atomexpo

ROSATOM

Round Table

on

Integrated solution for personnel training and development of nuclear infrastructure for national nuclear programmes

ATOMEXPO - 2015

Moscow, Russian Federation

1-3 June 2015

Status of Nuclear HR Program in Bangladesh

Engr. Md. Monzurul Haque

Member (Engineering)

Bangladesh Atomic Energy Commission

Email: mmhaque_2000@yahoo.com

Outline

- Overview of BAEC
- Regulatory Infrastructure
- Nuclear HR Development
- Cooperation with Russian Federation
- Workforce for Rooppur NPP & Strategy for HRD
- Conclusions

Overview of BAEC

- BAEC is a Government entity, which is responsible for promoting peaceful uses of atomic energy in the country.
- Total manpower of BAEC stands at more than 2000, which includes about 500 professionals having wide experience in various fields of nuclear science and technology.
- About 100 of these personnel have exposures on various aspects of NE program.

Overview of BAEC

Major facilities of BAEC includes:

- **3 MW TRIGA MARK II Research Reactor and its utilization laboratories:**
  - *Radio isotopes and ISO Certified Radio Pharmaceuticals production facilities*
  - *High performance neutron powder diffractometer and Triple Axis Spectrometer for NS experiments*
  - *Neutron Activation analysis Laboratory*
  - *Neutron Radiography facilities*

- 3 MV Tandem Accelerator,
- 350 kCi and 50 kCi Co-60 Sources,
- Reactor Calculations, Heat transfer & Stress analysis Laboratories

Overview of BAEC

Major facilities of BAEC includes: (continued)

- VLSI & other Electronics R&D Laboratories,
- Health Physics and Waste Management facilities
- SSDL Laboratory
- NDT Laboratory
- ISO Certified Analytical Chemistry Laboratory
- 14 Nuclear Medicine Centers & 1 NM Institute,
- Training Institute at AERE, Savar, Dhaka

Overview of BAEC

3 MW TRIGA Mk-II Research Reactor locally called BTRR

Shield Structure of the **TRIGA** Reactor

Critically date is in 14 September 1986

Analog control console

Replaced

2012

Digital control console

Reactor Operators (SROs/ROs) are trained and licensed locally.

Overview of BAEC

Health Physics & Waste Management Facility

Radioactive Waste Treatment Plant

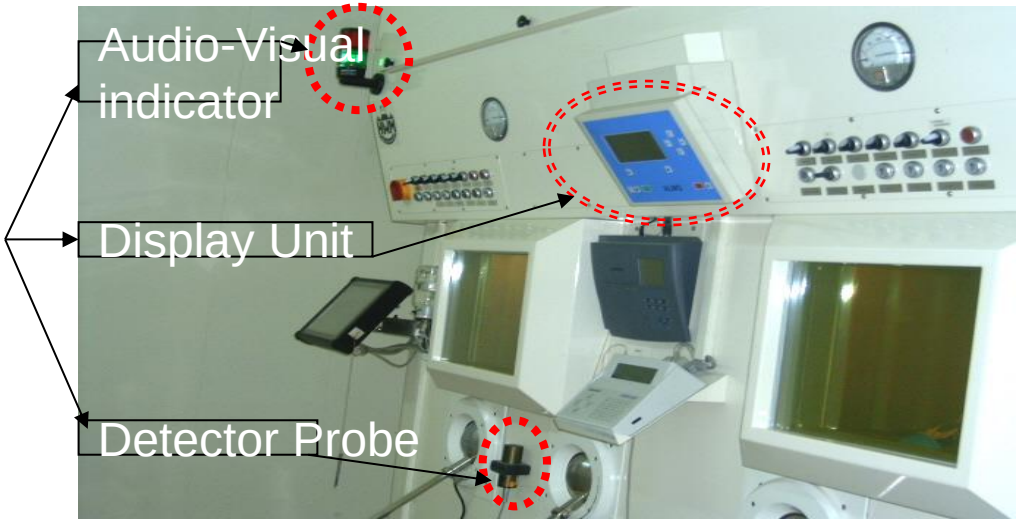
Overview of BAEC

RI & RP Facilities

Tc-99m Generators

I-131 Production Plant

Audio visual area Monitoring system



Good Radiation Practice (GRP) at new Tc-99m generator production facility

ISO Certified Tc-99m Cold Kit Production

Overview of BAEC

NAA Facilities

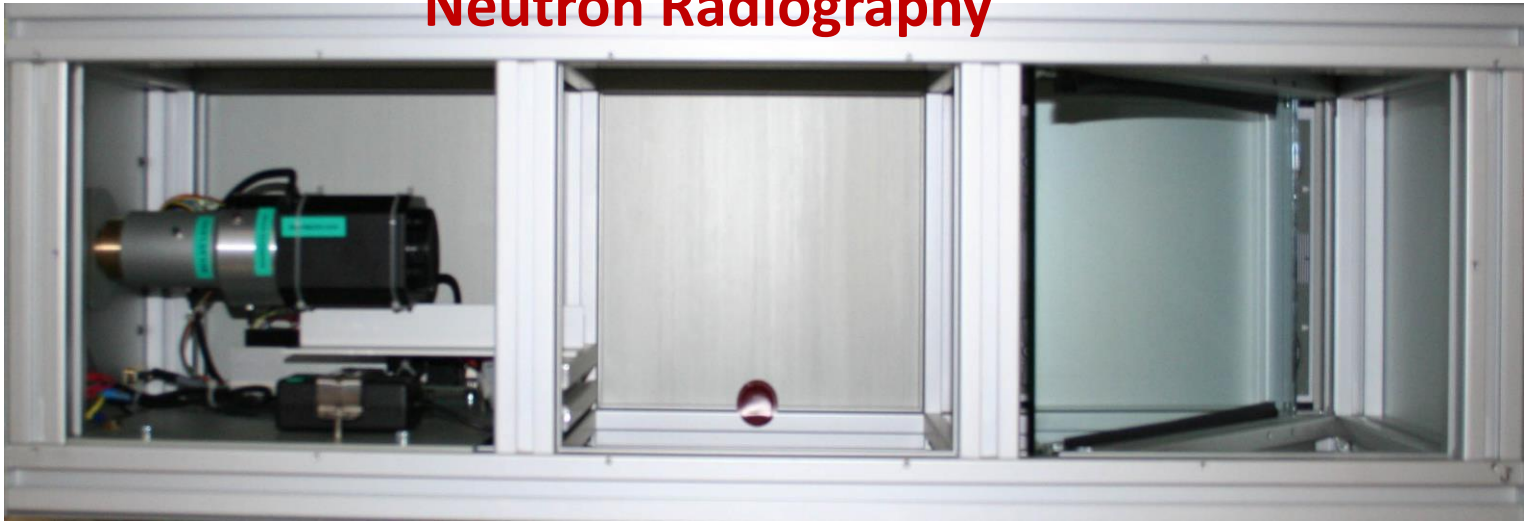
Automatic sample changer under the IAEA CRP

Overview of BAEC

Neutron powder diffractometer

TAS

Neutron Radiography



Overview of BAEC

3 MV Tandem Accelerator Facility

Overview of BAEC

Co-60 Irradiators

Sprout inhibition of potatoes and onion

Regulatory Infrastructure

- At the beginning of 2012 former NSRCD got separated from BAEC and emerged as an independent organization named BAERA (Bangladesh Atomic Energy Regulatory Authority)

BAERA Building

Regulatory Infrastructure

- In May 2012 the government enacted an Act entitled "Bangladesh Atomic Energy Regulatory Authority Act" (in short, BAERA Act-2012) for establishing an effective independent Regulatory Body in the country.

- Provisions of the BAERA Act-2012 cover nuclear safety, security and safeguard of nuclear as well as radioactive materials and also ensure civil liability for nuclear damage in the event of an accident.

Nuclear HR Development

Nuclear HR Development

Training Institute at AERE, Savar, Dhaka

All the training programs of BAEC are conducted at this institute except some commercial training courses on NDT

Nuclear HR Development

- **BNOC (Basic Nuclear Orientation Course)**

BNOC is a mandatory fundamental Training Course for newly recruited scientists (3 months) –

resource persons are the BAEC Senior Scientists

Nuclear HR Development

- **ITC and FTC Training Courses: (in collaboration with Japan)**

ITC Courses

The BAEC personnel are trained-up in Japan under the following ITC (*Instructor Training Course*) courses:

(1) Nuclear and Radiological Emergency Preparedness

(2) Environmental Radioactivity Monitoring

(3) Reactor Engineering

Nuclear HR Development

FTC Training Courses

After returning home the trained up instructors organize domestic FTC (*Follow up Training Course*) courses in the same areas in collaboration with Japanese Resources

The resource person of these locally organized FTC courses are BAEC trained up instructors in Japan and Japanese experts.

Last 3 years 150 scientists are trained up under ITC & FTC courses.

Nuclear HR Development

- In addition to ITC and FTC courses a remarkable number of NPP related BAEC professionals are being trained in home and abroad through various training programs like –

  - ✓ IAEA fellowships,
  - ✓ IAEA / RCA / ANSN training courses,
  - ✓ MEXT, Japan fellowships,
  - ✓ FNCA / KOICA training programs,
  - ✓ FCNE of NPCIL, India, etc.

Nuclear HR Development

- Bangladesh has become a full member of ANSN in 2012. Since then about 50 Scientists & Engineers from BAEC, BAERA and RNPP participate Training Courses/Workshops every year in the following categories (Tropical Groups):

1. Education and Training (ETTG)
2. Emergency Preparedness and Response (EPRTG)
3. Governmental and Regulatory Infrastructure (GRITG)
4. Operational Safety of Nuclear Power Plants (OSTG)
5. Radioactive Waste Management (RWMTG)
6. Safety Analysis (SATG)
7. Safety Management of Research Reactors (SMRRTG)
8. Sitting (STG)
9. Information Technology Support Group (ITSG)
10. Communication CTG)
11. Leadership and Management for Safety (LMSTG)

Nuclear HR Development

M.Sc., M.Phil. and Ph.D. thesis Support

Every year about 30 students from different public universities are being associated at different Nuclear Technology related laboratories of BAEC for preparing their M.Sc., M.Phil. and Ph.D. thesis.

Industrial Training Courses

Every year about 50 students from the Dept. of Mechanical Engineering, BUET and Dept. of Electrical Engineering, IUT are trained up on TRIGA Reactor O&M and utilization.

Nuclear HR Development

Opening of NE Dept. in Public Universities

- In December 2012 the newly opened NE department of Dhaka University (DU) started its first M.Sc. Engr. course with 26 students. In 2014, they started Nu. Engr. at undergrad level.
- BUET (Bangladesh University of Engineering & Technology) started offering NE courses to the Mechanical Engineering students from 2014;

The supports for practical and thesis work for NE students are Mostly provided by the Research Reactor based laboratories at AERE, Savar.

Nuclear HR Development

- A decision has already been taken to set up an advanced level Nuclear Education and Training Center at AERE, Savar, Dhaka with an aim to develop both professionals and technical personnel to enhance the NP program of the country.
- A Nuclear Information Center has been set up in Dhaka with the assistance of the Russian Federation with the aim to educate public in NPP related technology.

Cooperation with Russian Federation

Cooperation with Russian Federation

As a Part of Public Awareness, Nuclear Industry Information Center was Established at Bangabandhu Sheikh Mujibur Rahman Novo Theatre, Dhaka opened on 01 October 2013.

Cooperation with Russian Federation

- ✓ Under the provisions of the **IGA** (Inter-Government Agreement), SC ROSATOM of Russian Federation arranged an International Seminar on Nuclear Power in Dhaka, Bangladesh in **May 2013** involving all relevant stakeholders.
- ✓ Russian experts delivered several lectures on various aspects of Nuclear Energy in different organizations of Bangladesh during 2012 - 2014.
- ✓ SC ROSATOM also arranged hands-on-trainings for the members of the Bangladesh NEPIO at the under construction NPP site of Belarus.

Cooperation with Russian Federation

- ✓ We expect the continuation of close cooperation of the NPP technology supplier for developing Human Resources for the NPP Project Management organization, Operating organization, TSOs and Regulatory body.

Workforce for the “Rooppur NPP”

Rooppur NPP Project Management Office

- In April 2013, GOB approved a project entitled "Construction of Rooppur Nuclear Power Plant (First Phase)";
- Project Management Office for Rooppur NPP was established in Dhaka immediately after the approval of the project;

Rooppur NPP Project Management Office

- At present the Project Office having a total of 55 people (with 30 professionals). However, measures have already been taken to increase the number to 130 by this year;
- It has been decided that during execution of the project, the Project Management entity will gradually be transformed into the "Rooppur NPP Operating Organization";

Workforce for the "Rooppur NPP" Operational Stage

- BAEC has developed a tentative Organization Structure (OS) for the "Rooppur NPP" consisting of 1660 personnel;
- The OS will be finalized in consultation with JSC Atomstroyexport of RF in due course of time;
- Preliminary Decision has been taken for phase-wise recruitment for Rooppur NPP personnel on the basis of required work function and training requirement;

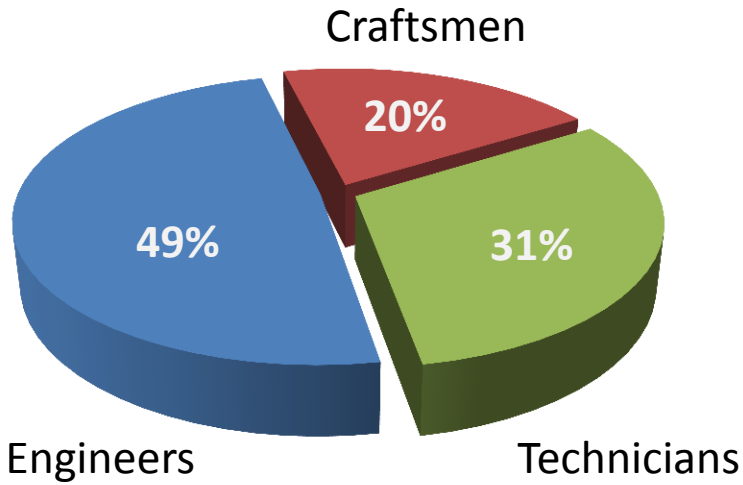
Workforce for the "Rooppur NPP"

In the OS, category-wise distribution of 1048 Technical Workforce has been proposed as follows:

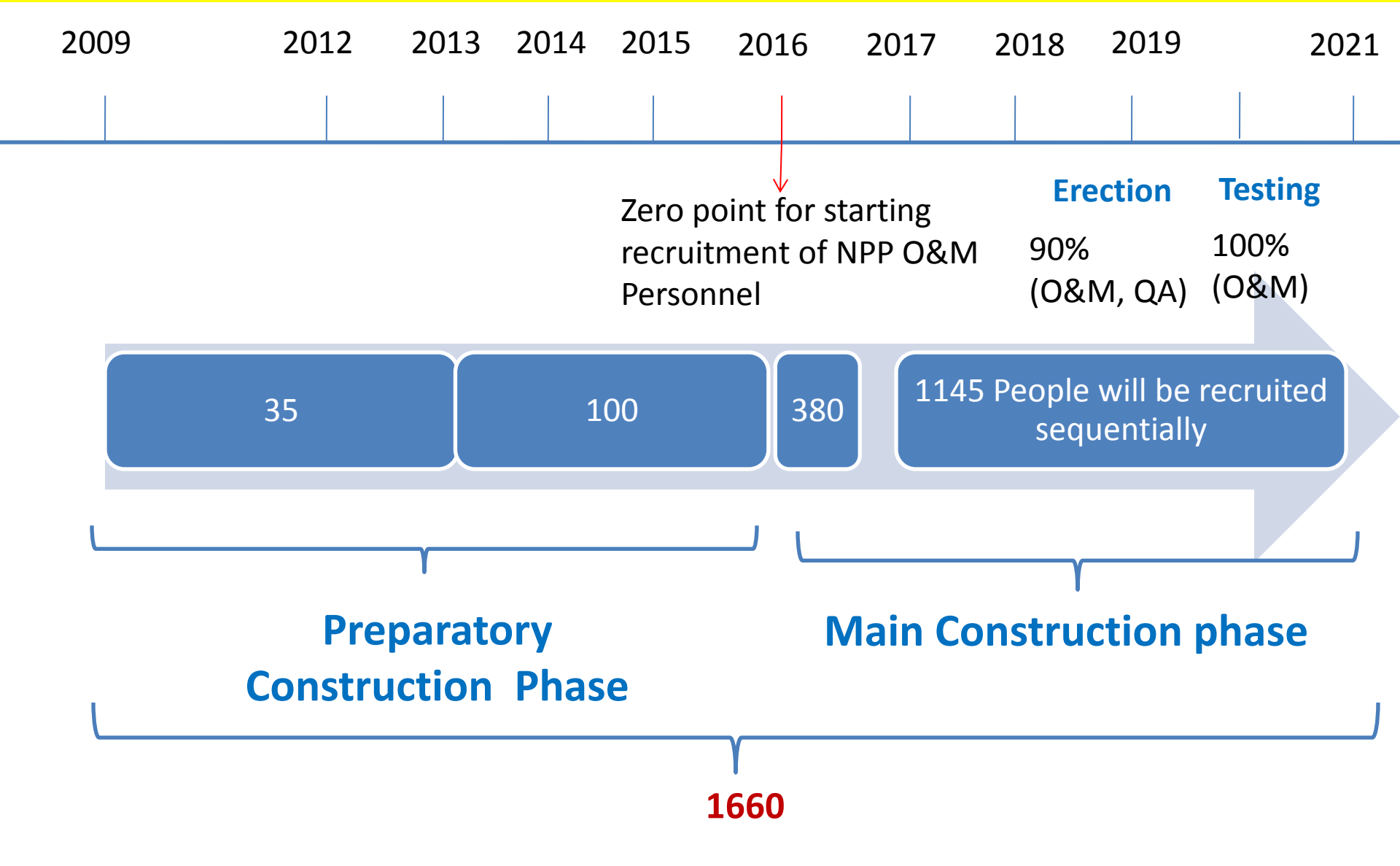
- Qualified Professionals : 513 (49%)
- Technicians/ Technologist : 325 (31%)
- Craftsman : 210 (20%)

TOTAL : 1048 (100%)

Structure of NPP Personnel
(the Case of Russian Federation)



Proposed Workforce Distribution of Rooppur NPP



Possible Resources for "Rooppur NPP"

Institutions	Public/Private	Approx. No. of Outputs with Relevant Degree	Rooppur NPP Needs
Engineering Universities (B.Sc. Engineering)	Public – 5	~2,300	340
	Private – 3		
Universities (General + Sci. & Tech.), (M.Sc.)	Public - 29	~4,000	173
	Private - 49		
Polytechnic /Diploma (4 years after SSC)	Public - 50	~9,000	325
	Private - 180		
Secondary Vocational	Public - 155	~90,0000	210
	Private - 1800		
Higher Secondary Vocational	Public - 64	~9,000	

Strategy for HRD

❑ Strategy for development of HRs for the NPP Operation

- ✓ For the HRD in connection with the NPP operation, we must need strong support from the vendor and would expect them to guide us in this matter.
- ✓ However, we have some basic requirements based on our job culture and practices and would expect the technology supplier to take those into consideration. These are -
  - ➢ At the entry levels of **NPP Operations Managements** we would prefer to start with Science Graduates/M.Sc. Degree holders from our local Universities and **not with Undergraduate holders;**
  - ➢ We would expect that **English** will be considered as the **medium of instruction** for the training of the above professionals in Russia;

Conclusion

Conclusions

- Development of competent manpower is one of the most essential elements for implementation of a successful nuclear power program in any country.
- Our Russian colleagues have vast experience in this field.
- The assistances of Russia in developing and enhancing competencies of our professionals in various aspects of civil nuclear energy program of Bangladesh will be highly appreciated.
- In particular we expect the cooperation from Russian Federation as an experienced vendor to develop skill manpower for major maintenance during the reactor shut down.

Thank you for your kind attention