Matching Situation of the New Needs 2007

No.	Need	Specification	Type of Training	Duration (Months)	Matching Situation	Note
Emergency Preparedness						
1	Emergency preparedness (Bangladesh)	To acquire knowledge which will help to implement NSRC Act and Rules-1997 properly through licensing, inspection and enforcement.	lecture, research, OJT	-	MEXT	IAEA/RCA
2	Emphasizing knowledge for licensees, regulators, public responders and retrieval teams in radiological emergency preparedness and response (Thailand)	Knowledge gained from train-the trainer training course for : -radiological assessor (inspector) -first responders (fire fighter civilian, military unit and related personnel) -medical responders	OJT	2-3	MEXT	IAEA/RCA
Radioactive Waste Management						
3	Advanced technology of radioactive waste management (Bangladesh)	To develop the management capabilities of radioactive waste and to build an adequate system to conduct the decommissioning of nuclear facility by using an advanced technology.	research, OJT	6-9 or more	-Rad Safety & radioactive waste(VN) -MEXT	
4	Planning for establishment of radioactive waste repository (Design, concept, safety assessment, QA, Safety analysis using AMBER) (Bangladesh)	To develop the capabilities for the assessment of various safety parameters by using different safety codes (AMBER) for the safety analysis of newly established a Center Radioactive Waste Processing & Storage Facility in Bangladesh and to gain knowledge for planning and design concept for the establishment of under ground repository for Low and Intermediate level waste.	research, OJT	6-9 or more	MEXT	
5	Advance technology on radioactive waste management(RWM) (Thailand)	To obtain knowledge and experience in appropriate/ advanced technologies on RWM and decommissioning of nuclear facilities.	OJT, TC research, expert services	3 - 6	MEXT	
Radiation Safety						
6	Radiation safety for radionuclide treatment in hospital (Thailand)	Radiation control and protection for in/out patients treatment.	OJT, TC	2	MEXT	IAEA/RCA
7	Development of registration and inventory control of radioactive source and radiation machines (Thailand)	Registration and inventory control of radioactive source and radiation machines	OJT, TC	3-6	MEXT	IAEA/RCA
8	Radiation safety for cyclotron and PET center (Thailand)	General knowledge, radiation protection, cyclotron-PET/CT operation and maintenance skill.	OJT, TC	2	MEXT	-IAEA/RCA -FNCA Seminar

9	Ecological risk assessment using AQUARISK (Thailand)	Hands on experience on the use of computer codes for the quantitative assessment of ecological risk associated with the release of contaminants into estuarine and coastal environment	OJT	3	Pending	Consult Australia
Radioisotope Production						
10	PZC based ^{99m}Tc-generator using (n, g) ^{99}Mo (Bangladesh)	Enhancement of Research Reactor Utilization. Production of (n,gamma) Molybdenum-99. Production of PZC based Tc-99m generator. Equipment: Research Reactor, Isotope Handling Hot cell, Ancilliary instruments.	research, experiment	6 or more	Pending	-IAEA TC -Consult Indonesia
11	188W-188Re generator (Bangladesh)	Preparation of target, chemical processing, column preparation, column loading, calibration of generator, quality control tests, etc. and production of therapeutic RI(166Ho, 177Lu, etc.) and their lebeled compounds. Equipment: hot cell facility, dose calibrator, HPGe detector, autoclave, and Anciliary equipments.	research, experiment	12	Pending	Consult IAEA/CRP
12	Research and development of Lutetium-177 radio-pharmaceuticals for therapeutic use (Bangladesh)	The candidate is directly involved in the production and quality control of the radioisotopes (I-131 and Tc-99m generator). The demand of the Lu-177 therapeutic radio-pharmaceuticals are increasing day by day but it is totally depend on import from other countries. The aims of the training program are mainly (i) to achieve sound knowledge & operational skill for smooth production of Lu-177 radio-pharmaceuticals. (ii) QA and QC of Lu-177 radiopharmaceuticals. (iii) research and development of Lu-177 labeled compounds. The proposed training course is, therefore, expected to provide the applicant with an opportunity to acquire knowledge on production and quality control of Lutetium-177 radiopharmaceuticals used at nuclear medicine centers for therapeutic purposes.	research	1yr	Pending	Consult IAEA/CRP
13	Research and Development of ^{188}Re and ^{99m}Tc kits (Bangladesh)	Research and Development of ^{188}Re and ^{99m}Tc kits. Kit preparation , clinical test, biological test of the final product.	research	12	Pending	-IAEA/CRP -For 99mTc kit/ Consult Thailand
14	Research and Development of ^{99m}Tc kits (Bangladesh)	Research and Development of ^{199m}Tc kits. Kit preparation , clinical test, biological test of the final product.	research	12	Pending	-For 99mTc kit/ Consult Thailand
15	Cyclotron based Isotope Production (Bangladesh)	To obtain knowledge & techniques in radioisotope production using cyclotron.	lecture, exp. research, expert service,	-	Pending	Consult Korea for Bi-lateral coop

Neutron Beam Application						
16	Application of NAA in industry, environment and human health (Bangladesh)	The NAA Group of BAEC is using reactor based instrumental neutron activation analysis method followed by relative standardization approach. In order to perform both qualitative and quantitative multi-elemental analysis of major, minor and trace elements in various samples with wide range, the NAA method is required to be explored. To implement the neutron activation analysis, the followings are needed: research reactor, gamma-ray counting systems, sample preparation equipments and software for data acquisition, gamma peak analysis and concentration calculation etc.	research	18(6 mo./ person	MEXT	IAEA/RCA
17	Application of neutron radiography in material science and industrial products (Bangladesh)	Neutron radiography (NR) facility has been installed at the trangential beam port of the 3 MW TRIGA MARK-II research reactor. In the existing NR facility only direct film NR time NR system in the existing NR facility. This facility will be utilized for research and industrial applications.	research	12 (6 mo./ person)	MEXT	
18	Application of neutron beam for material characterization using neutron scattering (Bangladesh)	Neutron diffraction study of different functional materials to understand the structural and magnetic properties of materials, study of texture and internal stress of different metals and alloys using four circle goniometer and adaptation of SANS facilities in the TAS for determining the structure of colloidal system and polymer sample.	research	18 (6 mo./ person)	MEXT	
19	Analysis of radionuclides in marine ecosystem (Bangladesh)	Sampling, separation and analysis of natural radionuclides in marine based samples e.g. sea water, fish, sediment, algae and phytoplanktons to study marine pollution level. Flame and Graphite Atomic Absorption Spectro.(AAS), Inductively Coupled Plasma- Atomic Emmission Spectro. (ICP-AES), Inductively Coupled Plasma- Mass Spectro.(ICP-MS), High Performance Liquid Chromatography (HPLC) etc.	research, expert services	4yrs.	Pending	Consult Philippines
20	Improvement of NAA laboratory by implementing ko-method and perparation of software development (Indonesia) .	Instrumental Neutron Activation Analysis (INAA) based on ko method is very useful technique to determine an element in trace quantity on vary samples. Recently this technique is one of the most reliable technique to be used on the monitoring of environmental pollution, food safety analysis, as well as, human health and nutrition application. Three research reactor located at Serpong, Bandung and Yogyakarta provide a thermal neutron source for NAA utilization. Research reactor at Serpong has a high flux of neutron thermal that very importance for trace elements analysis, meanwhile Triga Mark II and Kartini reactor has an ideal flux for most NAA application. Some irradiations facilities have been used to irradiate a number of samples. The spectrometry-g coupled to high resolution detector is a main equipment provided to analyze the gamma-ray emitted by irradiated sample. The INAA lab is also supported by a number of software such as GENIE2000, Hyperlab, ko-IAEA and ko-DSM to enhance the performance of analyze.	Lecture, experiment, expert services	2week	MEXT	-Consult FNCA Research Reactor PL -IAEA TC -Consult Vietnam

21	Microstructural studies using neutron diffraction technique (Indonesia)	The neutron powder diffraction, coupled with the Rietveld method for data analysis, has been spectacularly successful in elucidating the crystal structures of high temperature superconductor. However, this powerful technique is being increasingly used not only for the crystal structural studies but also for obtaining microstructural information, such as texture, average domain size and crystallite size distribution, strain and stress, and crystalline defect concentration [Davor Balzar and Nicolae C. Popa, Analyzing Microstructure by Rietveld Refinement, The Rigaku Journal 22(1), 16-25 (2005)]. The instrument/facility to be used are the powder neutron diffractometer, the sample to be studied in this case is the nanoparticles YBa2Cu3O7-x (YBCO) superconductor, and the Rietveld analysis software.	OJT, experiment, others	3	-MEXT -IAEA	
22	Neutron beam application (Thailand)	To obtain experience and knowledge for utilization in horticultural crops.	OJT, research	1-2	MEXT	
23	Neutron beam and electron beam applications (Vietnam)	To obtain exprerience and knowlegde for application of neutron and electron beams in various fields such as: nuclear physics, medicine, agriculture, industry and material science. Facilities: Neutron beams at research reactors, EB facilities.	Research, OJT, experiment	6-12	MEXT	
Accelerator, Radiation Processing						
24	Accelerator technology (Bangladesh)	One 3 MV Van de Graaff electrostatic Accelerator with 2 operational beam line, 2 scattering chamber with associated nuclear electronics and data acquisition system and software. One 3 MV Tandem electrostatic Accelerator with Accelerator Mass Spectroscopy (AMS) and Ion beam Experimental facilities, to be installed in near future.	Experiment, others	3m/ training & 2w/ scientific visit	MEXT	
25	Study on radiation effect for modification of carbon based nano composite materials (Indonesia)	Irradiation devices (gamma ray, electron beam, ion implantation, and neutron scattering)	Lecture, OJT, experiment others	6	MEXT	- IAEA/RCA - Consult Malaysia
26	Effect of γ-ray irradiation to Ionic conductivity in the solid state. (Indonesia)	Gamma-irradiation effect to composite materials will increase ionic conductivity because of material defect, and will also influence the enthalpy of materials depending on irradiation dose. Facility to be used are x-ray diffraction or neutron, DTA and DSC (differential thermal analysis and diffrential scanning calorimetry), and LCR-metre (inductance capasitance resistance)	Lecture, OJT, experiment	6	MEXT	Consult Malaysia
27	Operation and maintenance of cyclotron (Indonesia)	Operation and maintenance of cyclotron to support national program in development of short life radionuclide especially in the F-18 production which is used to preparing FDG radiopharmaceutical for health	Lecture, OJT, experiment	3	Pending	

28	Application of ion beam in life sciences / agriculture (Malaysia)	· Molecular applications of charged particle beams · Mathematical modelling · Existing and new ways of generating high energy ion beams · DNA irradiation using micro focussed ions · Ion beam analysis of DNA · DNA Damage Signalling and Biological Dosimetry · Cell Irradiation · Radiation-Induced DNA Damage · Cellular Imaging Approaches for Targeted Microirradiation of Biological Materials. · DNA sequencers and array technology and future technologies such as mass spectrometry, biochips, and single molecule analysis.	Research, OJT	3-6	MEXT	
29	Electron accelerator technology application (Thailand)	To obtain knowledge and technique in radiation processing using electron accelerator and its advance technology	-	6-12	MEXT	
30	Nanotechnology (hydrogel) (Thailand)	To acquire practical training and experience in the use of nuclear techniques for research in nanotechnology.	OJT, research	2-3	MEXT	IAEA/RCA
Industry and Environment Application						
31	Maintenance and refurbishment of gamma camera (Indonesia)	Since gamma cameras have been operated for 20 years in some hospitals in Indonesia, there is a need for well maintainance and repair in order to support continous operation. Due to lack of availability of spare parts and components, the comprehensive knowledge and skill to do proper maintenance and and refurbishment of gamma cameras are necessary for engineers and technicians.	Lecture, OJT, Exp.	3	Pending	
32	Application of nuclear techniques in industry and hydrology (Thailand)	To obtain the advanced technology of nucleonic instrumentation and the techniques of imaging, gauging, tracer, etc.	OJT	3	-NDT (MA) -MEXT	IAEA/RCA
33	Non-Destructive Testing level 3 training for industrial applications (Thailand)	To acquire practical training and experience in Non-Destructive Testing techniques, level 3 in radiographic testing, ultrasonic detection and surface methods.	OJT	3	-IAEA/RCA/RO, KOICA (KO)	Consult Japan
34	Computed radiography (Thailand)	CRT, image plate industrial application	OJT	2weeks	-IAEA/RCA, -MEXT	
35	Semiconductor detector repairing and maintenance (Thailand)	To train electronic engineer for repairing the HPGe Si(Li) detector and its cryogenig system.	OJT	1-2	Pending	
Agricultural application						
36	Induced mutation for improvement of crop/ornamental plants (Thailand)	To obtain knowledge and experience in advanced technique in radiation induced mutation for improvement of crop/ornamental plants	OJT, TC, research, expert services	6-12	-Application of Nuclear Technology for Crop Plant Improvement (MA) -MEXT	-clarify "advanced" technique

Medical Application						
37	Medial applications (Bangladesh)	Analysis, Clinical analysis, Quality Assurance, Quality Control of Nuclear images and Instruments. Radiation safety, Dosimetry, Therapy calculation etc. Instruments to be used PET, SPECT, Linear Accelerator, Cyclotron etc	lecture, exp. research, expert services	-	MEXT	IAEA/RCA
38	Development of dose planning program for LINAC therapy (Thailand)	Research on program development for modern dose planning of LINAC therapy & QA(Ph.D. Program)	-	3-6	MEXT	
39	Advance technology of diagnostic imaging (Thailand)	To obtain the advance technology on diagnostic imaging safety assessment and QA/QC programme	OJT	3-6	MEXT (univ.)	
40	Medical application in nuclear medicine (Thailand)	Experience and practice on PET, SPECT, CT, Cyclotron, Synthesizer, QA&QC instruments, radiopharmaceuticals development, image processing and its maintenance	OJT, TC, research, expert services	3-6	MEXT	-IAEA/RCA -FNCA/PET project
Research Reactor						
41	OJT on operation & Maintenance of digital control console and I&C system of the research reactor (Bangladesh)	To obtain training on operation and maintenance of digital control console and I&C system of research reactor.	OJT	3-6/each trainee	MEXT	
42	Implementation of quality management system (QMS) in the research reactor facility (Bangladesh)	To obtain OJT on QMS for research reactor facility.	OJT	3-6/each trainee	MEXT	
43	Evaluation of the safety of the reactor and target materials loaded into the reactor core for neutron irradiations (Bangladesh)	Develop capability to calculate various safety parameters such as, heat generation rates, temperature rise, pressure rise, etc. for the targets irradiated in the reactor for radioisotope production and other material irradiation services like gemstone coloration, silicon doping, etc..	OJT	6/ each trainee	MEXT	
44	Ageing management of research reactors (Malaysia)	Ageing management of research reactor systems, structures and components (SSC). Methods for verifying condition of SSC and strategies for implementing at the PUSPATI TRIGA reactor.	lecture, OJT	Lecture, OJT	MEXT (JMTR)	
45	Decommissioning of research reactor (Thailand)	Decommissioning plan, thermohydraulical analysis, irradiation devices, reactor waste	OJT	3-6	MEXT (JMTR)	IAEA/RCA
46	In-core irradiation facility design (Thailand)	To enhance the utilization of research reactor(design and validation)	research	3-6	MEXT (JMTR)	
47	The Methods to evaluate the integrity of reactor structural components (Indonesia)	Exploring the mechanical methods to evaluate the integrity of reactor (power and research reactors) structural component due to ageing. The instrument to be used are mechanical testing equipment, such as tensile machine, impact, creep machine etc.	lecture, expert services, experiment	3month+1 week expert dispatch	MEXT	

Reactor Engineering						
48	Reactor physics and nuclear engineering (Bangladesh)	The MS program with emphasis on reactor physics, reactor design and engineering , nuclear safety, plant design. Appropriate candidate is expected to go for PhD degree. The researcher/scientist is expected to work on a power plant to solve a specific problem as an essential part of the MS program. Advanced and appropriate computer codes (deterministic as well as Monte carlo codes), up to date nuclear data libraries with moderen computation facility must be provided for the power plant safety analysis. At least 3/4 months hands on training/internship in a power plant will provide essential knowledge about the environment and safety culture of NPP site.	lecture, research	3-12	MEXT	
49	Nuclear data and physics (Bangladesh)	It is very important to generate customized cross-section data library which is used for the cell and whole core calculation. Appropriate data processing code (such as NJOY) and adequate computation facility must be provided. Evaluation of the nuclear data is also very important. Evaluation consist in the comparison, critical assessment and selection of the experimental data and their statistical and systematic errors, followed by the derivation of internally consistent sets of preferred values by appropriate averaging procedure. Benchmark calculation using different sets of nuclear data libraries is also very important.	research, OJT	6-12	MEXT	
50	NPP instrumentation and control design and performance analysis (Indonesia)	Design, simulation and analyzing the performance of the instrumentation and control of NPP, including analog and digital equipments. It will cover the safety criteria, operation and maintenance	lecture, OJT	3	Pending	
51	Nuclear data and physics, Reactor physics, Reactor design and engineering (Malaysia)	The researchers involved in the reactor utilization programme generally lack the basic skill and theoretical knowledge to undertake engineering design of the neutron beamports and thermal column of the Reactor TRIGA PUSPATI (RTP) for use in neutron beam application e.g. Prompt Gamma Neutron Activation Analysis (PGNAA), neutron diffractometer, Boron Neutron Capture irradiation facility for medical & industrial research. The need for training is especially critical to implement the projects currently being planned.	Research, OJT	-	MEXT	
52	Research reactor experiment (Thailand)	To train instructor for student teaching in research reactor experiment	OJT	3	MEXT	IAEA/RCA
53	Nuclear power plant design (Thailand)	To obtain knowledge, techniques needed, NPP design engineering, basic skill, general description, design skill and etc for NPP	OJT, TC, expert services	12	Pending	
54	Nuclear engineering (Thailand)	To train young nuclear engineers in preparation for introducing nuclear energy as an electrical power in the country	OJT, TC, expert services	6-12	Pending	Inviting univ. prof.s

55	Research reactor design and engineering (Vietnam)	To obtain the advanced technologies needed for design, engineering and safety analysis of the new research reactor	lecture, research, OJT	12-24	MEXT	
Reactor Safety						
56	Reactor safety Bangladesh)	Safety analysis of reactors (research and power reactor) using appropriate computer codes e.g.,RELAP.	research, OJT	6-12	MEXT	IAEA/RCA
57	Thermohydraulical and nuclear analysis of core at low power (Indonesia)	- Thermohydraulical and nuclear analysis of core at low power - Calculation methods and codes that can support the analysis. - Device for experimental verification of the basic input data.	lecture, experiment, others	6	MEXT	
58	Human factors in the nuclear power (Indonesia)	Aspect of human factors and its consideration in the process design and operation of nuclear power will be explored in the training. Facility/instruments to be used includes: control room simulation, operation design, procedure and documentation	lecture, OJT, experiment	4	MEXT	
59	Safety analysis for nuclear power plant (Indonesia)	In safety analysis of NPP, several transient conditions, both for DBA and BDBA, shall be analyzed in order to know the plant capability to cope with such conditions and to assure the safety of people. Analysis should include both analysis using computer codes (including Computational Fluid Dynamic) and experimental methods	OJT, experiment, others,	6	MEXT	IAEA/RCA
60	Nuclear instrument refurbishment/research/development (Thailand)	To obtain the experience and knowledge for nuclear instrument refurbishment	OJT, research	1	Vietnam	
61	Research reactor computer codes (Thailand)	MCNP simulation	OJT, TC	3-6	MEXT	IAEA/RCA
62	Environmental impact and assessment, safety analysis and control (Thailand)	NPP Environmental impact and assessment, nuclear safety planning, reactor analysis of the being introduced NPP, regulation and computer code for licensing	OJT, TC	6	MEXT	
63	Nuclear safety (Vietnam)	Nuclear safety review and analyses required for NPPs introduction to Vietnam, including regulation, computer codes for licensing.	lecture, research, OJT	12-24	MEXT	IAEA/RCA
NPP Management						
64	Financing related training (Bangladesh)	Financing related training to improvise the quality of personnel to look for the appropriate financing mode of the first nuclear power project and to evaluate the proposals of different suppliers/consortiums/financiers.	OJT	3-6	Pending	

65	Overall nuclear power project management (Bangladesh)	Project management of nuclear power plants that will be required to implement the nuclear power programme. Project management related training is required to improvise the quality of personnel to look for the appropriate financing mode as well as managing the first nuclear power project.	OJT	3-6	Pending	-Consult Korea (Infrastructure) -FNCA Panel (NP Infrastructure & Possible contribution among FNCA countries)
66	Safety regulation and licensing (Bangladesh)	Safety and regulatory aspects of nuclear power plants that will be required to implement the nuclear power programme as well as to operate the plant.	OJT	3	Pending	
67	Public communication (Korea)	A public information program aimed at both the general public and the population around the site of the nuclear power plant should be carefully planned and implemented and start as early as possible. With regard to the risk, the following topics seem to be especially valuable for the public communication. (1) Genral comparision of the risk of nuclear power with other risks already accepted by society, (2) Comparisions of risks of energy systems, (3) Safety policy, (4) Approach to the public communications.	Lecture	1-2weeks	Pending	-Implementation of a new regular TC for FNCA member countries
68	NPP management (Thailand)	Pre-project activities, pre-construction stage, construction stage, commissioning stage, plant operation and plant maintenance stage	TC	1-2	Pending	IAEA/RCA
69	Preparation, Construction, Operation and Maintenance of NPP (Thailand)	To train nuclear engineers for NPP program planning in infrastructure, NPP construction, reactor instrumentation, reactor safety, nuclear fuel and waste management	OJT, TC, expert services	3-6	Pending	
70	Strategic planning for establishment of new NPP (Thailand)	To obtain knowledge and master experience in strategic planning for establishment of a new NPP	OJT, TC research, expert services	3	IAEA	
71	Basic HRD for nuclear power (Thailand)	To obtain knowledge, experience and techniques needed for nuclear power planning, human resources, basic nuclear power technology, manpower and computer codes for reactor modeling in NPP	OJT	3-6	Pending	
72	Public information, public acceptance and public relations for NPP (Thailand)	To gain experience and knowledge for conducting public information survey required for NPP introduction, public relations and public acceptance before the decision of the cabinet	OJT	6-12	Pending	
73	Safe operation and maintenance of PWR- NPP	Safe operation of PWR-NPP, instrumentation, control, core management and its maintenance	OJT, TC expert services	3-6	Pending	
74	Public information for NPPs (Vietnam)	Experience and knowledge for conducting public information activities required for NPP introduction, especially for public acceptance before the decision of the parliament (with emphasis on pulbic targets of scientists and decision-makers).	lecture, OJT	3-12	Pending	