EBP-ASIA-66
LIMITED DISTRIBUTION
November 2000

WORKING MATERIAL

REGIONAL WORKSHOP ON PREREQUISITES OF INSTITUTIONAL REQUIREMENTS FOR DEPLOYMENT OF NUCLEAR POWER

Vienna, Austria
2 - 3 November 2000

**EXTRABUDGETARY PROGRAMME ON THE
SAFETY OF NUCLEAR INSTALLATIONS
IN SOUTH EAST ASIA,
PACIFIC AND FAR EAST COUNTRIES**

**Reproduced by the IAEA
Vienna, Austria**

NOTE
The material in this document has been supplied by the authors and has not been edited by the IAEA. The views expressed remain the responsibility of the named authors and do not necessarily reflect those of the government(s) of the designating Member State(s). In particular, neither the IAEA nor any other organization or body sponsoring this meeting can be held responsible for any material reproduced in this document.

Report of Regional Workshop on
Prerequisites of Institutional Requirements for Deployment of Nuclear Power

IAEA Headquarters, Vienna, Room C07VI
2-3 November 2000

1. Objective of the Workshop

The objective of the workshop was to provide information from the experiences gained in some countries in building up nuclear safety infrastructure to participants in the Advisory Group Meeting (AGM) of the Extrabudgetary Programme (EBP) on the Safety of Nuclear Installations in the South East Asia, Pacific and Far East Countries. The results of the discussion among participants on the related topics will be utilized for completing a technical document on this matter.

2. Presentation and Discussion

Eight experts from China, Indonesia, Malaysia, Philippines, Thailand and Vietnam participated in the workshop.

Mr. S. Chakraborty and Mr. M. Lipar, presented lectures on the basis of the Working Material, Deployment of Regulatory Infrastructure for a Nuclear Power Programme, which was issued as a result of consultants meetings held in September and December 1999.

The question and answer session was very productive and lively discussions between the participants and lecturers took place.

3. Conclusion

The following points were concluded by the lecturers:

- The title of the document should reflect principles or procedure for development of regulatory infrastructure;

- Interface and share of responsibilities with other non-nuclear regulatory body should be added;

- In case of separation between nuclear safety and radiation protection, the necessity of clear written agreement between the regulatory bodies should be mentioned;

- Different regulatory approaches, such as prescriptive, results-oriented, process oriented, risk-informed should be described;

- Mission of the regulatory body, such as to ensure health, safety and welfare of public should be stated;

- It should be mentioned that the prime responsibility for safety lies with the plant operators;

- It should refer to minimum size of the regulatory body;

- Public hearing process should be described as an example;

- Provision for technical support for the regulatory body in a nuclear law should be mentioned;

- Practice from the spectrum of existing TSOs should be included;

- Environmental protection is missing;

- Staff training and education in implementing quality assurance for the regulatory activities should be more described;

- One-step licensing process (to avoid high financial risk) should be mentioned;

- The main activities, the minimum requirements and priority of a regulatory should be mentioned;

- Consistent terminology according to IAEA Glossary should be kept;

- Appendix giving the examples of three countries should follow the same structure of presentation;

- R & D support as a regulatory activity should be added;

- Conflicts of interest, in case same contractors are working both for regulatory body and utility, should be mentioned;

- Transition from research reactor regulation to nuclear power regulation should be described;

- The document should also address:

- waste management from regulatory point of view;
- spent fuel management;
- research activities;
- effectiveness and efficiency of regulatory body;
- more conclusions and recommendations and reference documents;
- difference of regulatory independence between developing and developed countries;
- emergency preparedness;
- role of the IAEA

- In order to finalize the document, further country-specific-workshops are needed.

Department of: Nuclear Safety

Division / Section of: NSNI-SPU

Issue No. 2

Date: 2000-11-02

00ME06463 (Workshop)

NOTIFICATION OF AN AGENCY MEETING

Title of meeting:	Regional Workshop on Prerequisites of Institutional Requirements for Deployment of Nuclear Power s					
Dates, inclusive:	2-3 November 2000 - Workshop	**Place:**	Meeting Room C07VI	**Ext.:**	21361	**Convening Time:** 09:30

Scientific Secretary	Room No.	Ext.	Secretary	Room No.	Ext.	Conference Clerk
L. Lederman	B0834	26070	R. Salem	B0835	26069	

COUNTRY / ORGANIZATION	PARTICIPANT	OFFICIAL MAILING ADDRESS	ADDRESS DURING MEETING	DATES	SEAT NO.
China	Mr. LENG Ruiping	China Atomic Energy Authority P.O. Box 2102, 100822 Beijing China Tel: 0086 10 68572077 Fax: 0086 10 68513717		2-3 Nov.	
	Mr. ZHAO Chengkun	China National Nuclear Safety Administration 115 Nanxiaojie, Xizhimennei, Beijing, 100035 China Tel: 0086 10 66111446 Fax: 0086 10 661 26715		2-3 Nov.	

Indonesia	Mr. B. Arbie	National Nuclear Energy Agency (BATAN) J. K.H. Abdu Rokhim Jakarta, Indonesia Tel/Fax: 0062 21 525 3803 E-mail: bakri@centrin.net.id	2-3 Nov.
	Mr. E. Kasma	Nuclear Energy Control Board (BAPETEN) Multiciti Agung Bldg. 5th Floor, JL. M.H. Thamrin No. 55 Jakarta 10350 Indonesia Tel: 0062 21 230 1277 Fax: 0062 21 230 1255 E-mail: ekasma@bapeten.org	2-3 Nov.
Malaysia	Mr. MOHAMAD AZWAR Hashim	Atomic Energy Licensing Board 13th Flr., Plaza Pekeliling Jalan Tun Razak 50400 Kuala Lumpur Malaysia Tel: 00603 4042 3687/3633 Fax: 00603 4041 5855 E-mail: azwar@aelb.gov.my	2-3 Nov.
Philippines	Mr. A.J. Mateo	Philippine Nuclear Research Institute Commonwealth Avenue Diliman, Quezon City Philippines Tel: 00632 929 6011 to 19 Fax: 00632 920 1646 E-mail: ajmateo@pnri.dost.gov.ph	2-3 Nov.

Slovakia	Mr. M. Lipar	Nuclear Regulatory Authority Bajkalska 27, POB 24 82007 Bratislava Tel: 0042 17 53421032 Fax: 00421753421015 E-mail: lipar@hdqt.ujd.sk	2-3 Nov
Switzerland	Mr. S. Chakraborty	Swiss Federal Nuclear Safety Inspectorate Federal Office of Energy CH-5232 Villigen-HSK Tel: 004156 310 3936 Fax: 0041 56 310 3855/4936 E-mail: chakraborty@hsk.psi.ch	2-3 Nov
Thailand	Mr. P. Yamkate	Office of Atomic Energy for Peace Vibhavadi Rangsit Road Chatuchak, Bangkok 10900 Thailand Tel: 00662 57 95 230/00662 561 4069 Fax: 0066 2 561 3013 E-mail: pathom@oaep.go.th	2-3 Nov.
Viet Nam	Mr. Le Van Hong	Viet Nam Atomic Energy Commission 59 Ly Thuong Kiet, Hanoi Tel: 0084 48 256479, 8251912, 7561 332 Fax: 0084 48 266133 E-mail: lvhong@vaec.gov.vn	2-3 Nov.

REGIONAL WORKSHOP ON PREREQUISITES OF INSTITUTIONAL REQUIREMENTS FOR DEPLOYMENT OF NUCLEAR POWER

IAEA Headquarters, Vienna, Room VIC/VI
2-3 November 2000

Thursday, 2 November 2000

OPENING

09:30	Opening Remarks	Mr. L. Lederman
09:50	Remarks from Chair Person	Mr. S. Chakraborty

TOPIC 1 : Infrastructure needs to support the launch of a nuclear power programme *

10:00	Presentation Plenary discussion	Mr. S. Chakraborty
10:50	<Coffee Break>	

TOPIC 2 : Organisation and structure of the nuclear regulatory body

11:10	Presentation Plenary discussion	Mr. M. Lipar
12:00	<Lunch Break>	

TOPIC 3 : Establishment of nuclear regulatory technical support programme

14:00	Presentation Plenary discussion	Mr. S. Chakraborty

TOPIC 4 : Relationship between a regulatory body and operating organisations involved in a nuclear power plant project

14:50	Presentation Plenary discussion	Mr. M. Lipar

TOPIC 5 : Relationship between a regulatory body and public

15:40	Presentation Plenary discussion	Mr. S. Chakraborty
16:30	<Coffee Break>	

TOPIC 6 : International co-operation for nuclear safety and regulatory activities

16:50	Presentation Plenary discussion	Mr. M. Lipar
17:40	Adjourn	

* Presentations should be based on the working material, "Development of regulatory infrastructure for a nuclear power programme". Additional remarks by representatives from France, Germany, Japan, Korea, Spain, and U.S. will be welcomed.

Friday, 3 November 2000

09:00 - 10:40	Remarks from the participating countries on completeness and adequacy of the IAEA working material presented (China, Indonesia, Malaysia, Philippines, Thailand and Viet Nam)
10:40	<Coffee Break>
11:00	Conclusions and further work required to complete the IAEA report
12:30	Adjourn

Development of regulatory infrastructure for a nuclear power programme

S. Chakraborty
D. Ibañez
M. Khatib-Rahbar
M. Lipar
Y. Matsuki

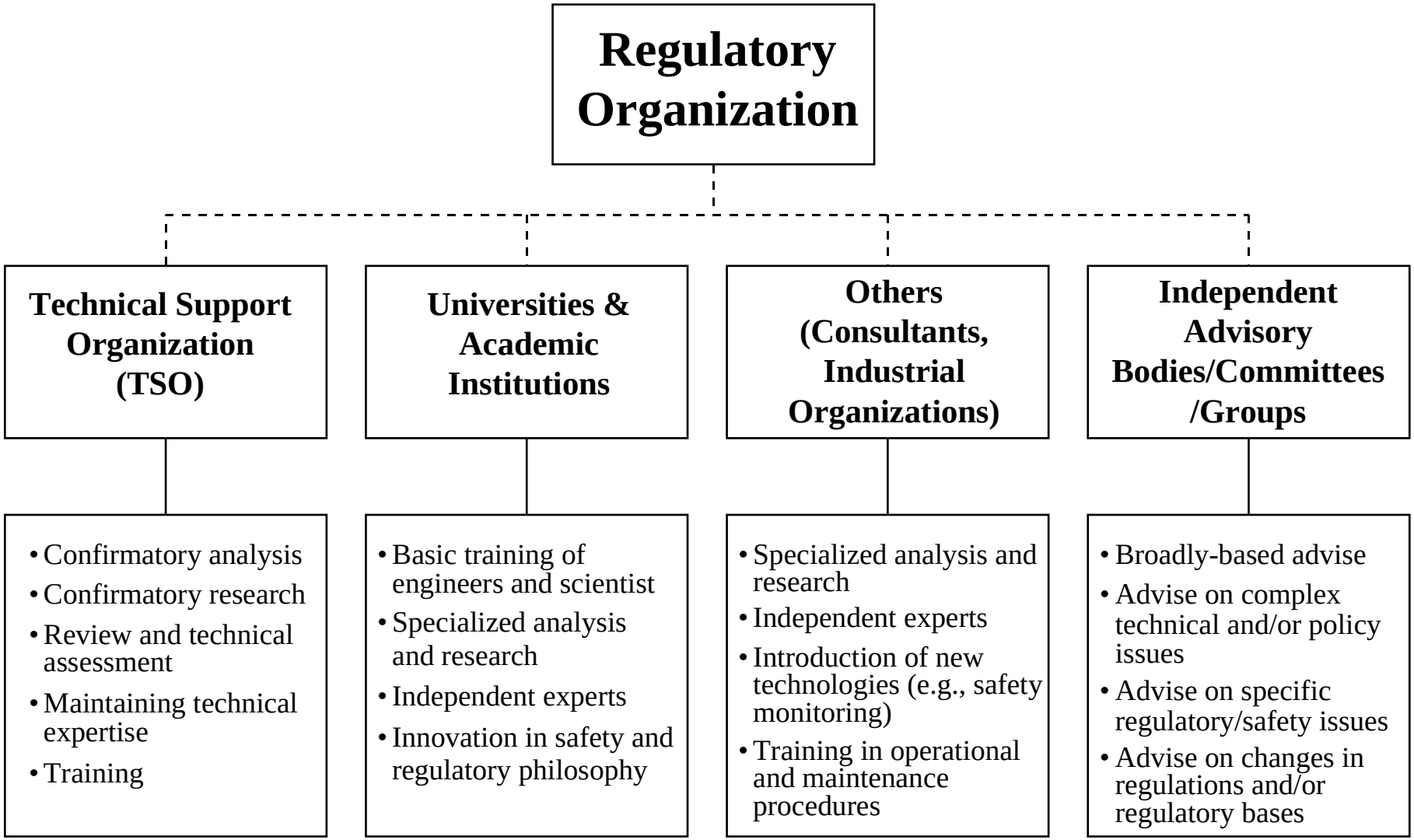
Background, Objectives and Scope

- Need to develop at an early stage regulatory infrastructure
- New challenges for nuclear regulation and international cooperation
- Learn from experiences from other countries
- Supplement the guidance provided in IAEA Safety Standards
- Compilation of specific time dependent needs, likely problems
- to be faced, and discussion of practical solutions
- Assist countries in choosing the options for a regulatory infrastructure

Nuclear Infrastructure

Nuclear power requires a certain infrastructure, including skilled personnel, regulatory bodies, industrial and research facilities

- **National industry infrastructure**
- **Legal framework for nuclear activities and its regulation, such as legal requirementswith which the manufacturer of nuclear systems must comply, special rules for the design and construction of components and a quality system**
- **Financial capabilities**
- **Education and training capabilities**
- **Emergency planning and preparedness**
- **International co-operation**



ELEMENTS OF NUCLEAR REGULATORY TECHNICAL SUPPORT PROGRAM

Nuclear Legislation

- Statutory basis for creation of a regulatory body
- Arrangements for decommissioning, closure, safe management of spent fuel and radioactive waste and safe transport of nuclear and radioactive materials
- Governmental emergency response system
- Financial indemnification for third parties in the event of a nuclear or radiation accident
- Funding for the operation of the regulatory body

Nuclear Legislation (contd)

- National law on nuclear energy
- Radiation protection law
- Promulgation of a series of regulation or provisions related to Emergency situations, Regulatory body funding, Liability, Control of nuclear material, Quality assurance, International co-operation agreements: Conventions, Third party liability/Paris convention

Establishment of Technical Support

- Several options for establishing required level of competence and expertise
- Preferable option: TSO as an Integral part of Organisation
- Alternative option: Relying on technical support through affiliated and independent organisations
- Establishmentof a national technical support infrastructure that can utilise all of the available resources

Technical Areas Relevant to Regulation

- Accident Analysis
- Thermal hydraulics
- Probabilistic Safety and Risk Assessment
- Quality control and quality assurance
- Fire protection and safety
- Reactor physics and criticality
- Structural mechanics

Technical Areas Relevant to Regulation (contd)

- Fracture mechanics
- Metallurgy
- Radiological protection and safety
- Emergency planning and preparedness
- Software reliability
- Instrumentation and control
- Waste management

Developing technical competence and build-up technical expertise

- Recruitment of an initial group of competent engineers and scientists
- Organisation of an initial formal training process in selected disciplines
- Arrangement of topic-specific and hands-on special training programme
- Organisation of necessary scientific and engineering infrastructure
- Planning and implementation of specific pilot projects to provide means for sustainable regulatory analysis programme
- Instrumentation and control
- Waste management

Developing technical competence and build-up technical expertise

- Provisions for exchange of scientists and engineers with other nuclear regulatory organisations and/or support centres
- Direct participation in the international confirmatory regulatory safety research programs or provisions to have access to the results of methods development programs and the state-of-the-art nuclear safety analysis programs
- Promotion of young technical staff to contribute archival quality papers to technical conferences and technical journals
- Arrangement with regulatory organisation in other countries to delegate candidate inspectors for an adequate period as active participants in inspection activities in operating NPP

Relationship between regulatory body and public

- During site selection phase impact to environment and risk to public are evaluated. Intensive interaction with the public at large is needed
- Structured communication process to enhance public understanding about radiological impact of a NPP under normal operation, design basis accidents and severe accidents at further licensing stages
- During NPP under operation communications to public and media when incidents occur or when issues or concerns are raised. Prompt communication of safety significance according to IAEA-INES

Communication at very early stage

- To be sensitive to public sentiments and to gain public confidence
- Development of an effective and co-ordinated information and dissemination strategy based on fundamental principles of communication:
  - Independence
  - Technical competence and credibility
  - Neutrality (without any biases) and balance
  - Timeliness, accuracy and transparency
  - Acceptance of responsibility and accountability

Nuclear Regulatory Authority of the Slovak Republic

REGIONAL WORKSHOP
ON PREREQUISITES OF INSTITUTIONAL REQUIREMENTS FOR DEPLOYMENT OF NUCLEAR POWER

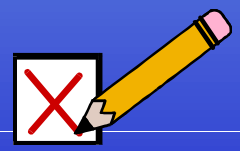
Miroslav Lipar
Chairman

Organization and structure of Nuclear Regulatory Organization

- Establishment of the regulatory body for safe regulation of the siting, construction, operation and decommissioning of nuclear power plant and other nuclear installations.
- The regulatory body structure ensures fulfilment of its responsibilities and functions effectively and efficiently.
- The regulatory body may be supported by the technical support organization's advisory committees or agents/consultants.

Activities of the REGULATORY BODY

- Issuance of authorizations, licenses, approvals, or permits
- **Review and assessment of submitted documentatio**
- Inspection of nuclear and radiation facilities and enforcement of the activities in those facilities
- **Issuance of regulations and guides**
- Control of radiation protection for workers and public
- **Operation of material safeguard system**
- Emergency preparedness
- **Liaison with other organizations**
- Information to the public
- **International co-operation**
- Research and development in area of nuclear safety
- **Support activities (legal, administrative, etc.)**
- Quality management



Activities of the REGULATORY BODY

- The regulatory authority by definition needs to be strictly independent of the operating organization. Based on experience it is appropriate to combine the function of nuclear safety and radiation protection at the outset.
- The basis for the national safety regulations:
  - **To use the regulations and standards of the supplier country.**
  - **To adopt the IAEA Safety Standards as a basic objectives, concepts, principles and requirements on:**
    - **Nuclear Safety,**
    - **Radiation Safety,**
    - **Radioactive Waste Safety, and**
    - **Transportation Safety,**

    and practices as detailed standards to the extent practicable.
  - **To prepare a system of their own regulation and standards based on IAEA Safety Standards.**
- The basis for industrial design and manufacturing codes

Activities of the REGULATORY BODY

Review and assessment: Review and assessment is conducted on the basis of regulations and guides, and the results may need to be confirmed by inspections.

Licensing: Licensing, one of the most important regulatory activity is based on independent regulatory review and assessment of information on nuclear safety of each particular nuclear installation.

Safety Culture: All organizations involved in the nuclear programme have the responsibility, as a priority, to establish and to support a safety culture. The regulatory body establishes a policy to invite the IAEA safety review missions, the OSART, IRRT, PROSPER missions and other relevant IAEA services.

Siting: The regulatory body in a country with a programme to build a new NPP develops a policy to select and qualify sites for NPPs. The IAEA has issued several NUSS documents which provide guidance on this subject.

Inspection activities

- Routine inspections conducted by resident inspector or dedicated inspector.
- Special inspections conducted with approved inspection programme and procedures.
- Team inspections conducted after abnormal events and to verify other activities such as start-up hold points during construction or commissioning.

Inspection activities

The inspection programme is based on inspection procedures which cover the following broad areas:

- Construction,
- Commissioning,
- Operation,
- Training and Qualification,
- Performance indicators,
- Technical specifications,
- Maintenance,
- Surveillance testing,
- Plant modifications,
- Fire protection,
- Radiation protection,
- Radioactive releases,
- Radioactive waste management,
- Physical security,
- Fuel management,
- Emergency preparedness,
- Quality assurance,
- Safeguards, and
- Decommissioning

Commissioning

- The regulatory review, assessment and inspection of the commissioning are very important part of the activities to be implemented by regulatory bodies. The period of commissioning is used to confirm design properties of the equipment, to demonstrate that installation is capable to be operated safely and reliably as defined in design and construction requirements.

- The main criterion of commissioning successfully is the quality of the unit tests and operation and the operators getting acquainted with it.

Commissioning

- **The tests carried out during the commissioning are to:**
- **confirm the conformity of functional test results with criteria elaborated from design requirements,**
- confirm the quality and conformity of components manufacturing to design specification,
- **confirm the quality and completeness of the equipment erection with regard to erection documentation and layout requirements,**
- verify the behaviour of equipment under nominal modes, transients and possible accident conditions as specified in test procedures,
- **identify malfunctions of the components or systems and give proposals for their solution,**
- implement the necessary modifications,
- **implement and validate operating procedures,**
- provide the operator with the reference data, and
- **allow the operators to get experiences and become familiar with the plant.**

Commissioning

- The regulatory body establishes hold points and commissioning process continues only after careful evaluation of previous stage of commissioning.

- ***overall cold and hot hydraulic tests,***
- ***pre-service inspection and testing,***
- ***fuel loading,***
- ***first criticality and zero power tests,***
- ***power tests on different levels,***
- ***trial operation, and***
- ***commercial operation.***

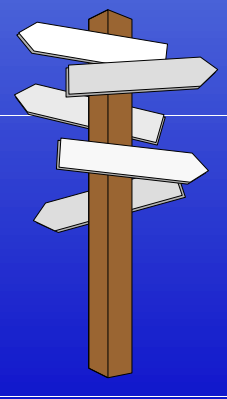
Commissioning

- Typical inspection and assessment activities of regulatory body during the commissioning are as follows:

- *quality control at execution of commissioning programmes,*
- *readiness of personnel for commissioning stages,*
- *readiness of equipment for commissioning stages,*
- *fulfillment of acceptance criteria, and*
- *completeness of objectives of commissioning stages and review of overall results obtained.*

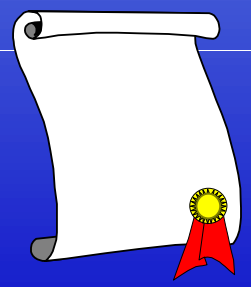
Structure of the Regulatory Body

- **The organizational structure and size of the regulatory body is influenced by many factors such as:**
- **the specific responsibilities assigned to the regulatory body,**
- the number of authorities involved in the regulatory process,
- **the legal system,**
- the regulatory system (prescriptive, non-prescriptive, and risk-informed),
- **the development of regulations and guides,**
- the patterns of industrial practice,
- **the size of existing and contemplated nuclear programme,**
- the number of licensees,
- **the number and types of designs,**
- the extent of procurement from foreign vendors,
- **the capability of the staff in the regulatory body,**
- the capability of technical support, and
- **the international co-operation.**



Regulatory Independence

- Financial
- Technical
- Enforcement
- Staffing
- Interface between Regulatory Body and Public
- Political
- Appeals Process
- Legislative
- Organizational
- International



Nuclear Regulatory Authority of the Slovak Republic

REGIONAL WORKSHOP
ON PREREQUISITES OF INSTITUTIONAL REQUIREMENTS FOR DEPLOYMENT OF NUCLEAR POWER

Relationship between a regulatory body and operating organisations

Miroslav Lipar
Chairman

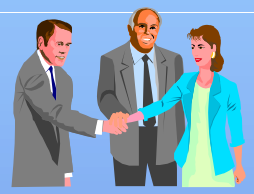
Nuclear Regulatory Authority of the Slovak Republic

REGIONAL WORKSHOP
ON PREREQUISITES OF INSTITUTIONAL REQUIREMENTS FOR DEPLOYMENT OF NUCLEAR POWER

International co-operation for nuclear safety and regulatory activities

Miroslav Lipar
Chairman

International relations and support



- ➪ ***Relationship*** **with the Supplier States**
- ➪ ***Relationship*** **with Other Countries With Similar Nuclear Energy Objectives**
- ➪ ***Relationship*** **with International Organizations**
- ➪ **Other Bilateral or Multilateral *Relationships***

Benefit

- Experience-base for the formulation of regulatory requirements and procedures;
- Pros and cons of regulatory philosophy and adequate protection standards;
- Training of the regulatory staff in promulgation of rules and regulations;
- Training of staff in the development of inspection procedures and activities;
- Experience-base in the build-up of technical review and assessment capability and their effective use; and
- Training of staff in enforcement of regulations.

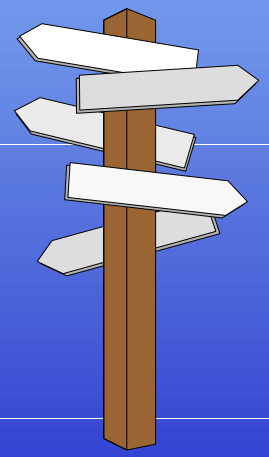
Regulator groups and organizations

Characteristics/activities					
Organization/ Agreement	Date established	Head regulators involved	Technical focus	Policy focus	Members
International Atomic Energy Agency Senior Regulators Meetings	1983		•		Senior regulators from the IAEA's 128 Member States
Nuclear Energy Agency Committee on Nuclear Regulatory Activities (CNRA)	1989	•[a]	•		Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, South Korea, Luxembourg, Mexico, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States
Convention on Nuclear Safety [b]	1996	•	•	•	50 States have ratified; 65 States have signed; 45 states participated.
International Nuclear Regulators Association (INRA)	1997	•		•	Canada, France, Germany, Japan, Spain, Sweden, United Kingdom, United States

Western European Nuclear Regulators Association (WENRA)	1998	•	•		Belgium, Finland, France, Germany, Italy, Netherlands, Spain, Sweden, Switzerland, United Kingdom
Forum of Iberian-American Regulators	1997	•	•	•	Argentina, Brazil, Cuba, Mexico, Spain
Network of Regulators of Countries with Small Nuclear Programs (NERS)	1998	•	•		Argentina, Belgium, Bulgaria, Czech Republic, Finland, Hungary, Netherlands, Slovak Republic, Slovenia, South Africa, Switzerland
Forum of WWER Regulators	1993	•	•		Armenia, Bulgaria, Czech Republic, Finland, Hungary, Russia, Slovak Republic, Ukraine
CONCERT Group	1991	•	•		Armenia, Belaruss, Belgium, Bulgaria, Croatia, Czech Rep., Estonia, Finland, France, Germany, Greece, Hungary, Italy, Lithuania, Kazakhstan, Netherlands, Romania, Russia, Slovenia, Slovak Rep., Spain, Sweden, Switzerland, UK
Forum for CANDU Regulators	1996	•	•		Argentina, Canada, China, India, South Korea, Pakistan, Romania

Relations with LICENSEES

- Siting, licensing and design approvals
- Operation license
- Inspections
- Information exchange
- Regulatory funding
- Principles for the relations with licensees



Comment to Working Material
Development of Regulating Infrastructure
for a Nuclear Power Programme

received from Engr. Alejandro Mateo
Philippine Nuclear Research Institute (PNRI)

IAEA – 99CT 11085, Vienna 2-3 November, 2000

2.1 Infrastructure Needs

PNRI is the regulatory body for atomic and nuclear energy matters by virtue of Republic Act 2067 enacted in 1958. PNRI owned several radiation facilities located in its compound, including the Philippine Research Reactor (PBR-1) which has been inoperational since 1988. Based on the regulations, these radiation facilities are exempt from licensing by PNRI.

Recently, a decision was made to have the PRR-1 operational and undergo rehabilitation and repair activities. In addition, PNRI management decided to enforce a "quasi-regulatory" for the PRR-1 and other PNRI-owned radiation facilities. This is addressed in a policy statement issued by the PNRI management in August 2000 to govern the licensing of the PRR-1. To be able to effectively enforced this directive, there is a need for strengthening the present licensing setup of PNRI by re-structuring the regulatory arm of the PNRI which is the Nuclear Regulations, Licensing and Safeguards Division (NRLSD).

The Philippines had already been involved in a nuclear power program development and implementation when in the late 1970 to late 1980 a nuclear power plant was being constructed in Bataan, a province in Luzon. The construction was the culmination of the feasibility study which was undertaken by the IAEA as requested by the commercial electricity supplier, MERALCO through the Philippine Atomic Energy Commission (PAEC). However, as changes were made in the laws, the government assigned the National Power Corporation (NPC) which was given the authority to own power plants to produce electricity in the country.

NPC took over from MERALCO and contracted on a "turnkey-project" the construction and operation of a 600 MW Pressurized Water Reactor supplied by Westinghouse International. NPC hired EBASCO as its consultant to advise on the safe construction of the nuclear power plant.

The Philippine Atomic Energy Commission (PAEC) now the Philippine Nuclear Research Institute (PNRI), was the regulatory body for the construction of the nuclear plant. This authority was vested in the basic law, Republic Act 5207, which was enacted in 1968. As the saying goes: "it is easy to adapt rather than reinvent the wheel", PAEC adopted the rules and regulations and licensing processes enforced by US Nuclear Regulatory Commission (USN7RC), since the nuclear power plant is
US-designed and are governed by the USNRC regulations. During this period, USNRC

experts were assigned by IAEA to assist and advise PAEC in the licensing and regulating the BN7PP construction. At the time, PAEC established local rules and regulations quality assurance programs, inspection and enforcement programs, etc. adapted from ITS 1OCFR and from IAEA safety documents.

The licensing process adopted was also US style. A Provisional Permit was issued for the initial ground preparations. A Construction Permit was issued for the construction of the structures, components, parts for the nuclear island and other non-safety related structures. PAEC implemented a regulatory inspection program for the BNPP construction. A team of inspectors visited the construction site every week to assist the assigned "resident inspector". The nuclear power plant has already neared its completion for eventual operation, when this was stopped and mothballed per the decision of the administration that took over the government in 1986. To date, **a nuclear power option has not been officially announced by the present government.** It is expected that nuclear power option will be in the year 2020-2025 at the earliest.

For the comments on the working paper in nuclear power under discussion, this delegate would like to present his views and remarks. He has been involved in the licensing and regulatory inspection of the BNPP construction as the Head of the Inspection and Enforcement Division, Department of Nuclear Regulations and Safeguards LIED, DNRSJ of the then PAEC.

2.2 Framework for Nuclear Legislation

Requirements for legal and governmental responsibilities are established in respect of the infrastructure development, safety of nuclear facilities, safe use of sources of ionizing radiation, radiation protection, safe management of radioactive waste and safe transport of radioactive material, financing, national participation, technology transfer, etc. One of the main activities is the creation of a Nuclear Regulatory Body which is the authority or a number of authorities designated by the government as having legal authority for conducting the regulatory process, including issuing authorizations and thereby regulating nuclear, radiation, waste and transport safety and radiation protection.

The above should be established by law. At this time, in the Philippines, there is a lead time to have a law enacted establishing an independent Regulatory Body. After which staffing can be done to create a manpower that will work for the establishment of the relevant regulations, guides, standards for nuclear power plants. The law should also provide financial support for the regulatory body by assigning sufficient budget for its operation. The new Atomic and Nuclear Energy Law should emphasize the creation of a Regulatory Body for atomic and nuclear energy **only to impose the "independence" aspect of the Regulatory Body**.

Another law on decommissioning and its relevant activities can be enacted later. Succeeding laws can also be enacted to address the other activities involved in nuclear power.

RA2067 that created the Philippine Atomic Energy Commission (PAEC) now the Philippine Nuclear Research Institute (PNRI) designated PAEC (PNRI) as an atomic research body which would promote atomic energy and conduct researches in atomic energy. At the same time, the law also empowers PAEC (PNRI) as the regulatory body for all atomic and nuclear

energy matters. Hence, when somebody look at RA2067, he would see a “conflict of interest” scenario.

At the time when the BNPP was being constructed, PAEC promulgated several regulations to cover the licensing of the activities for the nuclear power plant construction. There was also an attempt to enact a law creating an independent regulatory body purely for atomic and nuclear power matters. But since the BNPP was not pushed through its completion and operation, this move was shelved.

Under 2.2 International Cooperation Agreements

The Philippines has signed and ratified some convention instituted by IAEA. These international agreements/convention are the following:

a. Agreement on the Privileges and Immunities of the IAEA — Ratified and Entry into Force on December 17, 1962
b. Treaty on Non-Proliferation of Nuclear Weapons - Ratified and Entry into Force on October 5, 1972
c. NPT Related Safeguards Agreement — Ratified and Entry into Force on October 16, 1974
d. Supplementary Agreement on Provision of Technical Assistance by the IAEA — Ratified and Entry into Force on March 3,1980
e. Convention on Physical Protection of Nuclear Material — Ratified and Entry into Force on February 8,1987
f. Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology [RCA] —Ratified and Entry into Force on August 30,1987
g. Joint Protocol Relating to the Application of the Vienna Convention and the Paris convention — Signed on September 21,1988
h. Convention on Nuclear Safety — Signed on October 14, 1994
i. Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency — Ratified and Entry into Force on June 5, 1997
j. Convention on Early Notification of a Nuclear Accident — Ratified and Entry into Force on June 5, 1997
k. Additional Protocol to the Safeguards Agreement — Ratified and Entry into Force on September 30, 1997
l. Vienna Convention on Civil Liability for Nuclear Damage — Ratified and Entry into Force on November 1997
m. Convention on Supplementary Compensation for Nuclear Damage —Signed on March 10, 1988
n. Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management — Signed on March 10, 1998

3.1 Activities to be Implemented by the regulatory body for effective regulation of nuclear programmes are as follows

These are essentially the components of a nuclear power program which should be addressed by a regulatory body. Philippine experiences during the construction of the BNPP addressed

these components. Regulations were established which were adapted from USNRC 10CFR and IAEA Safety Documents. These regulations were incorporated into several Parts of the Code of PNRI Regulations (e.g., Part 2 CPR, Part 7 CPR, etc.)

Under 3.1 A system for establishing nuclear safety and radiation protection regulations

IAEA should establish a document identifying a licensing process and licensing stages for nuclear power plants for clearer interpretation. For example:

ACTIVITY	REQUIREMENT	PERMIT/LICENSE
Application for License submitted by the Applicant	Feasibility studies, siting studies environmental impact, etc.	Provisional Permit
Application for Construction Permit	Preliminary Safety Analysis Report, Environmental Report	Provisional Permit Construction Permits Full Construction Permit
Application for Operating License	Final Safety Analysis Report Technical Specifications	Pre-operational Testing Increasing Power Full Operation License

Under 3.1 To use the regulations and standards of the supplier country

Usually this is the option normally chosen just like the Philippine experience, since there is no need for the regulatory body to “re-invent the wheel”. Basically, this was done in the Philippines but with the addition of the IAEA safety documents.

Under 3.1 To adopt the IAEA Safety Standards as a basic objective

This is the best option for countries starting or will start a nuclear power program. This is now being done by PNRI for the licensing of the PRR-1 and the future nuclear power program of the government. This will also provide a lead time in having an enactment of the applicable laws to establish the regulatory body infrastructure which will include manpower development and the choice of the available types of nuclear power plants. This will be a good system and the Philippines is embarking on the adoption of the IAEA safety standards although at this time, the regulations being established are for research reactors. PNRI has issued a Policy Instruction on August 4, 2000 on the Safety Regulation and control of PNRI-operated Nuclear Facilities and Radioactive Materials.

Under 3.1 To prepare a system of their own regulation and standards based on L4EA Safety Standards

This could be aligned with the adoption of the IAEA Safety Standards. Each country would have to adapt to its own system of enacting laws and promulgating rules and regulations as well as regulatory guides.

Under 3.1 Licensing review, assessment, Inspections, audits, commissioning, etc.

These activities are identified and addressed in several IAEA Standards and Guides and adopting them would be the best option for the country embarking on a nuclear power

program. Technical people should be trained in advance and re-trained for these activities to ensure that these activities are performed by qualified people.

Under 3.1 Establish and support safety culture

It is important for the country to realize that nuclear safety does not need any compromises. Hence safety culture should be in place in all organizations and individuals to be involved in the nuclear power program. This will ensure that nuclear safety will not be compromised or dictated by economic savings. The EBP should develop means of having nuclear safety culture adapted and be a part in all aspects of the nuclear power program.

Under 3.1 Inspection activities; Inspection programs; Inspection procedures;

An independent regulatory body develops a comprehensive inspection program and quality assurance program for the Construction Phase, Pre-Operation Phase, and Operation Phase of the NPP. The regulatory body should assign a dedicated individual to head the inspection and enforcement as Chief Inspector and is given the authority to enforce the program. He should be answerable only to the Head of the Regulatory Body who can approve or disapprove his recommendations. Based on the approved inspection programs, the Chief inspector should establish relevant and applicable inspection procedures covering all facets of the inspection program. All inspection activities should be properly documented and kept on file/database.

For countries with nuclear power programs, the assistance of the IAEA through its IRRT, INSARR, Pre-OSART, OSART teams should be welcomed.

Under 3.1 Commissioning program

The regulatory review, assessment and inspection of the commissioning activities are very important activities to be implemented by the regulatory body. This is part of the evaluation whether the nuclear power plant as constructed can be allowed to operate. These activities involve the assessment of the hot and cold tests, preoperation tests, etc. and the knowledge and qualification of the operators and auxiliary personnel. The regulatory body should identify non-compliance, flaws and loopholes in the nuclear power plant before the operating license will be authorized.

3.2 Structure of the Regulatory Body

The organizational structure and size of the regulatory body is influenced by many factors such as:

a. specific responsibilities assigned to the regulatory body
b. number of authorities involved in the regulatory process
c. legal system
d. regulatory system (prescriptive, non-prescriptive, risk-informed)
e. development of regulations and guides
f. patterns of industrial practice
g. size of existing and contemplated nuclear programme
h. number of licensees

i. number and types of designs
j. extent of procurement from foreign vendors
k. capability of the staff in the regulatory body
l. capability of the technical support
m. international cooperation

Recruitment of qualified personnel to man the regulatory body is an essential part in organizing the regulatory body. Delineation of functions and responsibilities of the staff and personnel should be clearly stated. The initial number of personnel may increase as time and needs dictate. At the outset, preparation of the legislation, regulations, guides, adoption of standards are the most important part of the regulatory body activities. This activity may need a number not more than 30 but as the NPP will have to be constructed, additional manpower will be needed.

4. Establishment of Technical support

For a regulatory body that is starting to regulate a nuclear power plant, sufficient expertise in all areas may not be available from among the personnel. Even if there are experts advising, there could still be some activities that need to be addressed and no expertise from among the personnel is available. Therefore the regulatory body can hire technical support groups or organizations to assist in filling the gaps in expertise available with the regulatory body. The work of the support groups however may be short-term since the regulatory body will have to build up its own expertise on the work being done by the support group. The support group provides the recommendations and the regulatory body maintain the decision making. An advantage of hiring technical support groups, consultants, advisers, or advisory bodies is the regulatory body can make decisions on matters that may take a long time if the regulatory body will still have to develop its own expertise on the matter.

Also in some major decisions of the regulatory body, it is better to have second or third opinions to ensure nuclear safety. The technical support groups may be available in professional technical societies or organizations, academic or universities, consultancy organizations.

It is also advisable to have co-existing advisory bodies on areas such as regulations, radiation protection, reactor operation, radwaste management, environmental concerns, radiological emergencies, medical, etc. These advisory bodies will provide independent recommendations based on their expertise but the regulatory body still maintain its independent decision making.

To fill the gap in expertise among the staff, it is suggested that the regulatory body undergo dynamic training and re-training programs for its staff to update, upgrade, and enhance individual knowledge and expertise. IAEA can provide for this scheme.

5. Relationship to Industry and General Public

One area of concern in the establishment of nuclear power in any country is public acceptance. This issue should be given importance and the regulatory body should encourage discussions

on the pros and cons of nuclear power by concerned organizations. The regulatory body through its advisory bodies should not be biased for nuclear power but should provide technical and scientific explanations on matter, brought by the public. Media channels like print and broadcast and the tri-media should be used for these discussions.

5.1 Relations with Licensees

To maintain the independence of the regulatory body, all activities should be performed with professionalism and proper decorum. Licensee should be treated not as adversary but as another professional Interface should always be in official manner. Personal relationships of the regulatory staff and licensee personnel should be avoided.

All regulations promulgated by the Regulatory Body should be given to the Licensee for compliance. The regulations and standards should be the document to be used by the Regulatory Body in addressing issues and coming with decisions for authorizing the activities of the licensee.

The relationship between the regulatory body and the licensee is based on mutual understanding and respect as well as frank communication, bearing in mind that prime responsibility for safety is assigned to the operator and the primary role of the regulatory body is to ensure that the operator fulfills its responsibilities and commitments for safety.

5.2 Relations to Public

The responsibility for public acceptance of nuclear power plants rests with the Applicant/licensee/operator of the nuclear power plant. The nuclear power plant operator can use the media, both print or broadcast to inform and advertise to the people of the nuclear power plant. This activity should be done prior to the application for a license. The Regulatory Body should distance itself in issuing statements about the nuclear power plants. However, when the operator applies for a license for the construction and operation of a nuclear power plant, the Regulatory Body as part of its mandate/role in licensing the nuclear power plant would issue notices for the conduct of public hearings with concerned individuals or groups or organizations that may feel affected by the construction and operation of the nuclear power plant in their area. This is a good means to feel the pulse of the people about nuclear power plants. However, whatever the outcome of the public hearing, the regulatory body should not be taken with *bias whether against or for* the nuclear power plant.

The IAEA documents published can be used for the purpose of public acceptance.

At this time, PNRI as the lead agency under the Nuclear Power Steering Committee (NPSC) created in May 1995 is conducting public acceptance activities. Some of these activities are: PNRI officials serving as resource persons for students in schools and universities, conduct of training/seminars in radioisotope techniques, radiation protection and safety, industrial, medical uses of radioisotopes, etc. PNRI also issues licenses for the use of radioactive materials, equipment, and facilities.

When the government will decide for the nuclear option earlier than the Philippine Energy Plan in 2021-2025, a law creating an independent regulatory body for nuclear power is needed. The staff of the present Nuclear Regulations, Licensing and Safeguards Division

(NRLSD) will form the personnel complement of the new regulatory body. In this regard, the assistance being provided by the IAEA is very much welcome.

5.3 Others

At this time, the prioritized activity of the PNRI is the rehabilitation and repair of the PRR-1 to put it into operation in 2-3 years. The Acting Director of PNRI had issued a Policy Instruction governing the Safety Regulation and Control of PNRI Operated Nuclear Facilities and Radioactive Materials in August 4, 2000. The policy instruction declares that PNRI is committed to perform its activities in conformance with the IAEA Safety Standards and the Code of PNRI Regulations. The NRLSD was directed to regulate and control the activities in PRR-1 and a clear separation of responsibilities between NRLSD and other units in PNRI was to be maintained and implemented. NRLSD has identified the IAEA Safety Fundamentals, Safety Standards, Safety Guides, and Safety Practices. These documents are being reviewed and evaluated and NRLSD will come out with specific regulations which will govern the licensing of the PRR-1.

Comment to Working Material
Development of Regulating Infrastructure
for a Nuclear Power Programme

received from Dr. Bakri Arbie, Deputy Chairman
National Nuclear Energy Agency (BATAN)

IAEA – 99CT 11085, Vienna 2-3 November, 2000

1. Introduction

In introduction it would be better to include:

- The mission of regulatory body.
- Is the scenario that a country will import NPP from a vendor will always valid? Please provide other scenario.
- The scope mentioned: "Compilation of specific time dependent needs, likely problem to be faced and discussion of the practical solution" is not discussed in depth, need further elaboration.
- The timing for successful nuclear programme should specifically mentioned in strong and more elaborate statement of the consequence for example financial risk to owner of the plant and the nation.

2. Infrastructure Requirement

- "National industry infrastructure" can be added "supported by nuclear research establishment".
- It is not clear: Legal framework for radioactive or nuclear activities and its regulation. Legal framework for radioactive versus nuclear activities should be specified.