY ON FOOD IRRADIATION ON DECEMBER 12:

- Fundamentals of Food Irradiation by Estelita G. Cabalfin, PNRI Consultant
- Application and Status of Food Irradiation in the Philippines by Zenaida M. de Guzman, Supervising Science Research Specialist, PNRI
- Philippine Regulation on Food Irradiation by Jesusa Joyce N. Cirunay, Chief, Regulation Division II, Bureau of Food and Drugs
- Irradiation as Phytosanitary Treatment of Agricultural Crops by Larry R. Lacson, Chief, Quarantine Division, Bureau of Plant Industry-Department of Agriculture.



REPRESENTATIVE MARK O. COJUANGCO DELIVERS KEYNOTE SPEECH DURING THE OPENING CEREMONIES OF THE ADVOCACY SEMINAR ON FOOD IRRADIATION

THE TOPICS AND RESOURCE PERSONS FOR THE TECHNICAL SESSIONS ON DECEMBER 10 & 13:

- Retrospect on the Bataan Nuclear Power Plant from a Geologist's Point of View by Dr. Carlo Arcilla, Director, National Institute for Geological Sciences, University of the Philippines.
- Applications in Environmental Engineering by Dr. Genandrialine L. Peralta, Professor, Department of Chemical Engineering, College of Engineering, University of the Philippines
- Application of Isotope Techniques in Modeling Hydrological Processes, by Dr. Guillermo Tabios III, Professor, Department of Civil Engineering, College of Engineering, University of the Philippines
- Isotope Approach to Addressing Water Concerns in the Country: Overview and Case Studies by Soledad S. Castañeda, Senior Science Research Specialist PNRI.
- Nuclear Power, an Option for Energy Security by Dr. Carlito R. Aleta, former Coordinator of Regional Cooperative Agreement for Asia and the Pacific and former PNRI Director
- Considerations in Launching a Nuclear Power Program by Dr. Alumanda M. Dela Rosa, PNRI Director



SEMINAR ON FOOD IRRADIATION WAS ALSO HELD AT SULO HOTEL, QUEZON CITY WITH CONGRESSMAN MARK O. COJUANGCO OF THE 8TH DISTRICT OF PANGASINAN AS KEYNOTE SPEAKER.



CLOSING CEREMONIES

MS. VIRGINIA S. CALIX, 2007 AEW EXECUTIVE COMMITTEE CHAIRPERSON DELIVERS A MESSAGE DURING THE AEW CLOSING CEREMONIES



AEW SPECIAL AWARDS

Best Tour Guide

- Joseph Michael D. Racho, Analytical Measurements Research Group (AMRG), Atomic Research Division (ARD)
- Michael P. Hernandez, Personnel Services, Finance and Administrative Division

Best Technical Exhibit Presenter

- Ryan P. Morco, AMRG, ARD
- Richard M. Balog, Agricultural Research Group, ARD

Certificate of Appreciation (Most Number of Groups Toured)

- Llorina Rañada, Chemistry Research Group, ARD

THE DAILY ACTIVITIES FOR THE 35TH AEW OPEN HOUSE CELEBRATION INCLUDED GUIDED TOURS, LECTURE DEMONSTRATIONS, VIEWING OF EXHIBITS AND VIDEO SHOWING.



BEST TECHNICAL EXHIBIT BOOTH AWARDEES:

- ANALYTICAL MEASUREMENTS RESEARCH GROUP (TOP PHOTO)
- AGRICULTURAL RESEARCH GROUP



Appendices

TABLE 1. TECHNICAL TRAINING COURSES CONDUCTED IN 2007

Title of Training	Training Venue/Location	No. of Participants	Inclusive Dates Conducted	Funding Scheme
RADIOISOTOPE TECHNIQUES				
Radioisotope Techniques Training Course (Medical)	PNRI, Diliman, Quezon City	34	June 18 – July 13	Individual fee-paying
NUCLEAR SCIENCE FOR TEACHERS				
Seminar in Nuclear Science for High School Science Teachers	PNRI	31	April 23 – May 25	PNRI-sponsored
RADIATION SAFETY				
Safety in the Use of Nuclear Equipment and Devices	PSI Technologies, FTI, Taguig	8	January 9 – 13	Company-sponsored
Safety in the Use of Nuclear Equipment and Devices	NPC Alliance Corporation, Batangas Bataan	10	February 12 – 16	Company-sponsored
Safety in the Use of Nuclear Equipment and Devices	PNRI	33	March 5 – 9	Individual fee paying
Safety in the Use of Nuclear Equipment and Devices	Mirant Philippines Pagbilao Power Station, Quezon	10	March 12 – 16	Company-sponsored
Safety in the Use of Nuclear Equipment and Devices	Mirant Sual Corporation, Sual Power Station, Pangasinan	18	May 21 – 25	Company-sponsored
Radiation Safety Course for Medical and Radiopharmaceutical Facilities	St. Luke's Medical Center	12	May 26 – August 4	Company-sponsored
Safety in the Use of Nuclear Equipment and Devices	Printed Flexible Packaging Plant, Batangas City	10	June 4 – 8	Company-sponsored
Safety in the Use of Nuclear Equipment and Devices	Coral Bay Nickel Corp., Rio Tuba, Palawan	13	September 10 – 14	Company-sponsored
Radiation Safety Course for Medical and Radiopharmaceutical Facilities	University of Perpetual Help, Rizal Medical Center	24	October 8 – November 7	Company-sponsored
Safety in the Use of Nuclear Equipment and Devices	PNRI	33	November 19 – 23	Individual fee paying
NONDESTRUCTIVE TESTING COURSES (in cooperation with the Philippine Society for Nondestructive Testing, Inc. or PSNT)				
Ultrasonic Testing –Level 2	PNRI	19	January 8 – 23	Individual fee-paying
Surface Methods –Level 2	PNRI	21	February 5 – 20	Individual fee-paying
Eddy Current Testing –Level 2	PNRI	22	February 26 – March 9	Individual fee-paying
Radiographic Testing –Level 2	PNRI	25	March 12 – 27	Individual fee-paying
Radiographic Testing –Level 2	PNRI	20	March 15 – 20	Individual fee-paying
Radiographic Interpretation Seminar	PNRI	12	April 10 – 12	Individual fee-paying
Radiation Health and Safety Course for Industrial Radiographers	PNRI	12	April 16 – 27	Individual fee-paying
Surface Methods –Level 2	PNRI	19	April 16 – 27	Individual fee-paying
Ultrasonic Testing –Level 2	PNRI	39	May 7 – 23	Individual fee-paying
Ultrasonic testing –Level 2	PNRI	13	May 24 – June 8	Individual fee-paying
Surface Methods – Level 2	PNRI	19	June 18 – 29	Individual fee-paying
NONDESTRUCTIVE TESTING COURSES (in cooperation with the Philippine Society for Nondestructive Testing, Inc. or PSNT)				
Radiographic Testing – Level 2	PNRI	39	July 2 – 17	Individual fee-paying
Ultrasonic Testing –Level 2	PNRI	30	August 6 – 22	Individual fee-paying
Radiographic Interpretation Seminar	PNRI	12	August 22 – 24	Individual fee-paying
Fundamentals of NDT	PNRI	12	August 13 –17	Company-sponsored
Fundamentals of NDT	PNRI	12	August 20 – 24	Company-sponsored
Fundamentals of NDT	PNRI	12	August 28 – Sept 2	Company-sponsored
Ultrasonic Testing –Level 2	PNRI	16	October 1–16	Individual fee-paying
Surface Methods –Level 2	PNRI	21	October 15–26	Individual fee-paying
Radiation Health and Safety Course for Industrial Radiographers	PNRI	9	October 15 – 26	Individual fee-paying

TABLE 1. TECHNICAL TRAINING COURSES CONDUCTED IN 2007

Title of Training	Training Venue/Location	No. of Participants	Inclusive Dates Conducted	Funding Scheme
NONDESTRUCTIVE TESTING COURSES (in cooperation with the Philippine Society for Nondestructive Testing, Inc. or PSNT)				
Radiographic Testing –Level 2	PNRI	15	November 19 – December 5	Individual fee-paying
Radiographic Testing –Level 2	PNRI	19	December 3 – 18	Individual fee-paying
Ultrasonic Testing –Level 2	PNRI	10	December 6 – 21	Individual fee-paying

TABLE 2. NUCLEAR S & T TRAINING FOR UNDERGRADUATES

ON-THE-JOB-TRAINING				
FIELD OF TRAINING	PNRI UNIT/SECTION	SCHOOL	COURSE	NO. OF STUDENTS
Program Development for Recording, Monitoring and Retrieving Documents; Updating/ Encoding of Data for the PNRI Local Area Network and for Finance and Administrative Services Activities	Office of the Director, Technical Assistance, Finance and Administrative Division (FAD) and FAD Units (General Services, Property, and Accounting)	Polytechnic University of the Philippines Asian Institute of Computer Studies A.R. Ramos Institute of Science and Technology	Bachelor in Office Administration, Business Information Management Computer Science	20
Classification/Indexing and Data Encoding of PNRI Library Materials	Library Services	Asian Institute of Computer Studies	Computer Science	1
Air Pollution Study; Chemical Analysis of Water; Laboratory Inventory; Liquid Scintillation Spectrometry; and Data Analysis	Analytical Measurements Research	Adamson University University of the Philippines (UP) in Diliman UP --Visayas	BS Chemistry	5
Mutation Breeding and Nursery Management; Biology/Tissue Culture Techniques, Mass Rearing and Quality Control of Fruit Flies; Microbiology, Soil and Water Treatment	Agricultural Research	Philippine Normal University UP High School, Iloilo Rizal Technological University Philippine Science High School New Era University Virgen Milagrosa University Foundation	BS Biology for Teachers BS Biology and High School students	9
High Dose Dosimetry; Radiation Protection Operations and Routine SSDL Procedure; and Data Encoding of Radiation Protection Services	Radiation Protection Services	Polytechnic University of the Philippines (PUP) Technological Institute of the Philippines Eulogio Amang Rodriguez Institute of Science and Technology	BS Applied Physics, BS Chemical Engineering	7
High Technology Materials Research, X-ray Diffraction Studies of Aluminum-doped Earth Yttrium Garnets; Device Fabrication for Thin-Film Coating on Solid Substrates	Applied Physics Research Group	Polytechnic University of the Philippines	BS Physics	1
Research and Development on Designing of Volumetric Transfer; Red Tide Project; Carrageenan Project (Hydrogel)	Chemistry Research Group	Mapua Institute of Technology University of Sto Tomas	BS Chemical Engineering BS Chemistry BS Bio-Chemistry	6
Ra-226 Analysis in Fly Ash and Soil Samples	Health Physics Research Group	Polytechnic University of the Philippines	BS Chemistry	3
Chemical Analysis of Irradiated Food; Laboratory Activities and Services; Reagent Preparation	Biomedical Research Group	University of Sto Tomas	BS Bio-chemistry	2
Assistance in the Activities of Computer Services	Computer Services	Polytechnic University of the Philippines Central Colleges of the Philippines	BS Computer Science BS Computer Engineering	5
Assistance in the Preparation, Calibration and Routine Dose Measurements in the Cobalt-60 Facility and Preparation of Procedures for QMS	Irradiation Services		BS Chemistry	1

TABLE 3. THESIS / RESEARCH ADVISORSHIP

FIELD OF TRAINING	PNRI UNIT/SECTION	SCHOOL	COURSE	NO. OF STUDENTS
PVP-k-carrageenan as Excipient in the Controlled Release of Terrbinafine HC1, Mefenamic Acid and Cimitidene	Chemistry Research Group	University of the Philippines, Manila	BS Biochemistry	3
Isolation of Hen Egg White Lysozyme Using Carboxymethylated Carrageenan				
Carboxymethylation of Dried Seaweed as an Alternative to Refined Carrageenan and Subsequent Crosslinking of Product with Malik Acid				

TABLE 4. LIST OF IAEA RESEARCH CONTRACTS* IMPLEMENTED IN 2007

Client Name of Business/ Organization	Name/Tel No./ E-mail of Contact Person	Title/Description of Research	Project Duration		Name/E-Mail of Responsible Agency Staff	Project Cost (in Pesos)
			Start	End		
IAEA	Teresa Benson Tel: (431) 2600-21568	Dissecting Drought Tolerance Mechanisms in Rice Through Gain of Function Deletion Mutants	08-15-2007	09-14-2008	Jill Cairns International Rice Research Institute (IRRI)	Php504,000.00
IAEA	Teresa Benson Tel: (431) 2600-21568	Applications of Radiotracer and Radioassay Technologies in Paralytic Shellfish Poisoning Risk Analysis	09-15-2007	09-14-2008	Ma. Celestina Honrado mchonrado@pnri.dost.gov.ph	300,000.00
IAEA	Teresa Benson Tel: (431) 2600-21568	Improvement of Sterile Male Performance of Oriental Fruit Fly, <i>Bactrocera philippinensis</i> , for SIT Programs	10-15-2007	10-14-2008	Glenda Obra gbobra@pnri.dost.gov.ph	300,000.00
IAEA	Teresa Benson Tel: (431) 2600-21568	Evaluation of a Simplified Method of Perfusion Only Lung Scan Compared to Standard V/Q and Spiral CT In Patients with Pulmonary Disease	10-15-2007	10-14-2008	Gerard Fabian Goco St Luke's Medical Center	210,000.00
IAEA	Teresa Benson Tel: (431) 2600-21568	Use of Open Source Web the Development Tools in Improving Nuclear Knowledge Portal for the PNRI	11-01-2007	10-31-2008	Ana Elena L. Conjares aelconjares@pnri.dost.gov.ph	300,000.00
IAEA	Teresa Benson Tel: (431) 2600-21568	Radiation Processed Materials from Carrageenan for Agricultural Applications	12-01-2007	11-30-2008	Lucille V. Abad lvabad@pnri.dost.gov.ph	240,000.00
IAEA	Teresa Benson Tel: (431) 2600-21568	Application of Tritium and Hydrofluorocarbons as Geothermal Vapor-Phase Tracers in Geothermal Reservoir Management	12-01-2007	11-30-2008	Lauro Bayrante Philippine National Oil Company- Energy Research Development Center (PNOC-ERDC)	240,000.00
IAEA	Teresa Benson Tel: (431) 2600-21568	Assessment of Impact of Agricultural Pesticides on Water Quality of Laguna de Bay	12-15-2007	12-14-2008	Leonila Varca National Crop Protection Center	300,000.00
IAEA	Teresa Benson Tel: (431) 2600-21568	Selection for Greater Agronomic Water Use Efficiency in Rice for Salt Affected Areas Using Carbon Isotope Discrimination	12-15-2007	12-14-2008	Abdelbagi Ismail IRRI	450,000.00
TOTAL Php 2,844,000.00						

* IAEA Research Contracts are grants under the IAEA Research Contract Programme whose funding is sourced from the IAEA regular budget and also from extrabudgetary contributions to the IAEA. Through this program, minor equipment and miscellaneous local purchases are provided. The grant to a project is of the average US Dollar 5,000.00 per year.

TABLE 5. IAEA TECHNICAL COOPERATION IN PROJECTS* IMPLEMENTED IN 2007

Client Name of Implementing Agency	Name/Tel No./E-mail of Contact Person	Title/Description of Research	Project Duration		Project Cost (in Pesos)
			Start	End	
IAEA	Corazon C. Bernido, Ph.D. ccbernido@pnri.dost.gov.ph	Human Resource Development and Nuclear Technology Support	2003	2008	Php 8,673,615.60
IAEA	Virginia S. Calix vscalix@pnri.dost.gov.ph	Establishment of a National Nuclear and Radioanalytical Measurements Center	2007	2008	1,436,188.00
IAEA	Leonardo S. Leopando lileopando@pnri.dost.gov.ph	Support for the Preparation of a Decommissioning Plan for the Philippine Research Reactor	2007	2008	3,839,680.00
IAEA	Maria Visitacion B. Palattao mvbpalattao@pnri.dost.gov.ph	Development of a Near Surface Radioactive Waste Disposal Facility	2007	2008	2,390,939.20
IAEA	Estelita G. Cabalfin egcabalfin@pnri.dost.gov.ph	Upgrading of the Gamma Irradiation Facility	2005	2008	2,224,430.00
IAEA	Soledad S. Castañeda sscstaneda@pnri.dost.gov.ph	Isotope Applications in Improving Water Resource Management and Protection	2005	2008	4,338,100.00
TOTAL					Php 22,902,952.80

TABLE 6. 2007 INTERNATIONAL SCIENTIFIC LINKAGES AND NETWORKS

Name of Institution/Country	Scientific Institution Name/E-mail/Position of Contact Person	Nature/Description of Scientific Linkages	Dates of Engagement	
			Start	End
International Atomic Energy Agency (IAEA)/ Vienna, Austria	Thru PNRI as the national competent authority on nuclear-related matters Contact Person: Alumanda M. dela Rosa, PhD. Director, PNRI	Technical cooperation program (including national technical cooperation projects, research contracts, regional RCA and non-RCA projects, interregional projects)	1958	Present
Regional Cooperative Agreement and Training Related to Nuclear Science and Technology (RCA) for Asia and the Pacific/ Vienna, Austria	Thru PNRI	Regional projects, provision of training and experts, and minimal equipment/supplies	1972	Present
Ministry of Science, Technology, Education, Culture and Sports/ Japan	Thru PNRI	Nuclear Researchers Exchange Program	1985	Present
Comprehensive Nuclear Test Ban Treaty Organization (CTBTO)/Vienna, Austria	Thru PNRI	Establishment/maintenance of international monitoring stations and data center; provision of training	1999	Present
Forum for Nuclear Cooperation in Asia (FNCA)/ Japan	Thru PNRI	Regional projects	2000	Present
RCA Regional Office/ Korea	Thru PNRI	Regional projects, provision of training and education	2002	Present
Nuclear Safety Research Association (NSRA)/ Japan	Thru PNRI	Expert dispatch and training provision	2004	Present
United States Department of Energy	Thru PNRI	Project, experts, equipment, and training provision	2005	Present
Australian Nuclear Science and Technology Organization (ANSTO)	Thru PNRI	Regional project, expert and training provision	2006	Present
Other Organizations from Australia, Japan, Canada, United States, Korea and other countries through bilateral agreements/institute agreements	Thru PNRI	Bilateral agreements		

TABLE 6. EXPERTS/MISSIONS

Field/Purpose	Title/Description of Research Name/E-Mail of Responsible Agency Staff	Project Cost (in Pesos)
• Technical Visit (contractor for project on Upgrading of Gamma Irradiation Facility)	Mr. Tamas Sipos Dr. Peter Revai	20 – 21 Jan '07
•	Ms. Paula Jones	29 Jan – 2 Feb '07
• Installation of a Tritium Enrichment System	Mr. Mazoor Choudhry	28 Jan – 16 Feb '07
• Memorandum of Agreement Between KAERI and PNRI	Mr. Jeong-kong Lee	31 Jan '07
• Nuclear and Radiological Security Enhancement Project (NRSE)	Mr. Geoff Howard Ms. Celia Hacker	5 – 9 Feb '07
• Forum for Nuclear Cooperation in Asia (FNCA) – Application of Electron Accelerator	Dr. Tamikazu Kume Dr. Fumio Yoshii Prof. Seiichi Tokura	14 – 17 Feb '07
• Preparatory Activities for CTBTO Workshop	Mr. Dong-Myung Kim Ms. Ayse Altunoglu	21 – 25 March '07
• Technical Cooperation Programme	Mr. Zhang Jing	6 – 8 June '07
• Development of a Near Surface Radioactive Waste Disposal Facility	Mr. Bernard Neerdael	9 – 13 June '07
• Seminar on Nuclear Power	Dr. Yutaka Kawakami	19 June '07
• Comprehensive Nuclear Test Ban Treaty (CTBTO)	Mr. H.E. Tibor Toth	8 – 12 July '07
• Upgrading of the Gamma Irradiation Facility	Dr. Inder Paul Gadh	29 July – 4 Aug '07
• Soil Erosion	Mr. Desmond Walling	3 – 7 Sep '07
• Training Needs Assessment	Dr. Shahid Mallick Maria Josefa Racho Ramirez	9 – 13 July '07
• Establishment of a National Nuclear and Radioanalytical Measurements Center	Dr. Michael Bickel	12– 16 Nov '07
• Upgrading of the Gamma Irradiation Facility	Ms. Maria Helena de O. Sampa	3 – 6 Dec '07

TABLE 7. PNRI HOSTINGS

FIELD	PHILIPPINE PARTICIPANT	AGENCY/ INSTITUTE	ORGANIZER	VENUE OF TRAINING	DATE
• Regional Training Course on Harmonization of Data and Source Components	Dr. Leni Quirit Preciosa Corazon B. Pabroa Joseph Michael G. Racho Ryan P. Morco <u>Course Director:</u> Flora L. Santos	University of the Philippines PNRI	IAEA and PNRI	PNRI	21– 25 May '07
• CTBTO Workshop on International Cooperation	ASEC. Evan Garcia Leah Ruiz Noel Servigon Gunther Sales Dr. Alumanda M. dela Rosa Dr. Corazon C. Bernido Virginia S. Calix Teresa Y. Nazarea Teofilo Y. Garcia Ana Elena L. Conjares Dr. Renato Solidum Dr. Bartolome Bautista Ishmael Narag Esmeralda Banganan	Department of Foreign Affairs PNRI PHIVOLCS	CTBTO, DFA, PNRI	Crowne Plaza, Quezon City	27– 29 June '07

TABLE 7. PNRI HOSTINGS

FIELD	PHILIPPINE PARTICIPANT	AGENCY/ INSTITUTE	ORGANIZER	VENUE OF TRAINING	DATE
• Regional Training Course on the Promotion of Radiation Technology Utilization	Victoria Fe O. Medina Maria Celerina M. Ramiro Haydee M. Solomon Justina S. Cerbolles <u>Course Director:</u> Lucille V. Abad	PNRI	IAEA and PNRI		9– 13 July '07
• Regional Training Course on Self-Assessment of National Regulatory Infrastructure by Member States, Using RASSIA Protocol	Alan M. Borrás Teresita G. de Jesus Ma. Teresa A. Salabit Luzviminda L. Venida <u>Observers:</u> Thelma Artificio Rosita R. Daroy Giuseppe Filam O. Dean <u>Course Director:</u> Eulinia M. Valdezco	PNRI	IAEA and PNRI	Manila	23– 27 July '07
• Expert Steering Group Meeting to Agree on Content of Modules on Diagnostic Radiology	Agnette Peralta	Bureau of Health Devices and Technology (BHDT)	IAEA and BHDT	Manila	1– 5 Oct '07
• Regional Training Course on Techniques for Capturing Critical Nuclear Safety Knowledge	Ana Elena L. Conjares Victoria Fe O. Medina Nydia C. Medina Mylene M. Espinal <u>Course Director:</u> Corazon C. Bernido	PNRI	IAEA and PNRI	Quezon City	22– 26 Oct '07
• Regional Workshop on Early Reporting of Events and Information Sharing for Event and Exercise Management	Victoria Fe O. Medina Luzviminda L. Venida	PNRI	IAEA and PNRI	Crowne Plaza, Quezon City	19– 23 Nov '07
• Regional Meeting for National Trainers to Initiate Trialing of the Program for Radiotherapy Specialty					3– 7 Dec '07
• R ₂ D ₂ P Workshop on Characterization Survey	Eulinia M. Valdezco Leonardo S. Leopando <u>Observers:</u> Teofilo V. Leonin, Jr. Vangelina K. Parami Rosita R. Daroy Lynette B. Cayabo Lopito A. Caluag Lorna Jean F. Palad <u>Course Director:</u> Leonardo S. Leopando	PNRI	IAEA and PNRI	PNRI	3– 7 Dec '07
• Regional Training Course on Application of the Requirements and Guidance on Developing National Capability for Response to Nuclear or Radiological Emergencies	Eulinia M. Valdezco – Lecturer Edgar D. Racho Carl M. Nohay Maria Agnes Palacio	PNRI Office of Civil Defense	IAEA and PNRI	Holiday Inn Galleria, Pasig City	10 – 14 Dec '07

TABLE 8. NON-PNRI HUMAN RESOURCES DEVELOPMENT (FOREIGN)

FIELD	NAME	AGENCY	TRAINING VENUE	DATE	SPONSOR
On-the-job Training					
Molecular Biology Techniques and Immunodiagnosics	Concepcion Ang	University of the Philippines-Philippine General Hospital	South Africa	19 Feb – 18 March	IAEA
Nutritional and Health-Related Environmental Studies	Rosario Sagum	Food and Nutrition Research Institute	Australia	12 March – 4 April	IAEA
Use of Fallout Radionuclides in Soil Erosion/Sedimentation Studies	Esperanza Dacanay	Bureau of Soils and Water Management	China	30 April – 29 May	IAEA
Regional Training Course					
• Prevention of Accidental Exposures in Radiation Therapy	Darrin Casipong Mart Lester De Guzman	VSMC Medical City	Thailand	19 – 23 March '07	IAEA
• Combating Illicit Trafficking in Nuclear and Other Radioactive Materials	Artemio Gabriel	OTS, DOTC	China	28 May – 1 June '07	IAEA
• 3D Conformal Radiotherapy and Quality Assurance for Radiation Oncologists	Manuel Martin Lopez Charito Uy	University of the Philippines-Philippine General Hospital Cebu Doctors Hospital	Japan	9 – 13 July '07	IAEA
• Anthropometry and Stable Isotope Preparation and Administration for Body Composition Assessment	Rosario Encabo Rodolfo Sumayao, Jr.	Food and Nutrition Research Institute	Japan	1 – 5 Oct '07	IAEA
• PET Applications in Clinical Management of Patients	Wenceslao Lauderer Marie Rhiamar Gomez	Jose R. Reyes Memorial Medical Center Dela Salle University Medical Center	Thailand	10 – 14 Nov '07	IAEA
• Applications of IAEA Analytical Tools for Evaluation of Sustainable Energy Strategies for Addressing Climate Change Issues	Marietta Quejada Danilo Vivar Salvador Sarmiento, Jr.	Department of Energy National Power Corporation	Korea	26 Nov – 7 Dec '07	IAEA
• Implementation of the International Code of Practice for Radiotherapy Dosimetry. IAEA TRS -398	Lilian Rodriguez	Jose R. Reyes Memorial Medical Center	Singapore	5 – 8 Dec '07	IAEA
Seminar					
• Seminar for Trainers on Radiological Emergency Medicine in Asian Region	Jose Albert Capuno	East Avenue Medical Center	Japan	27 Feb – 1 March '07	NIRS
Meeting					
• Project Progress Review Meeting on Prevention of Osteoporosis and Promotion of Bone Mass	Aida Mallillin	Food and Nutrition Research Institute	Thailand	15 – 17 Jan '07	IAEA
• RAS/5/040 Project Final Review	Conсорcia Reano	University of the Philippines – Los Baños	India	15 – 19 Jan '07	IAEA
• 2nd Regional Coordination Meeting on Molecular Tools for Quality Improvement in Vegetatively Propagated Crops Including Banana and Cassava	Emma Sales	University of Southern Mindanao	India	5 – 9 Feb '07	IAEA
• Network of Cardiologists Trained by IAEA in Radiation Protection	Jose Tangco	UP-Philippine General Hospital	Malaysia	17 – 18 March '07	IAEA
• Project Mid-Term Progress Review Meeting on Tumour Imaging Using Radioisotopes	Gerard Fabian Goco	St. Luke's Medical Center	Vietnam	16 – 20 April '07	IAEA
• Project Planning Meeting on Distance-Assisted Training for Nuclear Medicine Technologists	Orestes Monzon	Philippine Heart Center	China	16 – 18 April '07	IAEA
• Project Planning Meeting on Control and Prevention of Childhood Malnutrition in Asia	Trinidad Trinidad	Food and Nutrition Research Institute	China	17 – 20 April '07	IAEA
• Project Planning Meeting on Application of High-Precision 3D Radiotherapy for Predominant Cancers in the RCA Region	Miriam Joy Calaguas	Jose Reyes Memorial Medical Center/ St Lukes Medical Center	Singapore	7 – 11 May '07	IAEA
• Regional Meeting for National Trainers to Initiate Trialing of the Programme for Radiotherapy Specialty	Margarita Galon Agnette Peralta	Department of Health	Thailand	25 – 26 June '07	IAEA
• Regional Meeting on 3D Conformal Radiotherapy and QA for Radiation Oncologists	Manuel Martin Lopez Charito Uy	University of the Philippines-Philippine General Hospital Cebu Doctors Hospital	Japan	9 – 13 July '07	IAEA
• Update Meeting on Newborn Screening Programs in Asia	Carmencita Padilla	University of the Philippines-National Institute of Health	Austria	8 – 11 Oct '07	IAEA

Conference/Symposium/Scientific Visit

• End-Users Conference on Improved Information About Urban Air Quality Management	Leni Quirit	University of the Philippines-Institute of Communication	New Zealand	26 – 27 March '07	IAEA
• Scientific Visit- Use of Fallout Radionuclides in Soil Erosion/Sedimentation Studies	Gina Nilo	Bureau of Soils and Water Management	China	16 – 20 April '07	IAEA
Study Grant					
• World Nuclear University	Dickerson Moreno	Dela Salle University	Korea	14 July – 24 Aug '07	IAEA

TABLE 9. PNRI HUMAN RESOURCES DEVELOPMENT (FOREIGN)

FIELD ON-THE-JOB TRAINING	NAME	COUNTRY	DATE	SPONSOR
• Animal Production	Celia O. Asaad	United Kingdom	28 March – 27 July '07	IAEA
• In Vitro and In vivo Techniques for the Screening, Identification and Development of Functional Substances with Radioprotective/Anti-Cancer Properties	Chitho P. Feliciano	Korea	15 April – 14 Oct '07	IAEA
• Analytical and Instrumental Techniques	Lourdes G. Fernandez	Germany	20 Aug – 19 Nov '07	IAEA
• Plant Breeding and Genetics: Molecular Marker Technique	Mary Jayne C. Manrique	Finland	20 Aug – 19 Dec '07	IAEA
• General Atomic Energy Development	Emma L. Cancino	USA	20 Aug – 20 Sept '07	IAEA
TRAINING COURSE				
• Safety Assessment for Radioactive Waste Disposal Facilities	Editha A. Marcelo Ma. Teresa A. Salabit	Indonesia	2 – 6 April '07	IAEA
• Biological Dosimetry: Dose Assessment Immediately and Retrospectively to an Occupational and Accidental Overexposure	Juana S. Gregorio	Korea	30 April – 4 May '07	IAEA
• Quality Control Test Procedures in Nuclear Instrument Maintenance and Refurbishment	Eduardo T. Cabildo	Indonesia	7 – 18 May '07	IAEA
• Combating Illicit Trafficking in Nuclear and Other Radioactive Materials	Julietta E. Seguis	China	28 May – 1 June '07	IAEA
• Radiation Safety for Control of Public Exposure Including Safe Management of Radioactive Waste	Abelardo A. Inovero	Bangladesh	11 -15 June '07	IAEA
• Advance Detection Equipment	Ma. Teresa A. Salabit	India	30 July – 3 Aug '07	IAEA
• Radiation Processing for Basic and Medium Level Personnel	LLorina Ranada Rhett Simon DL Tabbada	Malaysia	6 – 10 Aug '07	IAEA/RCA
• Response to Unauthorized Acts Involving Nuclear and Other Radioactive Materials	Nelson P. Badinas	India	6 – 10 Aug '07	IAEA
• Application of Nanotechnology	Valerie Ann I. Samson Lorna S. Relleve	Pakistan	29 Oct – 2 Nov '07	IAEA
• Electron Beam Application on Fruits and Frozen Foods	Lvelyn M. Tolentino	Vietnam	5 – 9 Nov '07	IAEA
• Assessment of Occupational Exposure Due to Intake of Radionuclides	Mary Rose Q. Mundo	Korea	12 – 23 Nov '07	IAEA
• Group Training Course – Government Budgeting Course	Bernard M. de Lara	India	1 Nov – 31 Dec '07	Colombo Plan
• Implementation of International Code of Practice for Radiotherapy Dosimetry	Estrella S. Caseria	Sngapore	5 – 8 Dec '07	IAEA
SEMINAR/WORKSHOP				
• Regional Training Workshop on Use of NATs and Interaction with End-Users	Elvira Z. Sombrito	Malaysia	5 – 9 Feb '07	RCARO
• Seminar for Trainers on Radiation Emergency Medicine in Asian Region	Eulinia M. Valdezco Emma I. Cancino	Japan	27 Feb – 1 Mar '07	NIRS
• Workshop on Emergency Exercise and Emergency Preparedness and Response Topical Group	Eulinia M. Valdezco Teofilo V. Leonin, Jr.	Indonesia	11 – 15 June '07	IAEA

TABLE 9. PNRI HUMAN RESOURCES DEVELOPMENT (FOREIGN)

FIELD	NAME	COUNTRY	DATE	SPONSOR
SEMINAR/WORKSHOP				
• International Workshop on Harmonization of Approaches to Assuring Safety Within National Radioactive Waste Management Policies and Strategies – A Common Framework for the Safety of Radioactive Waste Management and Disposal	Ma. Visitacion B. Palattao	South Africa	2 – 6 July '07	IAEA
• Regional Seminar on Facts of Nuclear Power and Considerations to Launch a Nuclear Power Program	Dr. Alumanda M. dela Rosa	Korea	10 – 13 July '07	IAEA
• Sub-Regional Workshop on Illicit Trafficking: Information Management and Coordination	Julietta E. Seguis	Singapore	10 – 13 July '07	IAEA
• Workshop for Developing Future Strategy; Working Group Meeting on Enhancing the Roles and Status of the RCARO	Dr. Alumanda M. dela Rosa	Korea	24 – 27 July '07	RCARO
• Workshop on Human Resources Development	Dr. Corazon C. Bernido	Indonesia	27 – 31 Aug '07	FNCA
• 2nd ANSN Topical Group on the Safety of Radioactive Waste Management; Joint Convention	Maria Visitacion B. Palattao Editha A. Marcelo	Australia	3 – 7 Sept '07	IAEA
• Regional Workshop on Deterministic Safety Analyses	Carl M. Nohay Christina A. Petrache	Japan	10 – 14 Sept '07	IAEA
• Regional Nuclear Material Accounting and Control at Facilities	Teresita G. de Jesus	China	17 Oct - 1 Nov '07	IAEA
• Application of Radiation Processing for Natural Polymers	Lorna S. Rellve	Vietnam	22 – 26 Oct '07	FNCA
• Regional Workshop on Incident Reporting System/International Nuclear Event Scale Criteria and Reporting	Teofilo V. Leonin, Jr.	China	29 Oct – 2 Nov '07	IAEA
• Regional Workshop on Promotion of Safety Culture and Research Reactor Operation	Graceta DL. Cuevas Vangelina K. Parami	China	29 Oct – 2 Nov '07	IAEA
• Regional Workshop on Information Technology Security	Angel B. Anden Christopher G. Halnin	China	13 – 15 Nov '07	IAEA
• FNCA Workshop on Mutation Breeding	Faye G. Rivera	Korea	19 – 23 Nov '07	NSRA
• FNCA Workshop on Radioactive Waste Management	Editha A. Marcelo Ma. Visitacion B. Palattao	Thailand	19 – 23 Nov '07	TINT
• Sub-Regional Workshop on Implementation of International Counter-Terrorism Instruments	Julietta E. Seguis	Indonesia	26 – 27 Nov '07	Australian Gov't
• 3rd International Workshop for Individual Monitoring of Ionizing Radiation	Elvira Z. Sombrito	Japan	2 – 5 Dec '07	Chiyoda Technology Corp.
• Training/Meeting/ Workshop on Competitiveness of Nuclear Power and Other Generation Technologies in Restructured Electricity Markets	Christina A. Petrache	USA	3 – 14 Dec '07	IAEA
• Workshop on Mo-99m Production Using Low Enriched Uranium	Adelina dM. Bulos	Australia	3 – 5 Dec '07	Argonne Nat'l Lab
• Regional Workshop on Promotion of Integrated Management Systems for Research Reactors	Dr. Corazon Garcia Alan M. Borrás	Malaysia	3 – 6 Dec '07	IAEA
• Workshop on Safety Assessment for Predisposal Radioactive Waste Management Facilities	Jose N. Calaycay Alfonso A. Singayan	Malaysia	3 – 7 Dec '07	IAEA
MEETING				
• Project Final Review- Enhancement of Genetic Diversity in Food Pulses, Cereals, Oil Crops and Establishment of Mutant Germplasms Network	Alfonso O. Grafia	India	15 – 19 Jan '07	IAEA
• Midterm Progress Review for Assessment of Soil Erosion Using Fallout Radionuclides in Selected Agricultural Watersheds	Adelina dM Bulos	China	22 – 25 Jan '07	IAEA
• 8th Coordinators Meeting of Forum for Nuclear Cooperation in Asia (FNCA)	Dr. Alumanda M. Dela Rosa	Japan	7 – 9 Feb '07	MEXT
• Meeting of Standing Advisory Group (SAGTAC) on Technical Assistance and Cooperation	Dr. Alumanda M. Dela Rosa	Austria	19 – 23 Feb '07	IAEA
• Consultancy Meeting on Integrated Safety Evaluation	Dr. Corazon C. Bernido	Austria	5 – March '07	IAEA
• Regional Coordination Meeting on Public Exposure Control	Eulinia M. Valdezco	Myanmar	5 – 7 March '07	IAEA
• Final Progress Review Meeting on Radioisotope Technology for Natural Resource Exploration and Exploit	Silvestre L. Abaya Ma. Luz M. Ascaño	Korea	5 – 9 March '07	IAEA
• Technical Meeting on Management Systems	Eulinia M. Valdezco	Austria	19 – 23 March '07	IAEA
• 29th NR Meeting on Regional Cooperative Agreement	Dr. Alumanda M. Dela Rosa	Australia	20 – 23 March '07	Phil. Gov't

TABLE 9. PNRI HUMAN RESOURCES DEVELOPMENT (FOREIGN)

FIELD	NAME	COUNTRY	DATE	SPONSOR
MEETING				
• Meeting and End-Users Conference- Final Progress Assessment and Planning on Improved Information About Urban Air Quality Management	Flora L. Santos	New Zealand	26 – 30 March '07	IAEA
• Regional Coordination Meeting on Strengthening Infrastructure for Radioactive Waste Management	Editha A. Marcelo	Indonesia	26 – 30 March '07	IAEA
• Project Planning Meeting on Assessment of Trends in Freshwater Quality	Soledad S. Castañeda	Austria	2 – 5 April '07	IAEA
• ANSN Topical Group Meeting on Safety Analysis	Carl M. Nohay	Vietnam	17 – 20 April '07	IAEA
• Information Technology Support Group	Angel B. Anden	Japan	18 – 20 April '07	IAEA
• Project Planning Meeting –IAEA RAS/8/106	Lucille V. Abad	Thailand	23 – 27 April '07	IAEA
• Coordination Meeting on Refurbishment of Nuclear Instruments	Eduardo T. Cabildo	Thailand	30 Apr – 4 May '07	IAEA
• Project Planning Meeting on Sustainability of Regional Radiation Protection Infrastructure	Eulinia M. Valdezco	Sri Lanka	7 – 11 May '07	IAEA
• Review Meeting/Asia-Pacific Seminar -Regional Security of Radioactive Sources Project Combating Nuclear Terrorism	Eulinia M. Valdezco	Australia	16 – 18 May '07	ANSTO
• Consultants' Meeting; International Symposium for the Global Network of Isotopes in Precipitation; Advances in Isotope Hydrology and its Role in Sustainable Water Resources Management	Soledad S. Castañeda	Austria	21 – 25 May '07	IAEA
• Meeting to Guide and Review Draft Strategic Plans and Processes for Sustainability in National Nuclear Institutions	Virginia S. Calix	Indonesia	21 – 25 May '07	IAEA
• Regional Coordination Meeting for Occupational Exposure Control	Estrella S. Caseria	Mongolia	28 May – 1 June '07	IAEA
• International Radioactive Waste Technical Committee (WATEC)	Dr. Alumanda M. dela Rosa	Austria	29 May – 1 June '07	IAEA
• 6th Meeting of the Steering Committee - Asian Nuclear Safety Network	Dr. Corazon C. Bernido	China	5 – 6 June '07	IAEA
• Export Control and Non-Proliferation Policy	Eulinia M. Valdezco	USA	5 – 8 June '07	US Gov't
• Project Planning Meeting for Establishing a Benchmark for Assessing the Radiological Impact of Nuclear Power Activities on the Marine Environment in the Asia-Pacific Region	Teofilo Y. Garcia	Australia	11 – 15 June '07	IAEA
• Project Planning Meeting on Improvement of Crop Quality and Stress Tolerance for Sustainable Crop Production Using Mutation Techniques and Biotechnology	Alfonso O. Grafia	Malaysia	25 – 29 June '07	IAEA
• Technical Meeting for Sharing of Information as to States' Implementation of the Code of Conduct on Safety and Security of Radioactive Sources and its Supplementary Guidance on the Import and Export of Radioactive Sources	Eulinia M. Valdezco	Austria	11 – 15 June '07	IAEA
• APEC Meeting of Senior Officials to Discuss the Establishment of an Informal Asia-Pacific Safeguards Association	Julietta E. Seguis	Australia	26 – 28 June '07	Gov't of Australia
• Project Planning Meeting on Development and Application of Advanced Industrial Radiography and Tomography Techniques	Renato T. Bañaga	India	2 – 6 July '07	IAEA
• IAEA/RCA Project Planning Meeting of the RCA Project on a Benchmark for Assessing the Radiological Impact of Nuclear Power Activities in the Marine Environment in the Asia-Pacific Region	Teofilo Y. Garcia	Austria	9 – 13 July '07	IAEA
• Project Planning Meeting on Novel Applications of Food and Radiation Technology for Improving Socio-economic Development	Zenaida M. de Guzman	Indonesia	16 – 20 July '07	IAEA
• Regional Coordination Meeting on the Establishment of Emergency Preparedness and Response Capabilities	Teofilo V. Leonin, Jr.	Singapore	23 – 27 July '07	IAEA
• Regional Meeting on Sharing Core Nuclear Safety Processes and Relevant Knowledge	Vangelina K. Parami Carl M. Nohay	Pakistan	23 – 27 July '07	IAEA
• Project Planning Meeting on Characterization and Source Identification of Particulate Air Pollution	Flora L. Santos	India	21 – 24 Aug '07	IAEA
• Topical Meeting (American Nuclear Society)-- Decommissioning, Decontamination and Reutilization	Dr. Corazon C. Bernido	USA	16 – 19 Sept '07	IAEA
• 2nd Research Coordination Meeting on Comparative Analysis of Methods and Tools for Nuclear Knowledge Preservation	Ana Elena L. Conjares	Austria	15 – 19 Oct '07	IAEA
• Meeting for Establishment of a Regional Forum for Regulators in the Framework of RASAREN	Eulinia M. Valdezco	Austria	15 – 19 Oct '07	IAEA
• Topical Group Meeting - ANSN (Education and Training)	Dr. Corazon C. Bernido	Austria	16 – 17 Oct '07	IAEA

TABLE 9. PNRI HUMAN RESOURCES DEVELOPMENT (FOREIGN)

FIELD	NAME	COUNTRY	DATE	SPONSOR
MEETING				
• Project Review Meeting for Post-Tsunami Environmental Impact Assessment Project	Elvira Z. Sombrito	Thailand	22 – 25 Oct '07	RCARO
• Technical Meeting for the Establishment of an International Decommissioning Network (IDN)	Dr. Corazon C. Bernido	Austria	29 – 31 Oct '07	IAEA
• Technical Meeting to Support the Safe Decommissioning of Nuclear Facilities Demonstration Project Transition Phase	Leonardo S. Leopando	Australia	12 – 16 Nov '07	IAEA
• Technical Meeting for Marketing and Quality Management of Radiotracer and Sealed Source Techniques	Ma. Luz M. Ascaño	Austria	12 – 16 Nov '07	IAEA
• Technical Meeting to Develop a Guidance Document on Knowledge Management for Nuclear R & D	Ana Elena L. Conjares	Austria	19 – 23 Nov '07	IAEA
• Regional Technical Meeting on Additional Protocol Implementation in Asia and the Pacific Region	Sylvia S. Busine Julietta E. Seguis	Australia	19 – 23 Nov '07	Australian Gov't
• National Coordinators' Meeting and Workshop on Area-Wide Management of Fruit Fly Pests	Glenda B. Obra	Austria	19 – 23 Nov '07	IAEA
• 7th Meeting of the Steering Committee - Asian Nuclear Safety Network	Dr. Alumanda M. dela Rosa	Vietnam	19 – 21 Nov '07	IAEA
• National Coordinators' Meeting for Supporting Web-based Nuclear Education and Training Through Regional Networking	Dr. Corazon C. Bernido	India	19 – 23 Nov '07	IAEA
• Regional Coordination Meeting on Applications of Radiotracers and Radioassay Technologies to Seafood Safety Risk and Analysis	Elivira Z. Sombrito	Monaco	20 – 23 Nov '07	IAEA
• Project Leaders' Meeting on Public Information of Nuclear Energy	Rhodora R. Leonin Justina S. Cerbolles	Malaysia	26 – 30 Nov '07	NSRA
• Regional Meeting on Developing and Implementing National Policy and Strategy for Radioactive Waste Management	Editha A. Marcelo Ma. Visitacion B. Palattao	Austria	3 – 7 Dec '07	IAEA
• Technical Meeting - EBP on Safety of Nuclear Installations	Dr. Corazon C. Bernido	Austria	10 – 13 Dec '07	IAEA
• 8th Ministerial Level Meeting and Senior Officials Meeting of the Forum for Nuclear Cooperation in Asia	Dr. Alumanda M. dela Rosa	Japan	17 – 18 Dec '07	IAEA
CONFERENCE/SYMPOSIUM				
• International Conference on Challenges Faced by Technical and Scientific Support Organizations in Enhancing Nuclear Safety	Dr. Alumanda M. dela Rosa	France	23 – 27 April '07	IAEA
• 15th International Conference – Environmental Bioindicators	Elvira Z. Sombrito	Hongkong	7 – 9 June '07	Official Time Only
• 51st IAEA General Conference; Senior Regulators' Meeting; and 26th RCA General Conference	Dr. Alumanda M. dela Rosa	Austria	13 – 22 Sept '07	Phil. Govt.
• Conference -Australasian Radiation Protection Society	Kristine Marie D. Romallosa	Australia	22 – 24 Oct '07	ANSTO
• International Conference – Research Reactors Safe Management and Effective Utilization	Dr. Alumanda M. dela Rosa Estrella S. Caseria Kristine Marie D. Romallosa	Australia	5 – 9 Nov '07	IAEA ANSTO
EXPERT MISSION				
• Characterization of Pupal Eye Color for Three Anastrepha Fruit Fly Species Namely: A. ludens, A. Obliqua and A. Serpentina" at Moscafruit-Moscamed Mass Rearing Facility	Sotero S. Resilva	Mexico	4 June – 27 July '07	IAEA
SCIENTIFIC VISIT				
• Scientific Visit on Food Irradiation	Zenaida M. de Guzman	China	12 – 17 Aug '07	IAEA
• Nuclear Law	Eulinia M. Valdezco	France	27 Aug – 7 Sept '07	IAEA
• Expert Mission to Investigate Available Educational Material and Future Cooperation with ANENT Countries	Flora L. Santos	Japan	22 – 26 Oct '07	IAEA
• Fellowship Visit in the Field of Nuclear and Radiological Security Enhancement	Estrella S. Caseria Kristine Marie D. Romallosa	Australia	29 Oct – 2 Nov '07	NRSE Project, ANSTO
• Scientific Visit in the Field Decommissioning of Nuclear Facilities	Vangelina K. Parami	Spain	10 – 14 Dec '07	IAEA
OTHER FELLOWSHIPS				
• Fellowship Attachment - Project Administration	Grace M. Carlos	Korea	1 May - 31 Oct '07	RCARO
• Regional Field Exercise (in the Chernobyl Exclusion Zone) for Extended Response by Radiological Assessors	Estrella S. Caseria Kristine Marie D. Romallosa	Ukraine	14 – 18 May '07	IAEA

TABLE 9. PNRI HUMAN RESOURCES DEVELOPMENT (FOREIGN)

FIELD	NAME	COUNTRY	DATE	SPONSOR
OTHER FELLOWSHIPS				
• Doctoral Program- Environmental Sciences	Ryan U. Olivares	Japan	2 Oct '07 – 2 Oct '08	ADB-Japan Scholarship program
• Doctoral Research (RONPAKU) Program-Radiation Chemistry	Lucille V. Abad	Japan	1 Nov – 22 Dec '07	Japan Society for the Promotion of Science

TABLE 10. PNRI HUMAN RESOURCES DEVELOPMENT (LOCAL)

FIELD	NAME	VENUE	DATE
Training Course			
• Re- Training on Full Test Uploading to the Philippine e-LIB Portal	Isabel M. Amiscaray Arminda V. Espineda	National Library	23 Feb '07
• Orientation Seminar and Training of Trainers on Good Citizenship Values Formation	Emma L. Cancino, Angel B. Anden, Alicia F. Lagunzad	Malacañang	27 March '07
• Responder Training on the Chemical, Biological, Radiological and Nuclear Personnel Protective Equipment	Dr. Graceta DL. Cuevas, Eulinia M. Valdezco, Teofilo V. Leonin, Jr.	Camp Aguinaldo	27 March '07
• Hands-on Training/Seminar on Government Electronic Procurement System	Luzviminda B. Muyco	Pasig City	9 – 10 July '07
• Short Course on HTML Website Development	Roel A. Loteriña	National Computer Center	20 Aug – 11 Sept '07
• PNRI-PSNM Basic Course in Nuclear Cardiology	Eulinia M. Valdezco, Virginia S. Calix, Thelma P. Artificio, Emma L. Cancino, Elvira S. Sombito, Estrella S. Caseria	Philippine Heart Center	10 – 11 Aug '07
• International Seaport Interdiction Training	Julietta E. Seguis	Bureau of Customs	10 – 14 Dec '07
Seminar/Workshop			
• Test Analysis and Calibration Information System at DOST (TACIS) SAD Workshop	Anden B. Angel	DOST	9 Jan '07
• Seminar/Workshop on Preparing a Quality Management System Conforming to ISO 9001:2000 Standard Conducted by the Metals Industry Research and Development (MIRDC)	Eulinia M. Valdezco, Virginia S. Calix, Flora L. Santos, Dr. Graceta DL. Cuevas, Osroxzon L. Amparo, Teofilo V. Leonin, Jr., Vangelina K. Parami, Emma L. Cancino, Julietta E. Seguis, Ma. Visitacion B. Palattao, Edgar G. Racho, Alan M. Borrás, Lynette B. Cayabo, Nelson P. Badinas, Carl M. Nohay, Teresita G. de Jesus, Alfonso A. Singayen, Luzvimina L. Venida, Johnylen V. Melendez, Luvimina G. Lanuza, Percedita T. Cansino, Ma. Celerina M. Ramiro	PNRI Auditorium	20 – 21 Feb '07
• Seminar - Workshop on Nuclear Power	Dr. Corazon C. Bernido, Virginia S. Calix, Dr. Graceta DL. Cuevas, Flora L. Santos, Eulinia M. Valdezco, Christina A. Petrache, Leonardo S. Leopando, Teofilo V. Leonin, Jr., Osroxzon L. Amparo, Elvira Z. Sombrito, Reynaldo P. Jacinto, Victoria Fe O. Medina, Nydia C. Medina, Alma S. Piñera, Rhodora R. Leonin, Ma. Visitacion B. Palattao, Justina S. Cerbolles, Mylene M. Espinal, Mary Jane C. Manrique, Josefina G. Natera, Jennylen C. Minglana, Johnylen V. Melendez	Traders Hotel, Manila	20 June '07
• Product Awareness Seminar	Conrado M. de Guzman and Arminda V. Espineda	Heritage Hotel	3 Aug '07
• Workshop on Irradiation as a Quarantine Treatment	Zenaida M. de Guzman, Glenda B. Obra, Luvimina G. Lanuza, Haydee M. Solomon	City State Tower	1 – 2 Aug '07
• Internal Control Structure	Dr. Graceta DL. Cuevas	Commission on Audit, Quezon City	6 – 9 Aug '07

TABLE 10. PNRI HUMAN RESOURCES DEVELOPMENT MANPOWER DEVELOPMENT (LOCAL)

FILED	NAME	VENUE	DATE
Seminar/Workshop			
• Seminar-Workshop on Customer Satisfaction Measurement (Conducted by MIRDC/DOST)	Dr. Graceta DL. Cuevas, Flora L. Santos, Virginia S. Calix, Victoria Fe O. Medina, Teofilo V. Leonin, Jr., Vangeline K. Parami, Ma. Visitacion B. Palattao, , Julietta E. Seguis, Thelma P. Artificio, Sylvia S. Busine, Carl M. Nohay, Alan M. Borrás, Edgar G. Racho, Nelson P. Badinas, Luzviminda L. Venida, Teresita G. de Jesus, Alfonso A. Singayan, Lynette B. Cayabo, Johnnylen V. Melendez, Alicia F. Lagunzad, Estrella S. Caseria, Luvimina G. Lanuza, Percedita T. Cansino, Reynaldo P. Jacinto, Zenaida M. de Guzman, Soledad S. Castañeda, Preciosa Corazon B. Pabroa	PNRI Auditorium	28 – 29 Aug '07
• National Radioactive Source Security Awareness Seminar	Corazon C. Bernido, Eulinia M. Valdezco, Virginia S. Calix, Flora L. Santos, Graceta DL Cuevas, Reynaldo P. Jacinto, Leonardo S. Leopando, Angel B. Anden, Victoria Fe O. Medina, Nydia C. Medina, Julietta E. Seguis, Sylvia S. Busine, Ma. Teresa A. Salabit, Mylene M. Espinal, Johnnylen V. Melendez	Crown Plaza Hotel	6 Aug '07
• Proliferation Awareness Training Workshop	Eulinia M. Valdezco, Julietta E. Seguis, Nydia S. Medina, Mylene M. Espinal	Dusit Nikko Hoter	25 – 26 Sept '07
• Seminar-Workshop on Technical Writing and Presenting with Power	Dennis Aquino, Haydee Solomon	DOST	14, 17 & 18 Sept '07
• Test Analysis and Calibration Information System at DOST (TACIS) SAD Workshop	Angel B. Anden	DOST	From Sept 4 and once a week until Dec '07
• Seminar / Workshop on Internal Quality Audit – Conducted by MIRDC/DOST	Eulinia M. Valdezco, Dr. Graceta DL. Cuevas, Flora L. Santos, Elvira Z. Sombrito, Vangeline K. Parami, Ma. Visitacion B. Palattao, Edgar G. Racho, Alan M. Borrás, Carl M. Nohay, Teresita G. de Jesus, Lynette B. Cayabo, Alfonso A. Singayan, Guiseppe Filam O. Dean, Normita C. Lim, Conrado M. de Guzman, Bernard M. De Lara, Alma S. Piñera, Susan S. Pascual, Renato T. Bañaga, Eduardo T. Cabildo, Luvimina G. Lanuza, Estrella S. Caseria, Soledad S. Castañeda, Zenaida M. de Guzman, Ryan P. Morco	PNRI Auditorium	19 – 21 Sept '07
• Proliferation Awareness Training Workshop	Eulinia M. Valdezco, Julietta E. Seguis, Nydia C. Medina, Mylene M. Espinal, Jennylyn C. Minglana, Laura R. Pineda, Mirriam F. Rejas, Elizabeth C. Vidal, Emma L. Cancino, Ma. Lucia C. Cobar, Graceta DL Cuevas, Arminda V. Espineda, Eileen Beth A. Hernandez, Socorro P. Intoy, Normita C. Lim, Victoria Fe O. Medina, Cecilia T. Perez, Ma. Celerina M. Ramiro, Levelyn M. Tolentino, Catherine V. Villa	Bureau of Customs	10 – 14 Dec '07
• Human Security Act Seminar	Eulinia M. Valdezco, Ma. Visitacion B. Palattao	Quezon City Sports Club	27 Nov '07
Meeting			
• Consultative Meeting for IDAP Focal Persons	Emma L. Cancino	DOST	19 Jan '07
Conference			
• Office Productivity; Tips and Tricks in Using Powerpoint for Power Presentation	Eulinia M. Valdezco, Victoria Fe O. Medina, Grace M. Carlos, Julietta E. Seguis, Arturo F. Salih, Erlinda N. Veracruz, Catherine V. Villa	SM Megamall	4 Dec '07
Others			
• National Womens' Day Celebration	Emma L. Cancino, Laura R. Pineda, Josefina J. Omandam, Alicia F. Lagunzad	Aquino Stadium	8 March '07
• Orientation to the Bids and Awards Committee Members on the IRR of R.A. 9184 and Bidding Procedures	Virgilio R. Santiago, Normita C. Lim, Luzviminda B. Muyco	DOST	13 – 14 June '07
• Parada sa Kalayaan in Connection with the 109th Anniversary Celebration of the Philippine Independence	Alan M. Borrás, Ma. Teresa L. Borrás, Michael T. Fernandez, Dolores M. Lazo	Luneta	12 June '07

TABLE 10. PNRI HUMAN RESOURCES DEVELOPMENT MANPOWER DEVELOPMENT (LOCAL)

FILED	NAME	VENUE	DATE
Others			
• PNRI-PSNM Basic Course in Nuclear Cardiology	Eulinia M. Valdezco, Virginia S. Calix, Elivira Z. Sombrito, Thelma P. Artificio, , Estrella S. Caseria, Emma L. Cancino	Philippine Heart Center	10 – 11 Aug '07
• Lecture-Consultation entitled "Usapang K"	Celia O. Asaad, Grace M. Carlos, Estrella Cortez, Mylene M. Espinal, Ruby Liza Gabriel, Michael Hernandez, Teofilo V. Leonin, Jr., Nydia Medina, Jennylyn Minglana, Laura R. Pineda, Mirriam Reyes, Elizabeth Vidal, Emma Cancino, Ma. Lucia Cobar, Graceta DL. Cuevas, Arminda Espinal, Eileen Beth Hernandez, Socorro Intoy, Normita Lim, Victoria Fe O. Medina, Cecilia Perez, Ma. Celerina M. Ramiro, Levelyn Tolentino, Catherine Villa	PHIVOLCS	16 Nov '07

TABLE 11. PNRI GRADUATE PROGRAM IN 2007

NAME / ADDRESS E-MAIL OF SCHOLAR	LEVEL (MS OR PHD) FIELD OF STUDY	NAME OF RECEIVING HIGHER EDUCATIONAL INSTITUTION	STATUS (ON-GOING OR GRADUATE) SPONSOR
With Scholarship			
Lucille V. Abad	Ph.D. in Chemistry	The University of Tokyo	On-going/ JSPS
Ryan U. Olivares	Ph.D. in Environmental System	The University of Tokyo	On-going/ ADB-JSP
Preciosa Corazon B. Pabroa	Ph.D. Environmental Science	University of the Philippines- Diliman	On-going/ SEI
Vangeline K. Parami	Ph.D. in Environmental Science	University of the Philippines- Diliman	On-going/ DOST
Charito T. Aranilla	M.S. Chemistry	University of Sto. Tomas	On-going/ PCASTRD
Ryan P. Morco	M.S. Chemistry	University of Sto. Tomas	On-going/ SEI
Joseph Michael D. Racho	M.S. Chemistry	University of Sto. Tomas	On-going/ SEI
Kristine Marie D. Romallosa	M.S. Physics	University of the Philippines-Diliman	On-going/ DOST
Self-Financed Studies			
Thelma P. Artificio	Ph.D. Technology Management	Technological University of the Philippines - Manila	On-going
Soledad S. Castañeda	Ph.D. in Environmental Science	University of the Philippines- Diliman	On-going
Lorena A. del Castillo	Ph.D. in Materials and Minerals	University of South Australia	On-going
Jade R. Trono	Ph.D. in Nuclear Engineering and Management	The University of Tokyo	On-going
Denis DC. Aquino	M.S. in Engineering	University of the Philippines- Diliman	On-going
Chitho P. Feliciano	M.S. in Microbiology and Biotechnology	University of the Philippines- Diliman	On-going
Lorna Jean H. Palad	M.S. in Environmental Science	University of the Philippines- Diliman	On-going
Rhett Simon DC Tabbada	M.S. in Marine Science	University of the Philippines- Diliman	On-going
Christopher G. Hahnin	M.S. in Information Technology	Polytechnic University of the Philippines	On-going
Justina S. Cerbolles	M.A. in Education	Philippine Normal University	On-going

TABLE 12. LIST OF SCIENTIFIC PUBLICATIONS IN 2007

Title of Scientific Paper	Name/E-Mail of Authors	Publication	
		Name/Type of Journal*	Date Published
Rate Constants of Reactions of e-Carrageenan with Hydrated Electron and Hydroxyl Radical	Lucille V. Abad –PNRI lvabad@pnri.dost.gov.ph S. Saiki H. Kudo Y. Muroya Y. Katsumura Dr. Alumanda M. dela Rosa - PNRI amdelarosa@pnri.dost.gov.ph	Nuclear Inst. and Methods in Physics Research, B, 265 (1), 410-413	2007
Development of Quality Control Procedure for Mass Produced and Released <i>Bactrocera philippinensis</i> (Diptera: Tephritidae) for Sterile Insect Technique Programs	Sotero A. Resilva saresilva@pnri.dost.gov.ph Glenda B. Obra gbobra@pnri.dost.gov.ph Nenita B. Zamora Erdie B. Gaitan	Florida Entomologists, Volume 90, Issue 1, pp 58 -63	March 2007
Use of <i>Perna viridis</i> as a Bioindicator of Paralytic Shellfish Toxins at Low <i>Pyrodinium bahamense</i> var <i>compressum</i> Density using a Radioreceptor Assay	Elvira Z. Sombrito M. C. V. Honrado A. de Vera R. S. Tabbada Ma.L. Rañada J. Relox Jr. K. Tangonan, M.dC	Environmental Bioindicators , 2:4 264 - 272 .	2007
Leachable ²²⁶ RA in Philippine Phosphogypsum and its Implication in Groundwater Contamination, Isabel, Leyte, Philippines	Socrates Jose P. Cañete Lorna Jean H. Palad ljhpalad@pnri.dost.gov.ph Elisa B. Enriquez ebenriquez@pnri.dost.gov.ph Teofilo Y. Garcia tygarcia@pnri.dost.gov.ph Teresa Y. Nazarea	Environmental Monitoring Assessment Journal	15 September 2007

TABLE 13. ADDITIONAL RESOURCES FROM EXTERNAL SOURCES IN 2007

DONOR NAME OF INSTITUTION	PROJECT TITLE	PROJECT LEADER/ E-MAIL	DESCRIPTION OF ASSISTANCE	VALUE OF ASSISTANCE (IN PESOS)
A. LOCAL GRANTS-IN-AID				
Department of Science and Technology (DOST) / PCHRD	Semi-Commercialization of PVP-Carrageenan Hydrogels for Burn/Wound Dressing and Bed Sores (Phase II)	Lucille V. Abad lvabad@pnri.dost.gov.ph	Financing	2,959,281.00
DOST / Philippine Council for Industry and Energy Research and Development (PCIERD)	Assessment of Soil Erosion Using Fall-Out Radionuclides in Selected Agriculture Watersheds in the Philippines	Adelina dM Bulos admbulos@pnri.dost.gov.ph	Financing	1,190,192.200
DOST / PCIERD	Management of Technology Enhanced Naturally-Occurring Radioactive Materials (TENORM) Released into the Environment	Teofilo Y. Garcia tygarcia@pnri.dost.gov.ph	Financing	1,190,192.00
DOST / Philippine Council for Aquatic and Marine Research and Development (PCAMRD)	Application of Nuclear Techniques to Address Specific Harmful Algal Bloom Concerns, Phase II Project 1a-- Transfer of Receptor Binding Assay Technology to Local End Users: Assay on Marine Biotoxins-Production of Radiolabeled Compounds for Receptor Binding Assay on Marine Biotoxins	Elvira Z. Sombrito ezsombrito@pnri.dost.gov.ph	Financing	648,225.98
DOST / PCAMRD	Application of Nuclear Techniques to Address Specific Harmful Algal Bloom Concerns, Phase II Project 1b-Transfer of Receptor Binding Assay Technology to Local End Users: Assay on Marine Biotoxins-Technology Transfer of Receptor Binding Assay to Regulatory Setting	Azucena C. de Vera acdevera@pnri.dost.gov.ph	Financing	584,988.74

TABLE 13. ADDITIONAL RESOURCES FROM EXTERNAL SOURCES IN 2007

DONOR NAME OF INSTITUTION	PROJECT TITLE	PROJECT LEADER/ E-MAIL	DESCRIPTION OF ASSISTANCE	VALUE OF ASSISTANCE (IN PESOS)
A. LOCAL GRANTS-IN-AID				
DOST / PCAMRD	Application of Nuclear Techniques to Address Specific Harmful Algal Bloom Concerns Phase II Project 4b-Dinoflagellate Cysts in Selected Mariculture Sites: Implication of the Management of Historical Profile of Harmful Algal Cysts and Antropogenic - Inputs in Sediment Using Isotopic Techniques	Adelina dM Bulos admbulos@pnri.dost.gov.ph	Financing	449,936.25
DOST / PCAMRD	Isotopes and Nuclear Techniques Application in Water Management and Protection	Soledad S Castañeda sscstaneda@pnri.dost.gov.ph	Financing	3,393,034.00
DOST / Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD)	Varietal Improvement of Selected Ornamental Crops (<i>Spathoglottis</i> , Foliage-Type Anthuriums and Hoyas) Through Gamma Irradiation	Fernado B. Aurigue fbaurigue@pnri.dost.gov.ph	Financing	664,496.00
DOST / Philippine Council for Advanced Science and Technology Research and Development (PCASTRD)	Production/Development of Interactive Multi-Media Presentation as a Tool for Technology Transfer and for the Promotion of Nuclear Science and Technology in the Philippines	Rhodora R. Leonin rleonin@pnri.dost.gov.ph	Financing	200,595.00
DOST / PCIERD	Establishment , Implementation and Maintenance of Management Systems in all RDIs and Regional Offices: ISO 17025	Flora L. Santos flsantos@pnri.dost.gov.ph	Financing	3,364,542.10
DOST / PCIERD	Upgrading of Facilities of the DOST-RDIs in Support of R&D and S&T Services	Ma. Celerina M, Ramiro mcmramiro@pnri.dost.gov.ph	Financing	8,459,400.00
DOST / PCIERD	Characterization of the Natural Radioelement Signatures of Porphyry Copper-Gold Deposits in the Philippines by Gamma Ray Spectrometry: Implications to Minerals Exploration	Rolando Y. Reyes ryreyes@pnri.dost.gov.ph	Financing	339,650.00
DOST / PCIERD	Hazard Characterization for Decommissioning of the Philippine Research Reactor	Leonardo S. Leopando lileopando@pnri.dost.gov.ph	Financing	4,223,366.00
DOST / PCIERD	Development of a Near Surface Facility for Disposal of Low and Intermediate Radioactive Waste in the Philippines – Phase III	Ma. Visitacion B. Palattao mvbpalattao@pnri.dost.gov.ph	Financing	1,235,000.00

TOTAL LOCAL GRANTS: Php 28,903.899.07
B. FOREIGN GRANTS
B-1 COOPERATION AGREEMENT

United Nations Development Program (UNDP)	Radon Monitoring of the Valley Fault System (VFS) and its Implication as an Earthquake Precursor	Christina A. Petrache capetrache@pnri.dost.gov.ph	Financing	996,250.00
United States Department of Agriculture (USDA) thru the Department of Agriculture(DA) – Bureau of Plant Industry (BPI)	Establishment of Radiation Dose for Quarantine Treatment of Mango Pulp	Glenda B. Obra gbobra@pnri.dost.gov.ph	Financing	1,020,646.00
USDA thru D.A. BPI	Quality Assessment of Philippine Super Mangoes Irradiated at Maximum Tolerable Dose	Zenaida M de Guzman zmdeguzman@pnri.dost.gov.ph	Financing	380,700.00
USDA thru D.A. BPI	Upgrading of Pilot Scale Gamma Irradiation Facility	Luvimina G. Lanuza lglanuza@pnri.dost.gov.ph	Financing	875,250.00
USDA thru D.A. BPI	Advocacy Program on Food Irradiation Technology	Zenaida M de Guzman zmdeguzman@pnri.dost.gov.ph	Financing	904,200.00
Comprehensive Nuclear Test Ban Treaty Organization (CTBTO)	CTBTO- Post Certification Activities at RN52, Tanay, Rizal	Teofilo Y. Garcia tygarcia@pnri.dost.gov.ph	Financing	1,149,000.00
United States-Department of Energy (US-DOE)	DOE Regulatory Infrastructure Support for PNRI	Eulinia M. Valdezco emvaldezco@pnri.dost.gov.ph	Financing	718,923.00
US-DOE	Megaports – US DOE/Batelle and PNRI in Support of the Megaports Initiative Project- Deployment Training	Julietta E. Seguis jeseguis@pnri.dost.gov.ph	Equipment Grant	1,358,804.00

TOTAL FOREIGN GRANTS: Php 7,403,773.00

TABLE 13. ADDITIONAL RESOURCES FROM EXTERNAL SOURCES IN 2007

DONOR NAME OF INSTITUTION	PROJECT TITLE	PROJECT LEADER/ E-MAIL	DESCRIPTION OF ASSISTANCE	VALUE OF ASSISTANCE (IN PESOS)
B-2. IAEA TECHNICAL COOPERATION PROJECTS*				
IAEA	Human Resource Development and Nuclear Technology Support	Corazon C. Bernido, Ph.D. ccbernido@pnri.dost.gov.ph	Equipment grant, expert dispatch, fellowship/ training	8,673,615.60
IAEA	Establishment of a National Nuclear and Radioanalytical Measurements Center	Virginia S. Calix vscalix@pnri.dost.gov.ph	-do-	1,436,188.00
IAEA	Support for the Preparation of a Decommissioning Plan for the Philippine Research Reactor	Leonardo S. Leopando lsleopando@pnri.dost.gov.ph	-do-	3,839,680.00
IAEA	Development of a Near Surface Radioactive Waste Disposal Facility	Ma. Visitacion B. Palattao mvbpalattao@pnri.dost.gov.ph	-do-	2,390,939.20
IAEA	Upgrading the Gamma Irradiation Facility	Estelita G. Cabalfin egcabalfin@pnri.dost.gov.ph	-do-	2,224,430.00
IAEA	Isotope Applications in Improving Water Resource Management and Protection	Soledad S. Castañeda scastaneda@pnri.dost.gov.ph	-do-	4,338,100.00
TOTAL TC VALUE: Php 22,902,952.80				
B-3. IAEA RESEARCH CONTRACTS**				
IAEA	Dissecting Drought Tolerance Mechanisms in Rice Through Gain of Function Deletion Mutants	Jill Cairns International Rice Research Institute (IRRI)	Information exchange thru attendance to meetings; (minimal) financial support towards local expenses/ activities	504,000.00
IAEA	Applications of Radiotracer and Radioassay Technologies in Paralytic Shellfish Poisoning Risk Analysis	Ma. Celestina Honrado mchonrado@pnri.dost.gov.ph	-do-	300,000.00
IAEA	Improvement of Sterile Male Performance of Oriental Fruit Fly, <i>Bactrocera philippinensis</i> , for SIT Programmes	Glenda Obra gbobra@pnri.dost.gov.ph	-do-	300,000.00
IAEA	Evaluation of a Simplified Method of Perfusion Only Lung Scan Compared to Standard V/Q and Spiral CT in Patients with Pulmonary Disease	Gerard Fabian Goco St Luke's Medical Center	-do-	210,000.00
IAEA	Use of Open Source Web Development Tools in Improving the Nuclear Knowledge Portal for the PNRI	Ana Elena L. Conjares aelconjares@pnri.dost.gov.	-do-	300,000.00
IAEA	Radiation Processed Materials From Carrageenan for Agricultural Applications	Lucille V. Abad lvabad@pnri.dost.gov.ph	-do-	240,000.00
IAEA	Application of Tritium and Hydrofluorocarbons as Geothermal Vapor-Phase Tracers in Geothermal Reservoir Management	Lauro Bayrante Philippine National Oil Company-Energy Research Development Center (PNOC-ERDC)	-do-	240,000.00
IAEA	Assessment of Impact of Agricultural Pesticides on Water Quality of Laguna de Bay	Leonila Varca National Crop Protection Center	-do-	300,000.00
IAEA	Selection for Greater Agronomic Water Use Efficiency in Rice for Salt Affected Areas Using Carbon Isotope Discrimination	Abdelbagi Ismail IRRI	-do-	450,000.00
TOTAL RC VALUE: Php 2,844,000.00				

* Technical Cooperation Projects are under the IAEA Technical Cooperation Programs and are funded by the Technical Assistance Committee Fund (TACF) and extra budgetary contributions to the IAEA. Financial support provided in the form of three components, namely, expert assistance, equipment donation and overseas training.

** Research Contracts are grants under the IAEA Contract Research programme whose funding is sourced from the IAEA regular budget and also from extrabudgetary contributions to the IAEA. Through this program, minor equipment and miscellaneous local purchases are provided.

TABLE 14. TECHNICAL PAPERS PRESENTED

Aurigue, Fernando B. "Effects of Gamma Radiation on Spores and Sporelings of Fish-tail Fern (*Microsorium punctatum* "Grandiceps") and on Spores of Stag-horn Fern (*Platyserium coronarium*)". Presented at the 4th Symposium on Asian Pteridology held at Farmer's Training Center, Central Mindanao University, Musuan, Bukidnon, 12- 14 November 2007.

Calix, Virginia S. "PNRI Draft Strategic Plan for Sustainability". Paper presented at the Regional Meeting to Guide and Review Draft Strategic Plans and Processes for Sustainability in National Nuclear Institutions, Denpasar, Indonesia, 21 – 25 May 2007.

Caranto, J. A. (PNOC), H. R. Maspina (DCWD) and Soledad S. Castañeda (PNRI). "Delineation of Groundwater Recharge to the Davao City Aquifer Using Stable Isotopes". Presented at the Final Assessment Meeting for IAEA/RCA Project on Isotope Techniques Application in Groundwater Contamination held in Vienna, Austria, 2 – 6 April 2007.

Castañeda, Soledad S., Raymond J. Sucgang and Rosalina V. Almoneda. "Hydrogeochemical Characterization of Bacolod City Groundwater System". Presented by R. J. Sucgang (April 11) at the 22nd Philippine Chemistry Congress held in Tagaytay City, 10 – 13 April 2007.

Castañeda, Soledad S., Raymond J. Sucgang, Rosalina V. Almoneda, C. L. Iblan (MWCI). "Stable Isotopes as Potential Tracers for Assessing Groundwater Contamination from Landfills". Presented at the International Conference on Hydrology and Water Resources Management for Hazard Reduction and Sustainable Development held at Makati City, 19- 23 November 2007.

Castañeda, Soledad S., Rosalina V. Almoneda, Raymond J. Sucgang, J. Y. Gemora, D. Desengañó, and F. Lim. "Isotopic Evidence for Identifying the Mechanism of Salinization Groundwater in Bacolod City, Negros Occidental". Paper presented at the 2008 Eurasia Conference of Chemical Societies, August 2007.

De Guzman, Zenaida M. "Status of Food Irradiation in the Philippines". Presented during the RCA Planning Meeting for Novel Application of Food Irradiation Technology for Improving Socio-Economic Development held in Jakarta, Indonesia, 16 – 20 July 2007.

Grafia, Alfonso O. "Radiation Technology for Improving Grain Quality and Developing Drought Tolerant Varieties of Mungbean in the Philippines". Presented during the IAEA/RAS/5/045 Project Formulation Meeting held in Hongkong, 7 – 9 June 2007.

Lapade, Avelina G., Ana Maria S. Veluz, Adelaida C. Barrida, Alfonso O. Grafia, Fernando B. Aurigue, and Mary Jayne C. Manrique. "Status of Mutation Breeding in the Philippines". Presented at the Forum for Nuclear Cooperation in Asia Mutation Breeding Workshop, Daejeon, Korea, 19 – 23 November 2007.

Lapade, Avelina G., Adelaida C. Barrida, Faye G. Rivera, Alfonso O. Grafia, J. C. Mananguit. "Composition for Quality Crop Breeding in Rice: Grain Quality Improvement in Rice Through Induced Mutation Breeding". Presented at the FNCA 2007 Workshop on Mutation Breeding held at Daejeon, Korea, 19 – 23 November 2007.

Limbo, J. P. Q., L. V. Rodriguez, M. P. Sintos, B. C. San Juan, Eulinia M. Valdezco (PNRI), Vangelina K Parami (PNRI), and Thelma P Artificio (PNRI). "Comparison of Administered Doses in Diagnostic Nuclear Medicine in the Philippines and the BSS Guidance Levels". Presented at the Southeast Asian Congress of Medical Physics, University of Sto. Tomas, Manila, 21 November 2007.

Santos, Flora L., Preciosa Corazon B. Pabroa, Ryan P. Morco, and Joseph Michael D. Racho. "Elemental Characterization of New Year's Day PM10 and PM2.5 Particulate Matter at Several Sites in Metro Manila Presented by Ryan P. Morco at the 22nd Philippine Chemistry Congress held at DAP Convention Center in Tagaytay City, 10 – 13 April 2007.

Santos, Flora L., Preciosa Corazon B. Pabroa, Joseph Michael D. Racho, and Ryan P. Morco. "Ambient Air PM10 Lead Levels in Metro Manila. (1998- 2005)". Presented at the 22nd Philippine Chemistry Congress held at DAP Convention Center in Tagaytay City, 10 – 13 April 2007.

Sombrito, Elvira Z. "Nuclear Analytical Techniques in Coastal Studies: Environmental Radiotracer-210Pb". Presented at the RCARO Tsunami Regional Training Workshop, Kuala Lumpur, Malaysia, 5 – 9 February 2007.

Sombrito, Elvira Z., Ma C.V. Honrado, S.R. Tabbada, A.de Vera, M.d.C. Tangonan and L. Rañada "PSP Toxin Uptake in Mussel at Low Density of *Pyrodinium bahamense* var. *compressum*" (CONTROL ID: 332723). Presented during the 15th International Conference on Environmental Bioindicators (15th ICEBI), Hong Kong, 7 – 9 June 2007.

Sombrito, Elvira Z. and Estrella S. Caseria. "Occupational Exposure Monitoring in the Philippines". Presented at the 3rd International Workshop on Individual Monitoring of Ionizing Radiation, Oarai, Japan, 3 – 5 December 2007.

Garcia, Teofilo Y. "Radioactivity Concentration of Radon in No-Uranium Mines in the Philippines". Paper presented during the first Occupational Safety and Health Summit in the Visayas, Marco Polo Plaza Hotel, Cebu City, 11- 12 October 2007.

POSTER PRESENTATION

Castañeda, Soledad S., Raymond J. Sucgang, Rosalina V. Almoneda, Lourdes G. Fernandez, C. L. Iblan (MWCI), and D. G. Bauí (MWCI). "Isotope and Chemical Techniques in Assessing Groundwater Contamination from Metro Manila Landfill". Presented at the International Symposium on Advances in Isotope Hydrology and its Role in Sustainable Water Resources Management, Vienna, Austria, 21 – 25 May 2007.

LIST OF ABBREVIATIONS

ADB	-	Asian Development Bank
ANSN	-	Asian Nuclear Safety Network
ANSTO	-	Australian Nuclear Science and Technology Organization
CTBTO	-	Comprehensive Nuclear Test Ban Treaty Organization
DOST	-	Department of Science and Technology
FNCA	-	Forum for Nuclear Cooperation in Asia
IAEA	-	International Atomic Energy Agency
JSPS	-	Japan Society for the Promotion of Science
MEXT	-	Ministry of Education, Culture and Sports, Japan
MIRDC	-	Metals Industry Research and Development
NIRS	-	National Institute of Radiological Sciences, Japan
NSRA	-	Nuclear Safety Research Association of Japan
PHIVOLCS	-	Philippine Institute of Volcanology and Seismology
RCA	-	Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology for Asia and the Pacific
RCARO	-	RCA Regional Office in Korea
SAGTAC	-	Standing Advisory Group of Technical Assistance and Cooperation
SEI	-	Science Education Institute
USDOE	-	United States Department of Energy



L-R: VIRGINIA S. CALIX, FLORA L. SANTOS, ALUMANDA M. DELA ROSA, GRACETA DL. CUEVAS, CORAZON C. BERNIDO AND EULINIA M. VALDEZCO

PNRI *Organization*



PNRI *Officials*

Alumanda M. Dela Rosa, Ph. D.
Director

Corazon C. Bernido, Ph. D.
Deputy Director

Virginia S. Calix, MSc
Chief, Atomic Research Division

Flora L. Santos, MSc
Chief, Nuclear Services and Training Division

Eulinia M. Valdezco, MSc
Chief, Nuclear Regulations, Licensing and Safeguards Division

Graceta DL. Cuevas, DPA
Chief, Finance and Administrative Division

Directory

Tel. Number: (PNRI Trunkline) 929-6010 to 19

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DIRECTOR'S OFFICE

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(DL) 929-4719/920-8738

DEPUTY DIRECTOR'S OFFICE

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(TL) 929-6010 to 19
loc. 211/222
(DL) 920-8741

Planning

(TL) 929-6010 to 19 loc. 224

Technical Assistance

(TL) 929-6010 to 19
loc. 254/258
(DL) 920-8742

ATOMIC RESEARCH DIVISION (ARD)

Virginia S. Calix

(TL) 929-6010 to 19
loc. 214/228
(DL) 920-8765

Agricultural Research

(TL) 929-6010 to 19
loc. 237/294/272

Biomedical Research

(TL) 929-6010 to 19
loc. 238/273
(DL) 920-8776

Entomology

(TL) 929-6010 to 19
Loc. 274/290/298

Cytogenetics

(TL) 929-6010 to 19 loc. 269
(DL) 925-9211

Health Physics Research

(TL) 929-6010 to 19
Loc. 235/251/271

Health Physics Instrument Room

(TL) 929-6010 to 19 loc 282

Applied Physics Research

(TL) 929-6010 to 19 loc. 233
(DL) 920-8769

Chemistry Research

(TL) 929-6010 to 19 loc. 234
(DL) 920-1655

Chemistry Laboratory

(TL) 929-6010 to 19
loc. 277/292/297

Analytical Measurements Laboratory

(TL) 929-6010 to 19
loc. 281/291

Isotope Techniques Research

(TL) 929-6010 to 19 loc. 225

Nuclear Materials Research

(TL) 929-6010 to 19
loc. 252/296

NUCLEAR SERVICES AND TRAINING DIVISION (NSTD)

Flora L. Santos

(TL) 929-6010 to 19
loc. 229/215
(DL) 920-8784

Irradiation Services

(TL) 929-6010 to 19
loc. 240/243

Cobalt-60 Irradiation Facility

(TL) 929-6010 to 19 loc. 248
(DL) 920-8788

Nuclear Training Center

(TL) 929-6010 to 19 loc. 236
(DL) 920-8789

QA/QC

(TL) 929-6010 loc. 265

Information Services

(TL) 929-6010 to 19 loc. 286
(DL) 920-8787

Computer Services

(TL) 929-6010 to 19 loc. 280
(DL) 920-8786

Library Services

(TL) 929-6010 to 19 loc. 239

Radiation Protection Services

(TL) 929-6011 to 19 loc. 262
(DL) 920-8757

Film Badge Service

(TL) 929-6010 to 19 loc. 246

Electronics

(TL) 929-6010 to 19 loc. 263

Machine Shop

(TL) 929-6010 to 19 loc. 253

Engineering Services

(TL) 929-6010 loc. 245

Reactor Operations

(TL) 929-6010 to 19
loc. 231/268
(DL) 929-4645

NUCLEAR REGULATIONS, LICENSING AND SAFEGUARDS DIVISION (NRLSD)

Eulinia M. Valdezco

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(DL) 920-8796

Standards Development

(TL) 929-6010 to 19 loc. 227
(DL) 920-8810

Licensing Review & Evaluation

(TL) 929-6011 to 19 loc. 256
(DL) 920-8815

Inspection/Enforcement

(TL) 929-6011 to 19 loc. 266

Safeguards

(TL) 929-6011 to 19 loc. 220

Radiological Impact Assessment

(TL) 929-6010 to 19 loc. 285

FINANCE & ADMINISTRATIVE DIVISION (FAD)

Dr. Graceta DL. Cuevas

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loc. 212/223
(DL) 920-8746

Budget

(TL) 929-6010 to 19 loc. 283
(DL) 920-8748

Accounting

(TL) 929-6010 to 19 loc. 284

Cash

(TL) 929-6010 to 19 loc. 241
(DL) 920-8760

Property and Procurement

(TL) 929-6010 to 19 loc. 259

Personnel

(TL) 929-6010 to 19 loc. 242
(DL) 920-1646

Records and Communication

(TL) 929-6010 to 19 loc. 226

Medical Clinic

(TL) 929-6010 to 19 loc. 230

Dental Clinic

(TL) 929-6010 to 19 loc. 289

General Services

(TL) 929-6010 to 19 loc. 261

OTHERS:

Business Development Unit

(TL) 929-6010 to 19 loc. 232
(DL) 925-9210

Gate Guard

(TL) 929-6010 to 19 loc. 250