IAEA
International Atomic Energy Agency

Regional Workshop on the Development of a Nuclear Safety Knowledge Management Programme for the Regulatory Body

12-15 July 2022

a virtual IAEA event

National Presentation

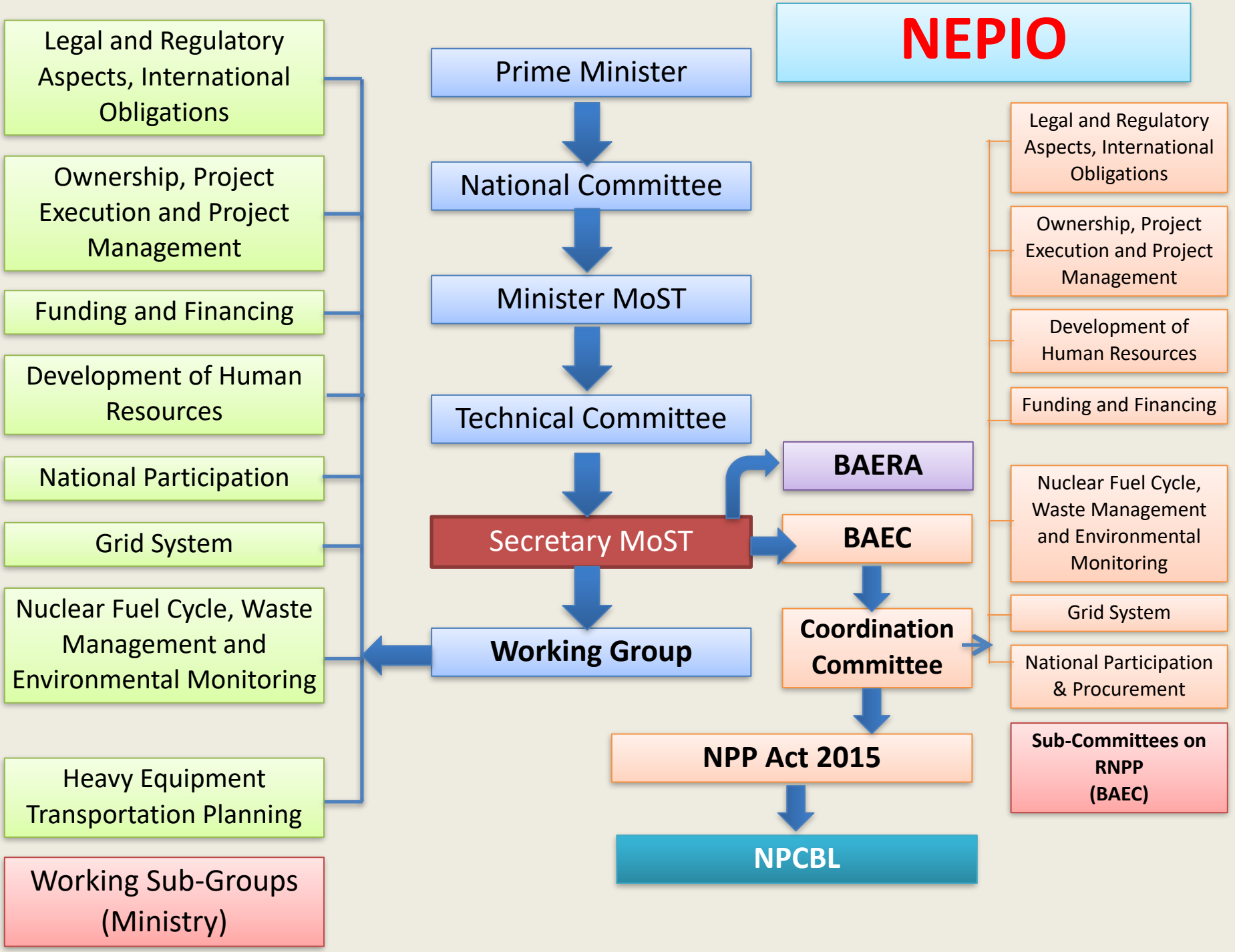
Bangladesh

Name: Debashis DATTA

Organization: Bangladesh Atomic Energy Regulatory Authority

National Context

- **Key national stakeholders and their responsibilities as part of the national nuclear safety infrastructure**
- **NEPIO**-High Level Committee headed by Hon'ble Prime Minister; Ministry of Science and Technology is the Secretariat of the NEPIO;
- **NPP Owner Organization (Licensee)**-Bangladesh Atomic Energy Commission;
- **NPP Project Management Organization**-Project Management Unit, BAEC;
- **Nuclear Regulatory Authority**-Bangladesh Atomic Energy Regulatory Authority;
- **Environmental Regulator**-Department of Environment;
- **NPP Operating Organization**-Nuclear Power Plant Company Bangladesh Limited; and
- **TSOs**-BAEC, NSPC, BTCL, Civil Defense and Fire Service Directorate


NEPIO
Prime Minister
National Committee
Minister MoST
Technical Committee
Secretary MoST
Working Group
BAERA
BAEC
Coordination Committee
NPP Act 2015
NPCBL
Legal and Regulatory Aspects, International Obligations
Ownership, Project Execution and Project Management
Funding and Financing
Development of Human Resources
National Participation
Grid System
Nuclear Fuel Cycle, Waste Management and Environmental Monitoring
Heavy Equipment Transportation Planning
Working Sub-Groups (Ministry)
Legal and Regulatory Aspects, International Obligations
Ownership, Project Execution and Project Management
Development of Human Resources
Funding and Financing
Nuclear Fuel Cycle, Waste Management and Environmental Monitoring
Grid System
National Participation & Procurement
Sub-Committees on RNPP (BAEC)

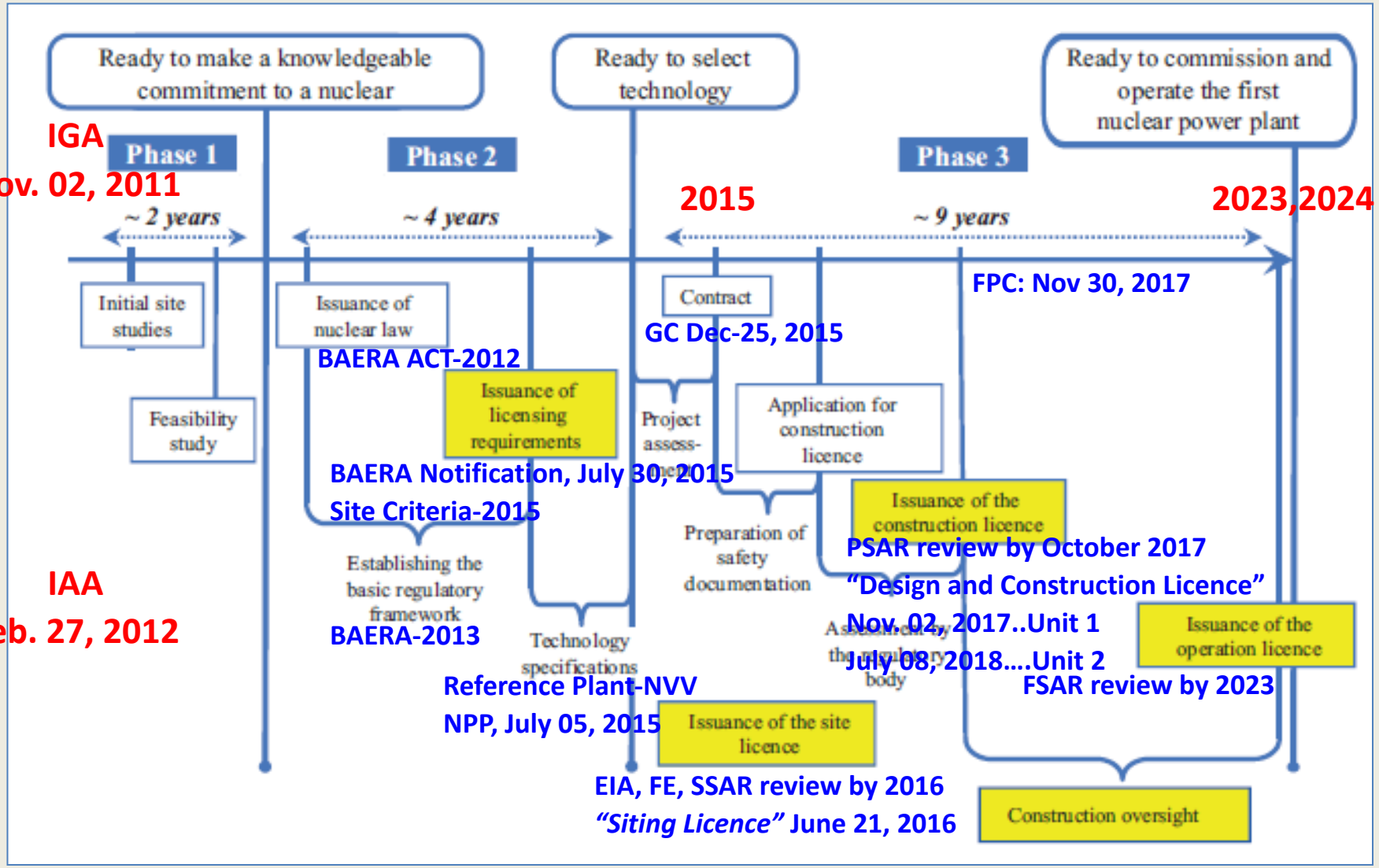
National Context

- National nuclear industry/regulatory activities where KM is of particular interest
- **National Nuclear Industry**
- Nuclear Power Plant Company Bangladesh Limited

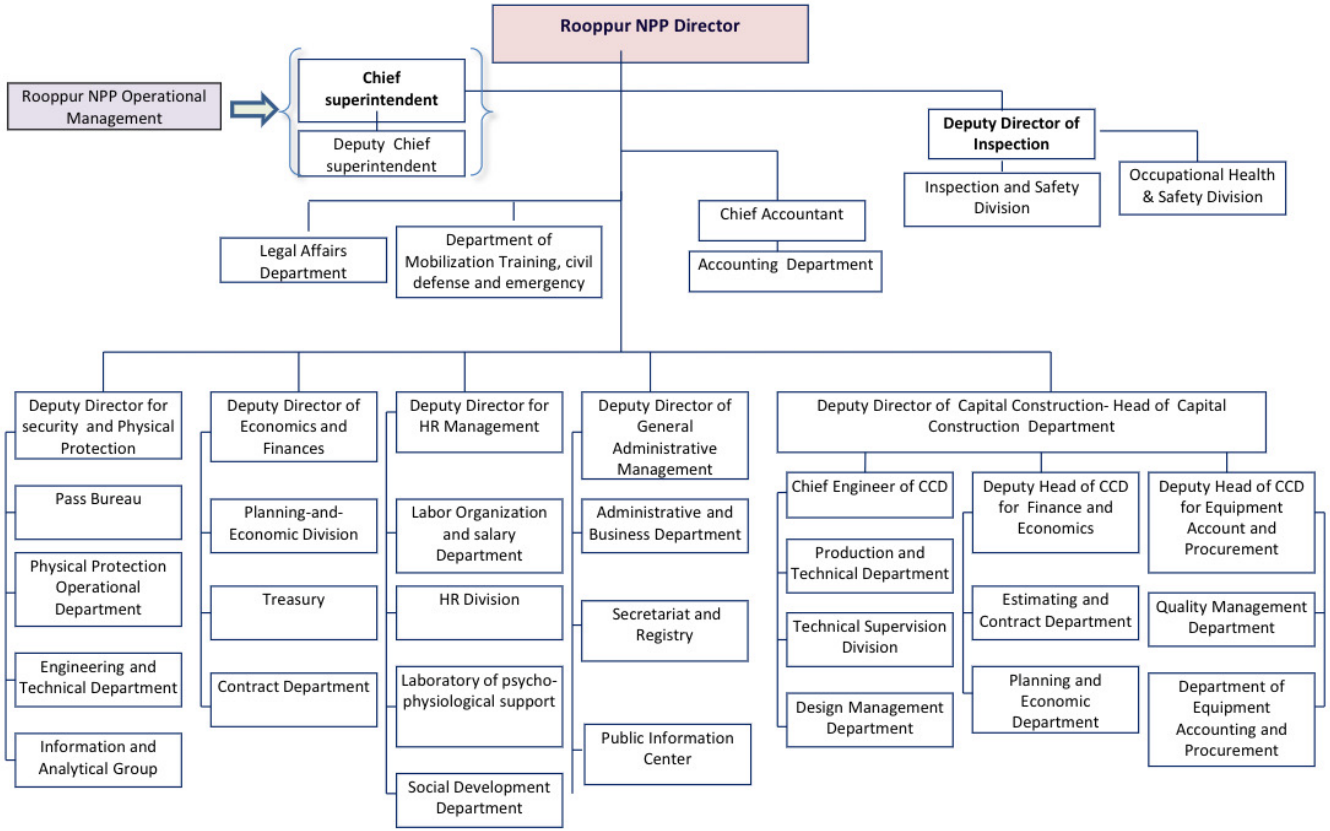
- **Regulatory activities**
- Bangladesh Atomic Energy Regulatory Authority

BAERA Knowledge badged regulatory decisions

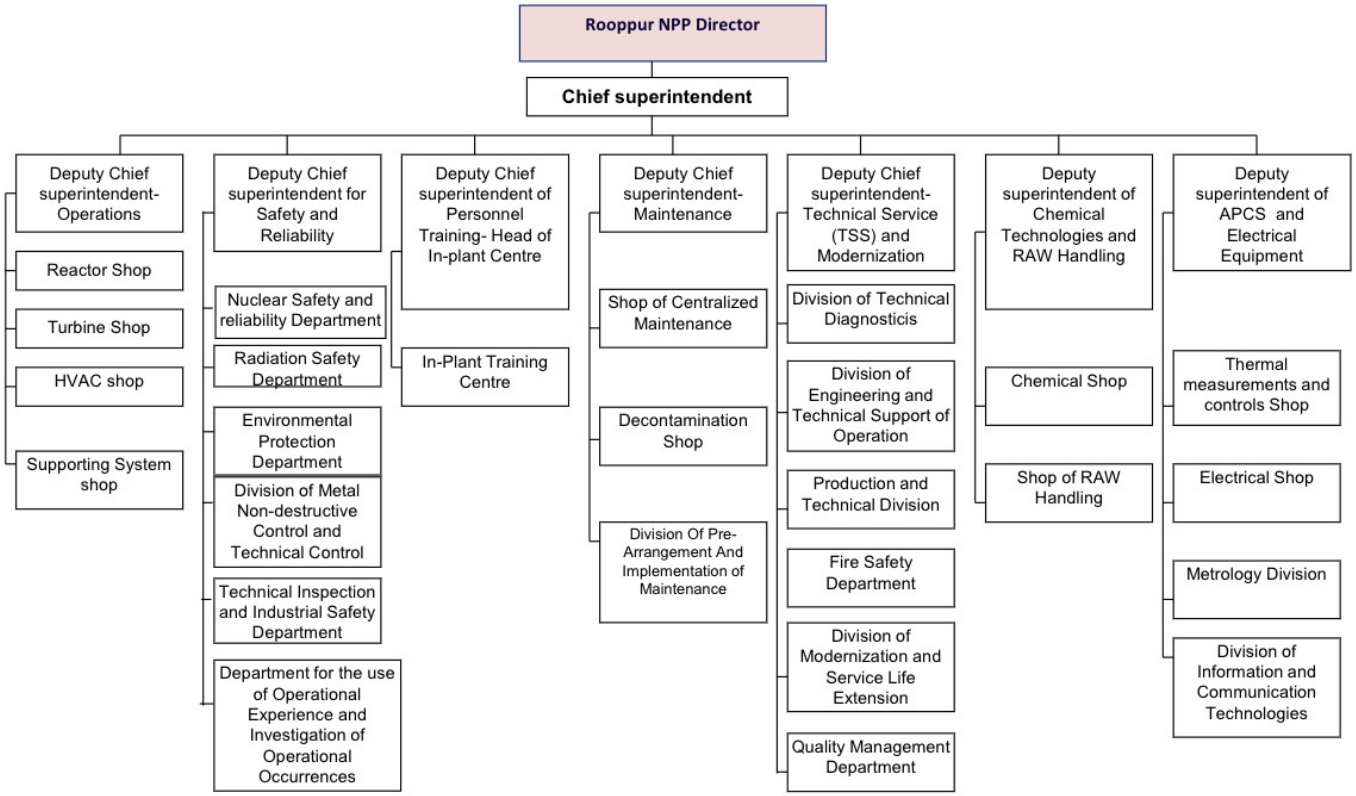
BAERA NPP licensing steps are also consistent with INSAG-26:



Organizational Structure of Rooppur NPP Operating Organization



Organizational Structure of Rooppur NPP Operational Management



FUNCTIONS:

1.To ensure the safe and peaceful uses of atomic energy according to the Act, and Rules & Regulations made there under.
2.To establish and adopt necessary standards, codes and guides.
3.To issue, amend, suspend or revoke authorizations i.e., license, certificate, registration, permit, etc.
4.To ensure the proper implementation of regulations related to nuclear safety, radiation protection, security, safeguard, import and export control and physical protection.
5.To establish a system or process of review and assessment for regulatory function;
6.To establish a programme for carrying out inspection;
7.To carry out review and assessment, inspection, and licensing;
8.To establish a guideline for enforcement actions and initiate and carryout enforcement actions against non-compliance.
9.To define exclusion related affairs.
10.To define and grant exemptions of nuclear and radiation facilities from regulatory control.
11.To define obligations, including financial ones, of persons or entities authorized.
12.To establish limits of radioactivity into soil, water and air and in any matter usable as food or during or otherwise by human being and animal;
13.To establish a public participation system through seminar, workshop, electronic and print media and internet, etc for information and consultations with interested parties about the possible risks associated with facilities and activities;
14.To participate in the definition of the design basis threat for the implementation of security provisions;
15.To establish and maintain a national register for radiation sources;
16.To establish and maintain a national register for persons authorized to carryout activities or practices under the Act;
17.To act as an organizer and coordinator for the implementation of the obligations arises from safe guard agreement;
18.Actions for implementations of international treaty, agreement, protocol and convention concerning nuclear safety and radiological emergency plan including safeguards and physical protection of nuclear and radioactive material, illicit trafficking to which Bangladesh is the contracting party.

ORGANOGRAM

of proposed

Bangladesh Atomic Energy Regulatory Authority

Ministry of Science and Technology

19.To establish and maintain a State System of Accounting for and Control of nuclear material (SSAC);
20.To conduct research programme for regulatory purposes;
21.To liaise and co-ordinate with other governmental or non-governmental bodies having competence in such areas as health and safety, environmental protection, security, and transport of dangerous goods;
22.To act as a coordinator for the implementation of national nuclear and radiological emergency plan and other related activities.
23.To approve an effective reporting procedures with respect to radiological incidents and to ensure that plans for protective action in emergency situation have been prepared;
24.To ensure that appropriate measures for physical protection of nuclear installations, and nuclear & radioactive material are taken;
25.To establish regulatory measures for the security of nuclear and radioactive material and their associated facilities, including measures for the detection, prevention and response to unauthorized or malicious acts involving such material, or facilities;
26.To ensure that corrective actions are undertaken when unsafe or potentially unsafe conditions are detected concerning a nuclear installations, radiation generator, nuclear material, nuclear substance or radioactive material;
27.To carry out activities associated with civil liability for nuclear damage;
28.To liaise with regulatory bodies of other countries and with international organizations to promote co-operation and exchange of regulatory information;
29.To establish the criteria for the recruitment and the service for it's employees.
30.To establish and maintain human resource development and training program for it's employees;
31.To exchange regulatory information and extend cooperation with other regulatory authority, relevant agencies and organizations;
32.To publish related information and communicate with relevant agencies, the public and media;
33.To create awareness to the public about nuclear safety and radiation protection.
34.To establish a schedule of fees and charges;
35.To formulate or adopt necessary policies and issues and implement orders or instructions in areas of its responsibility;
36.To perform any other duties prescribed or assigned to the Authority by the Government from time to time as deems necessary to meet its statutory obligations;
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Chairman

27+164 =191

Personnel-5
1xChairman = 1
1xAdministrative Officer = 1
1xOffice Assistant cum Computer Operator= 1
1xDriver =1
1xGeneral Attendant = 1

Member (Nuclear Safety)

Personnel-4
1xMember = 1
1xOffice Assistant cum Computer Operator =1
1xDriver =1
1x 1xGeneral Attendant (GA) = 1

Member (Radiation Safety)

Personnel-4
1xMember = 1
1x 1xOffice Assistant cum Computer Operator = 1
1xDriver =1
1x General Attendant = 1

Secretary

Personnel-3
1xSecretary = 1
1xOffice Assistant cum Computer Operator = 1
1x General Attendant = 1

Financial Adviser

Personnel-3
1xFinancial Adviser = 1
1x 1xOffice Assistant cum Computer Operator = 1
1x General Attendant = = 1

Member (Technical)

Personnel-4
1xMember = 1
1x Office Assistant cum Computer Operator = 1
1xDriver =1
1x General Attendant = 1

Member (Planning & Development)

Personnel-4
1xMember = 1
1xOffice Assistant cum Computer Operator = 1
1xDriver =1
1x General Attendant = 1

Nuclear Safety, Security and Safeguard Division

Personnel-57
1xChief Scientific Officer = 1
1xChief Engineer = 1
3xPrincipal Scientific Officer = 3
2xPrincipal Engineer = 2
8xSenior Scientific Officer = 8
5xSenior Engineer = 5
12x Scientific Officer = 12
7xEngineer = 7
1xSenior Experimental Officer =1
1x Experimental Officer =1
1xTechnical Officer=1
1xSub-Assistant Engineer = 1
1xSuperintendent =1
1xSenior Scientific Assistant= 1
1x Scientific Assistant -1 = 1
1x Scientific Assistant -2 = 1
1x Lab Attendant = 1
3xComputer Operator = 3
1x Office Assistant cum Computer Operator = 1
2xDriver = 2
3xGeneral Attendant = 3

Radiological Facility Authorization & Inspection Division

Personnel-38
1xChief Scientific Officer = 1
1xChief Engineer=1
3x Principal Scientific Officer = 3
2xPrincipal Engineer = 2
4xSenior Scientific Officer = 4
3xSenior Engineer = 3
7x Scientific Officer = 7
5x Engineer = 5
1xExperimental Officer = 1
1xSuperintendent = 1
1xSenior Scientific Assistant= 1
3x Computer Operator = 3
1x Scientific Assistant -1 = 1
1x Scientific Assistant -2 = 1
1x Lab Attendant = 1
1x Office Assistant cum Computer Operator = 1
1xDriver = 1
2xGeneral Attendant = 2

Administration Division

Personnel-29
1xPrincipal Administrative Officer =1
1xSenior Administrative Officer = 1
1x Administrative Officer = 1
1xSuperintendent = 1
3xComputer Operator =3
1XSenior Technician = 1
1xTechnician-1 = 1
2xTTechnician-2 = 2
4xDriver =4
2xTTechnician Helper = 2
5xSecurity Attendant = 5
2xGeneral Attendant =2
1XGardenar Attendant= 1
4xSanatary Attendant= 4

Finance Division

Personnel-8
1xPrincipal Account Officer =1
1xSenior Accounts Officer = 1
1xAccounts Officer= 1
2xAccountant = 2
2xAccount Assistant =2
1xGeneral Attendant = 1

Technical Services Division

Personnel-17
1xChief Principal Scientific Officer = 1
2x Principal Scientific Officer = 2
2xPrincipal Engineer= 2
2xSenior Scientific Officer = 2
2xSenior Engineer = 2
2x Scientific Officer = 2
3xEngineer = 3
1xLegal Officer = 1
1xComputer Operator = 1
1xGeneral Attendant = 1

Human Resources Development Division

Personnel-15
1xChief Principal Scientific Officer 1
2x Principal Scientific Officer = 2
1xPrincipal Engineer = 1
2xSenior Scientific Officer= 2
2xSenior Engineer= 2
2x Scientific Officer = 2
3xEngineer = 3
1xComputer Operator = 1
1xGeneral Attendant = 1

SUMMARY OF MANPOWER

Sl. No.	Name of the Post	No. of Post
Statutory Post		
1	Chairman	1
2	Member	3
3	Secretary	1
4	Financial Adviser	1
Class I		
5	CSO	4
6	CE	1
7	PSO	16
8	PE	12
9	PAO	1
	PAcO	1
10	SSO	1
11	SE	1
12	SEO	1
13	SAO	1

AUTHORIZATION OF THE TRANSPORT, MAJOR SCIENTIFIC & OFFICE EQUIPMENTS:

A. TRANSPORT

1	5x Jeep for the Chairman & Members = 5Jeeps
2	13x car for the 11 Directors+Secretary+FA = 13 Cars
3	6xJeep for Regulatory Inspection = 6 Jeeps
4	6x Microbus (10 Seats) for 54 CSO's, PSO's and equivalents transport = 6 Microbus
5	15x Microbus (10 Seats) for 149 SSO's, SO's and equivalents transport = 15 Miocrobus

B. MAJOR OFFICE EQUIPMENTS

Sl. No.	Name of Equipments	No of Items
1	Fax	5
2	Telephone	120
3	Computer	185
4	Printer	150
5	Laptop	20
6	Scanner	20
7	Fridge	2
8	Photocopier	10
9	Projector	4
10	Television	2
11	Air Conditioner	60
12	Generator	1
13	Close-circuit Camera system	2
14	Digital Camera	4

C. MAJOR SCIENTIFIC EQUIPMENTS

Sl. No.	Name of Equipments	No of Items
1	X-Ray & Gamma Survey meter	50
2	Alpha & Beta Survey meter	20
3	Neutron Monitor	15
4	Spectrometer	10
5	Contamination Monitor	15
6	Emergency Kit	15
7	Pocket Dosimeter	50
8	HPGe Gamma Detector	5
9	Floor Contamination Monitor	10
10	Hand & Foot Monitor	6
11	Hazmat PPE System	30
12	Extremity Dosimeter	40
13	Quality Control Kit for Different Practices	10
14	NPP Simulator	1
15		4

Knowledge Management

- Description of the national level nuclear safety KM programme
  - stakeholders

BAERA's stakeholders are:
- Citizens of the Republic of Bangladesh;
- National Assembly of the Republic of Bangladesh.
- Ministry of Science and Technology (MOST);
- Other ministries, regulators, public and other organizations (professional, commercial, research, educational…) with which BAERA cooperates;
- Clients in administrative procedures for obtaining authorizations for activities in the field of atomic energy use;
- External suppliers and contractors;
- Mass media;
- International organizations with which BAERA cooperates;
- Foreign national organizations with which BAERA cooperates;
- BAERA staff.

Knowledge Management

- Description of the national level nuclear safety KM programme
  - programme description

A differentiated approach to knowledge management is carried out at different stages and in different forms of BAERA activities through the assessment of the significance of knowledge:

- for BAERA personnel, it is carried out by assigning certain periods of data and information storage;
- for interested parties, determined when displaying information on the BAERA website;
- by selecting reputable organizations for staff training and knowledge sharing.

Knowledge Management

- Description of the national level nuclear safety KM programme
  - successes and challenges

Manpower for Operating Organization for Rooppur NPP

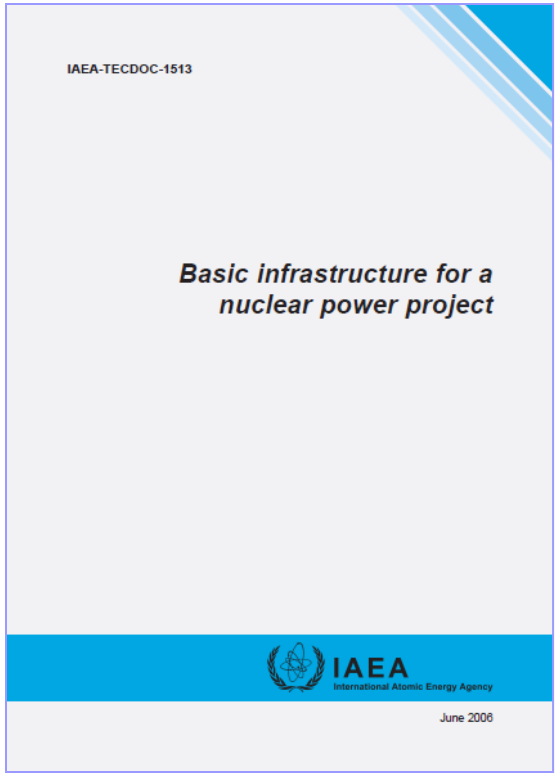
Total manpower for Rooppur NPP Station

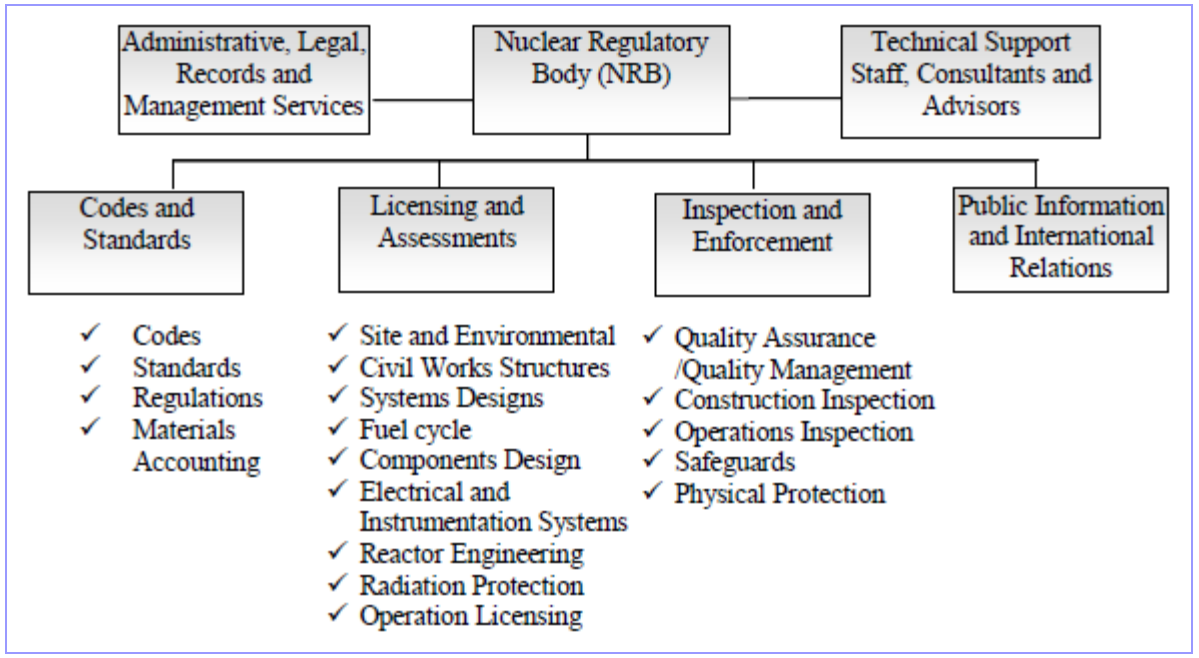
Manpower	Total No.	Training Requirement (Reserve)*	Training in Russian Federation
Rooppur NPP Station General Management	307	35 (+8)	851
Rooppur NPP Power Units Operation and Maintenance	1620	1084 (+297)	
Total	**1927**	**1119 (+305)**	**851**

*305 personnel are identified as reserve for case of illness, run away, etc.

BAERA: HRD Planning: S = Q (E + T) + A

- **At present BAERA has total 81 staffs. BAERA has recently proposed a new Organizational Structure as per IAEA INIR mission recommendation.**
- **The basic philosophy of this proposed Organizational Structure is consistent with IAEA-TECDOC-1513.**
- **BAERA has identified total 360 personnel for the Regulatory Control of RNPP (2xunit) to perform different regulatory work functions.**





Nuclear Grade Human Resource Development Project for Bangladesh Atomic Energy Regulatory Authority (BAERA) for 1000 MWe NPP

Ref. IAEA TRS 200; KINS Regulatory Manpower; STUK Regulatory Manpower

Majors		**%**
Nuclear Engg.	15	33
Mechanical Engg.	9	20
Electrical & Electronic Engg.	3	7
Chemical Engg.	3	7
Chemistry	1	2
Material Engg.	3	7
Civil Engg.	2	4
Physics	2	4
Geology	1	2
Computer Science	1	2
Environmental Science	1	2
Economics	1	2
Mathematics	1	2
Industrial and Production Engg.	1	2
Business Adminstration	1	2
Law	1	2
Total	**46**	

Present workforce of BAERA and Organizational Structure

- Scientific and Engineering Staff: 22 (senior)+20+26=68
- Supporting Staff: 40+20=60
- TSOs: National Institutes and Universities
- Vendor Country Regulatory Body: Rostechnadzor and its TSOs – JSC “VO “Safety” and SEC NRS
- Indian Regulatory Body: AERB
- IAEA TC project for capacity building for regulatory oversight, licensing, HRD for core personnel, etc.

Proposed Time Bound HRD Action Plan for BAERA
[50 personnel for oversighting of single unit 1000 MWe NPP]

Sl No.	Field of Training	No. of trainee	Proposed time of training	Proposed duration of training	Comments
	Site License + Construction Permit + Operation License (40 personnel)				
	Review of Environmental Impact Study (1~3 Years) (15 personnel)				
	Project Management and Support (i) Project management; and (ii) legal review	3	2014-2016	At least 6 months	Project Management (2), Legal (1)
	Siting (i) project management; (ii) Inspection team leadership; (iii) Inspection; (iv) hazard assessment; (v) risk analysis; (vi) emergency planning; and (vii) legal review.	12	2014-2016	At least 6 months	Electrical Engineer (1), Mechanical Engineer (1), Civil/Structural Engineer (1), Nuclear Enginer (1), RP/EP (1), Security (1), Seismic/Geo (1), Met/Hydro (1), Nuclear thermal hydraulics (1), Dose (1), PSA (1), QA (1)
	SSAR review and Issuance of Site License (1~2 years) (10 personnel)				
	(i) Project management; (ii) hazard assessment; (iii) risk analysis; (iv) emergency planning; (v) system configuration analysis; and (vi) legal review.	10	2015-2016	At least 6 months	Legal (1), Nuclear Physics (2), Nuclear Thermal Hydraulics (1), PSA (1), Sev Acc (1), Nuclear Systems (2), Mechanical Engineer (1), Nuclear I&C (1)
	PSAR review and Issuance of Construction Permit (1~2 years) (10 personnel)				
	(i) Project management; (ii) inspection team leadership; (iii) inspection; (iv) hazard assessment; (v) risk analysis; (vi) emergency planning; (vii) system configuration analysis; (viii) quality assurance; and (ix) legal review.	10	2016-2017	At least 6 months	Dose (1), Mechanical (1), Civil/Structural (1), Mat'l/Chem (1), Nuclear I&C (1), Nuclear Ops (1), Fire Protection (2), Human Factor (1), Security (1)
	Detailed Inspection during Construction Phase, FSAR review and Issuance of Operation License (4~6 years) (5 personnel)				
	(i) Project management; (ii) Inspection team leadership; (iii) Inspection; (iv) hazard assessment; (v) risk analysis; (vi) emergency planning; (vii) system configuration analysis; (viii) quality assurance; (ix) events assessment; (x) emergency response; and (xi) legal review.	5	2017-2023	At least 6 months	QA (1), Electrical (1), Civil/Struct (1), Mat'l/Chem (1), Human factor (1)
	Academic programme (10 personnel)				
	M.Sc. + Ph.D. in Nuclear Engineering	10	2016-2026	Max 6 years	To be specialized in the above mentioned areas.

Ref: (i) G-OIST, 2009. "Staffing, Training and Technical Support for Startup of a Nuclear Safety Regulatory Program", AdSTM, USNRC.
(ii) TRS 200, 1980. "Manpower Development for Nuclear Power, A Guidebook", IAEA.

BAERA HRD and KM
IAEA TC Projects for BAERA

200 million US$ "Nuclear Regulatory Infrastructure Development for BAERA"…ADP….. 10 years project...

BAERA KM Process objectives

Ensure that knowledge relevant to the activities of the regulator is acquired, stored, maintained and disseminated (i.e. generally managed as a very valuable resource for the regulator).

BAERA KM Process goals

Purpose of the knowledge management process:

1) Achievement of the best results in the regulation of nuclear and radiation safety;

2) Transfer of nuclear knowledge from one generation to the next and attraction, support and further development of highly specialized and highly qualified personnel in order to maintain competence in BAERA's areas of activity;

3) Compliance with the quality of BAERA regulation, innovations in industries related to ensuring nuclear and radiation safety;

4) Ensuring the responsible use of knowledge by correctly identifying "sensitive" knowledge and adequately protecting it from unauthorized use.

IAEA Mission Related to Nuclear Power Program

- **INIR Mission**: 2011
- **INIR Follow-Up Mission**: 2016
- **OLA Mission**: 2017
- **IPPAS Mission**: 2009
- **Site Safety Review Mission**: 2011, 2014
- **INSSP Mission**: 2013-2016
- **ISSAS Mission: Q1, 2022**
- **IRRS Mission**: Nov. 27 to Dec 09, 2022
- **IPPAS Mission**: Q1, 2023
- **EPREV Mission**: Q3, 2023.

Knowledge Management

- Ways of fostering a KM culture
  - at the national level
  - **Through the use of time bound Annual Performance Analysis (APA) tool.**
  - **Specific number of local and foreign training program must be conducted within specific time frame.**

  - at the corporate level
  - **Through Govt. approved annual development projects (ADP).**
  - **ADP facilitates financial supports to conduct continuous theoretical and field training on a routine basis with the help of internal and external experts.**

Nuclear Safety Knowledge Networks

- In which nuclear safety knowledge networks is your country participating? **Vendor Country, IAEA, AERB**
  - What is the purpose of the network?
  - **To continue supply of adequate nuclear grade Human Resources.**
  - Who are the stakeholders?
  - **Operator, Regulator, Policy Maker**
  - What are the KM benefits of this particular network?
  - **To acquire and sustain knowledge of similar reactor technology.**
  - What/who is missing from the information exchange?.....**N/A**

Nuclear Safety Knowledge Networks

- Information about country involvement in international activities and working groups
  - What KM ideas, tools, processes have you learned and incorporated into your own organization from participation in international activities
  - **Development of reactor design specific KM policy, process and procedure using Vendor country's experience.**
  - What would you like to see in the future as a participant of a KM working group?
  - **To fill up the gap and upgrade our KM in an IAEA standard.**

Conclusions

Key References

- BAERA-ROSTECHNADZOR Inter Agency Agreement.
- BAERA-AERB bilateral contract.
- BAERA-JSC “VO “Safety” General Framework Contract.
- BAEC-ASE General Contract.
- IAEA TC Project.
- National NURID project of BAERA.
- BAERA KM Policy, Process and Procedure.

IAEA
International Atomic Energy Agency

Thank you!