BPTC

Basic Professional Training Course

Safety and Security Coordination Section
Department of Nuclear Safety and Security
IAEA Basic Professional Training Course is aimed at assisting nuclear regulatory bodies, operating organizations and technical support organizations in setting up training activities in the area of nuclear safety. The course consists of 22 modules and was designed to run 6-9 weeks.
In 1991, the General Conference (GC) in its resolution RES/552 requested the Director General to prepare 'a comprehensive proposal for education and training in both radiation protection and in nuclear safety' for consideration by the following GC in 1992. In 1992, the proposal was made by the Secretariat and after considering this proposal the General Conference requested the Director General to prepare a report on a possible programme of activities on education and training in radiological protection and nuclear safety in its resolution RES1584.
- The Secretariat prepared a Standard Syllabus for the Post-graduate Educational Course in Radiation Protection.
- Planning of specialised training courses and workshops in different areas of Standard Syllabus were also made.
- A similar approach was taken to develop basic professional training in nuclear safety.
In January 1997, Programme Performance Assessment System (PPAS) recommended the preparation of a standard syllabus for nuclear safety based on Agency Safely Standard Series Documents and any other internationally accepted practices.

A draft Standard Syllabus for Basic Professional Training Course in Nuclear Safety (BPTC) was prepared by a group of consultants in November 1997 and the syllabus was finalised in July 1998 in the second consultants meeting.
The Basic Professional Training Course on Nuclear Safety was offered for the first time at the end of 1999, in English, in Saclay, France, in cooperation with Institut National des Sciences et Techniques Nucleaires/Commissariat a l’Energie Atomique (INSTN/CEA).

In 2000, the course was offered in Spanish, in Brazil to Latin American countries and, in English, as a national training course in Romania, with six and four weeks duration, respectively.
In 2001, the course was offered at Argonne National Laboratory in the USA for participants from Asian countries.

In 2001 and 2002, the course was offered in Saclay, France for participants from Europe. Since then the BPTC has been used all over the world and part of it has been translated into various languages.

In particular, it is held on a regular basis in Korea for the Asian region and in Argentina for the Latin American region.
| 1. Nuclear Safety Principles and Technical Aspects_Young S. Eun_20130408(Mon.).pptx |
| 2. Nuclear Reactor Principles_Sweng Woong Woo_20130408(Mon.) (Rev.1).pdf |
| 3. Overview of Nuclear Power Plant_Won ky Shin_20130409(Tue.).pptx |
| 4. 5 Safety Classification of SSCs_Won ky Shin_20130409(Tue.).pptx |
| 6. Design of Nuclear Reactor_Sang-Min LEE_20130409(Tue.).ppt |
| 7. Site Selection _Myunghyun Noh _20130410(Wed.).ppt |
| 8. Probabilistic Safety Analysis_Yong Jin CHO_20130410(Wed.).ppt |
| 9. Waste Management_Haiyong JUNG_20130412(Fri.).pdf |
| 10. Decommissioning_Sangmyeon Ahn_20130412(Fri.).ppt |
| 11. In-Plant Accident Management_Yong Jin CHO_20130412(Fri.).ppt |
| 12. Emergency Preparedness and Response_Dewhey LEE_20130415(Mon.).ppt |
| 12-1. Atomic Computerized Technical Advisory System for a Radoiological Emergency_Dev |
| 13. Quality Assurance_Won Pyo Rhee_20130415(Mon.).pdf |
| 14. Radiation Protection_Sung Ho NA_20130415(Mon.).pptx |
| 15. Deterministic Accident AnalysisJaedon Choi_20130416(Tue.).pdf |
| 16. Deterministic Accident Analysis_Geol Woo LEE_20130416(Tue.).pdf |
| 17. Fukushima Accident_Sang Jong LEE_20130416(Tue.)Rev.1.pdf |
| 18. Limiting Condition for Operation_Jong Kap KIM_20130416(Tue.).pptx |
| 20. Suerveillance Programmes_Walter KIM_20130417(Wed.).pptx |
| 21. Safety Culture_Kwang Sik CHOI_20130417(Wed.).pptx |
| 22. Public Communication_Kwang Sik CHOI_20130417(Wed.).pptx |
| 23. Maintenance_Se-Won KIM_20130418(Thur.).ppt |
| 24-1. Operational Safety - General_Durk-hun LEE_20130418(Thur.).pptx |
| 24-2. Operational Safety - Event_Durk-hun LEE_20130418(Thur.).pptx |
| 25. Experience of Nuclear Energy Development_SUNG KeyYong_20130419(Fri.).pdf |
KINS BPTC is a two weeks, tailored course considering who participants are.

KINS hosts BPTC at least once every year since 2008.

BPTC coordinator selects modules from the total 25 modules prepared.

Each module slightly modified by reflection of regulatory experience.
In July 2013, IAEA issued Request for proposal “Design, development and delivery of training material for the train-the-trainer’s package on nuclear safety”

As the title implies, the proposal asked to develop training material for the Basic Professional Training Course on nuclear safety (BPTC)
Revision of BPTC -2

- Present the training material content in “plain language”, with necessary reference to the original standards, naturally.

- In cases of very important concepts, e.g., safety fundamentals, they will be directly cited in the training materials.
Who is it for

- Nuclear Safety Teachers/Trainers
- Junior professionals who have recently become involved in nuclear safety related activities,
- Highly specialized professionals who may not have a broad overview of nuclear safety.
What it includes

- E-book
- Trainer’s tool Package
  - Transparencies
  - Exercises/Questions
  - Case Studies
E-book 23 Modules

- Nuclear physics and reactor theory
- Radiation protection in nuclear facilities
- Basic principles of nuclear safety
- Design of a nuclear reactor
- Safety classification SSC

- Deterministic safety assessment
- Probabilistic safety assessment
- Integrated risk informed decision making
- Siting considerations and EIA
- Operational safety including operational feedback

- Operational limits and conditions
- Plant renewals, modifications and upgrades, aging
- Maintenance programme
- Surveillance programmes
- In-plant accident management

- Emergency preparedness and response
- Fuel cycle, SFM and transport of radioactive materials
- Decommissioning
- Waste management
- Regulatory control

- Human performance
- Public communication
- Management system, leadership and safety culture
Module Transparencies

BASIC PROFESSIONAL TRAINING COURSE

Module I

Nuclear physics and reactor theory

Table of nuclides

Composition of the nucleus

- Nucleus is composed of particles called nucleons:
  - Proton (p): charge $+e_0$, mass $1,0072766 \text{ u}$
  - Neutron (n): no charge, mass $1,0086654 \text{ u}$

- They are bound together with nuclear force (strongest force in nature)
Module Case Studies

Examples of suspect and counterfeit items and the lessons learned

- **Stainless steel bolts** were hand-stamped to indicate they met a different standard.

- Lessons learned: The method of identifying bolts allowed for raised or depressed head markings which would enable someone to add stamping after production. Reliance on head stamping to identify bolts could lead to potential problems without manufacturer certification.

Example – lack of preventive maintenance

- Licensee Event Report – LER 1-05-003 (Limerick Generating Station, Unit 1), Reactor Scram Due To Invalid Actuation Of Main Generator Lockout Relay.

- The event was caused by concurrent positive and neutral grounds and a corroded disconnect position switch that caused a false actuation of the main generator output breaker position monitoring circuit.

- A root cause of the event was lack of preventive maintenance on the disconnect position switch contact.
Module 13 Maintenance programme - Questions

2 TYPES OF MAINTENANCE

Which actions does corrective maintenance include? Choose the right answer:
   a) Repair, overhaul or replacement,
   b) Continuous or monitoring and diagnosis,
   c) Testing.

Correct answer: a).

Which condition monitoring technology is used for detection of poorly seated valves?
   a) Vibration analysis,
   b) Acoustic leakage monitoring,
   c) Wear debris analysis and ferrography,
   d) Oil analysis.

Correct answer: b).

Which condition monitoring technology is not used to identify problems with bearings?
   a) Vibration analysis,
   b) Shock pulse method,
   c) Thermography,
   d) Acoustic leakage monitoring.

Correct answer: d).

Which maintenance activities does preventive maintenance include?
   a) Periodic, predictive and planned maintenance activities,
   b) Periodic, predictive and unplanned maintenance activities,
   c) Periodic, unpredicted and unplanned maintenance activities.
Ready in 2015