

Concept of Technical Support Organization for Nuclear Activities in Indonesia

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Abstract. According to the nuclear energy act No. 10/1997, the promoting and regulating functions of utilization of nuclear energy which are previously conducted by single body so-called BATAN, is separated. The regulating function is conducted by a regulatory body namely BAPETEN, and promoting function in the field of applications of nuclear energy is vested in the promotional body, which is BATAN. On the other hand, for supporting the task of regulatory body, the existence of a technical support organization (TSO) is believed indispensable, especially in case of detailed assessment of technical problems. Conceptual arrangement of technical support system is proposed in this paper. Based on the experiences of developed countries and national conditions, it is proposed that TSO might be independent of both regulatory body and operating organization. That independency is also expected to increase transparency. The embryo of this TSO is resources in BATAN and also in several universities.

Key words: TSO, nuclear energy, regulatory

1. Introduction

In Indonesia, the activities in the field of nuclear science and technology were started by the establishment of National Committee for Investigation of Radioactivity. The main duty of the committee was to assess the impact of radioactive fall out as results of nuclear weapon testing in the pacific region during the year fifties. In the beginning of 1960, one research reactor was built to accelerate the research and development of nuclear science and technology in Indonesia. Then, the committee was changed to Atomic Energy Board. In 1964, the government established National Atomic Energy Agency, so-called BATAN, to replace the Atomic Energy Board by enacting Atomic Energy Act No. 31, year 1964. Based on this act, BATAN is the only agency who is responsible to perform, regulate and control utilization of nuclear energy for public safety, health and welfare. The implication of this act is unification of promoting function and regulating function in one organization.

As the activities in utilization, research and development of nuclear science and technology have been developed from time to time, and also regarding the need of regulating function independency, the new Nuclear Energy Act No. 10/1997 was enacted in 1997 [1]. In this act, it is clearly endorsed the separation of promoting function (including research and development), that is performed by so-called executing organization, and regulating function which is conducted by a regulatory body. Then, in 1998, the government of Indonesia established a regulatory body which is called BAPETEN. At the time of its establishment, the initial main element (i.e. employee and facilities) of BAPETEN came from regulating division of BATAN. On the other hand, based on Presidential Decision No. 103 year 2001 [2], BATAN becomes an executing organization with the main function is to promote the nuclear science and technology through research, development and dissemination of its results.

As the activities developed, the number of object under regulatory control increases, which includes hospitals, industries, research reactors and fuel cycle facilities. The development of the activity might continue with the projection of the introduction of nuclear power plant in the national electricity generation system. As this development challenges the regulatory activities, then the support dealing with the technical aspects is needed, especially when the safety is concerned. At present, there is no one specific organization dealing with such tasks. This paper describes the concept of technical support organization (TSO) in Indonesia and the challenges that might be faced. The concept proposed is based on the current practices and the existing organizational structures, both of the regulatory and operating organization, and also the foreseen development of nuclear energy application in Indonesia.

2. Organizational Structure of Regulatory and Executing Bodies

Nuclear Energy Act No. 10/1997 gives BAPETEN mandate to establish regulation, issue licenses, perform inspection and undertake necessary enforcement in order to ensure the compliance of the nuclear energy operators to safety regulations and requirements [3].

BAPETEN which is an independent regulatory body has responsibility to assure that any activity related to the use of any nuclear energy is obligated to maintain the safety, security, and peace, as well as the health of the workers and the public, and also the protection of the environment. These are administered by:

1. Drafting and establishing nuclear safety regulations
2. Controlling nuclear installations and nuclear materials through licensing and inspection systems that covered all stages of Nuclear Power Plant (NPP) establishment (from site selection to decommissioning stages);
3. Controlling the use of radioactive materials and other radiation sources through licensing and inspection systems.

To perform these tasks, several directorates and centers are established in the BAPETEN's organizational structure as shown in Figure 1.

BATAN is established as the national effort to maximize the benefits of the use of nuclear energy. The activities in BATAN include the research and development of nuclear science and technology and its application for public health and welfare.. In performing its task, BATAN operates several nuclear facilities, including three research reactors, fuel fabrication facility and waste management facility. Beside of the research and development, BATAN has also a function to promote the nuclear science and technology to the public through, for example, dissemination of the research and development results. Figure 2 shows the BATAN's organizational structure.

3. Concept of Technical Support Organization

As shown in the structure organization of BAPETEN, there is two centers under Deputy for Nuclear Safety, Assessment have the responsibility to assess the radiation and nuclear safety, i.e. Center for Regulatory Assessment of Nuclear Installation and Nuclear Materials, and Center for Regulatory Assessment of Radiation Facilities and Radioactive Sources. Their scope of activities is intended to support the main function of BAPETEN comprising development of regulation, licensing and inspection. Their supports concern mainly on providing scientific judgment for technical problem encountered during the performance of its function. Considering their responsibility, these two centers could be considered as an internal TSO. In current practices, due to limitation of its resources and to

obtain the more comprehensive assessment results, those two centers call for external experts coming from various centers in BATAN or from the universities.

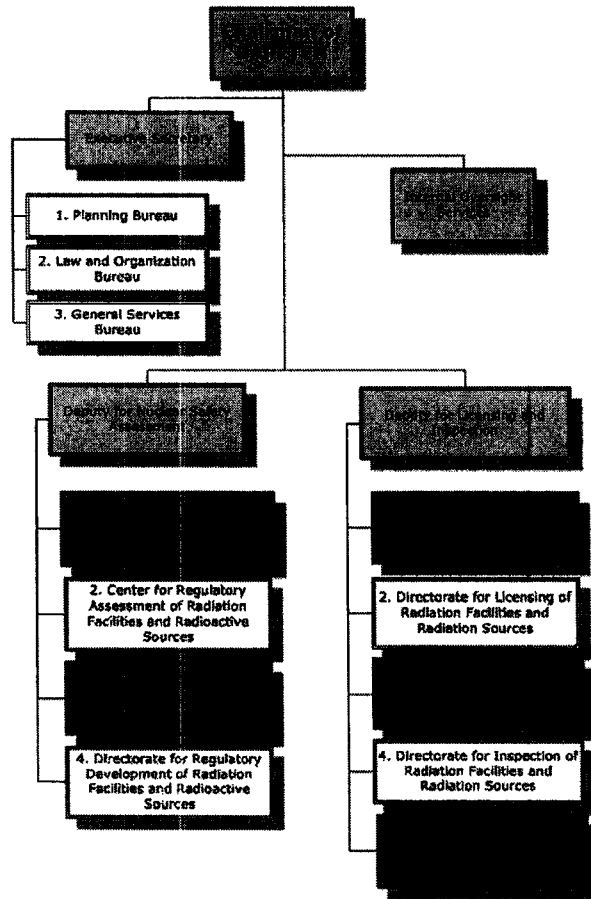


FIG. 1. Organizational structure of BAPETEN [3].

As shown in the organizational structure (see Fig. 2), the R&D activities in BATAN cover the basic and applied researches and also in the engineering and application development. Concerning the nuclear and radiation safety, there are the centers such as PTRKN and PTKMR, respectively. On the other hand, to support the introduction and development of nuclear power, there are several centers such as PPEN, PTRKN, PTBN, PPGN, PTLR and PRPN.

Regarding the use of nuclear energy as an option for primary energy source for electricity, the introduction of NPP in Indonesia is aimed to reach an optimum energy mix considering cost, environment, and to relieve the pressure arising from increasing domestic demand for oil and gas. It is enforced by the Presidential Decree Number 5 year 2006 on National Energy Policy that specifies the share of new and renewable energy, especially: biomass, nuclear, hydro, solar and wind in the national energy mix should reach more than 5% in the year 2025. The optimized energy mix scenario shows that the nuclear energy (from nuclear power plant, NPP) is expected to contribute about 4-5% of national electricity generation, i.e. 4000 MWe approx. The first NPP of 1000 MWe power is assumed could be operated in 2016.

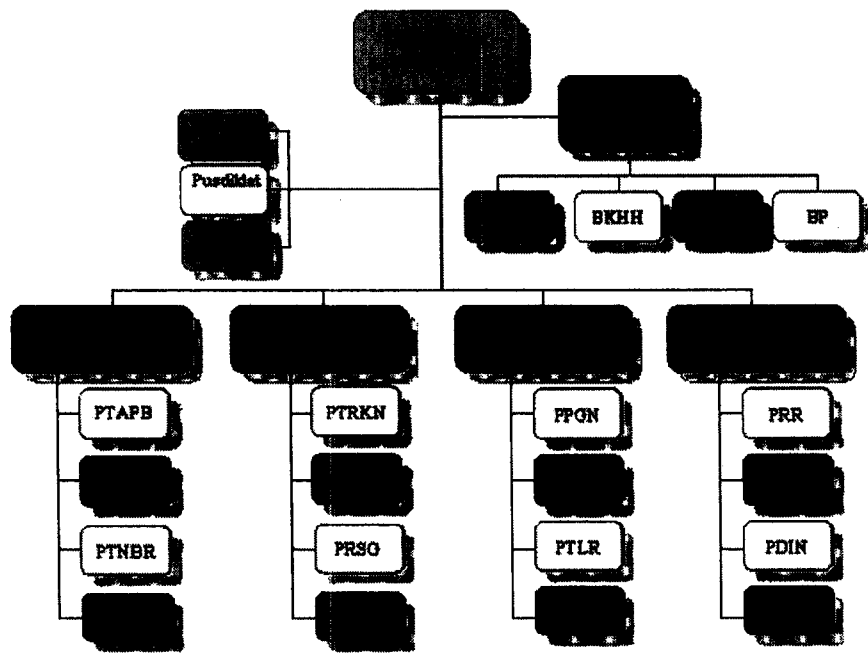


FIG. 2. Organizational structure of BATAN.

Based on Nuclear Energy Act, the development, operation and decommissioning of NPP shall be performed by state company, cooperatives or any other private company, BATAN has been prepared to play a role as a TSO, which will give technical support to both the regulatory body and operating organization. Figure 3 shows the concept of organizations involving in the NPP Project. If the reactor technology and safety is concerned, PTRKN and PPEN could be expected to be major counterparts. As to support the man power needed for the project, several centers in BATAN dealing with research reactors, such as PTAPB, PTNBR, PRSG and Pusdiklat, could support by providing education and training in nuclear engineering fundamental knowledge. On the other hand, it is mentioned in Nuclear Law that BATAN is responsible for fuel cycle activities, and in the organizational structure of BATAN, this activities are leaded by PTBN, PPGN and PTLR.

In the long term, assuming the nuclear activities continue to develop in Indonesia, the establishment of an independent TSO which is separated from both BAPETEN and BATAN should be considered to have a more independent technical support to regulatory body and the utilities. If it should be established, the embryo of this organization could be the resources from BATAN, BAPETEN and also universities. However, to optimize the resources, if the R&D is needed, TSO could still cooperate with BATAN or the universities.

4. Conclusions

The nuclear activities in Indonesia develop from time to time. At present, nuclear regulation is conducted by BAPETEN. To support its regulation function, BAPETEN has internal technical support directorates, only in some cases it calls for support from other institutions, such as BATAN or the universities. In the middle term, to anticipate the introduction of first NPP, BATAN has a role as TSO, both to the utility and BAPETEN. In the long term, when the nuclear activities continue to develop, the establishment of an independent TSO could be considered with the embryo comes from BATAN, BAPETEN and the universities.

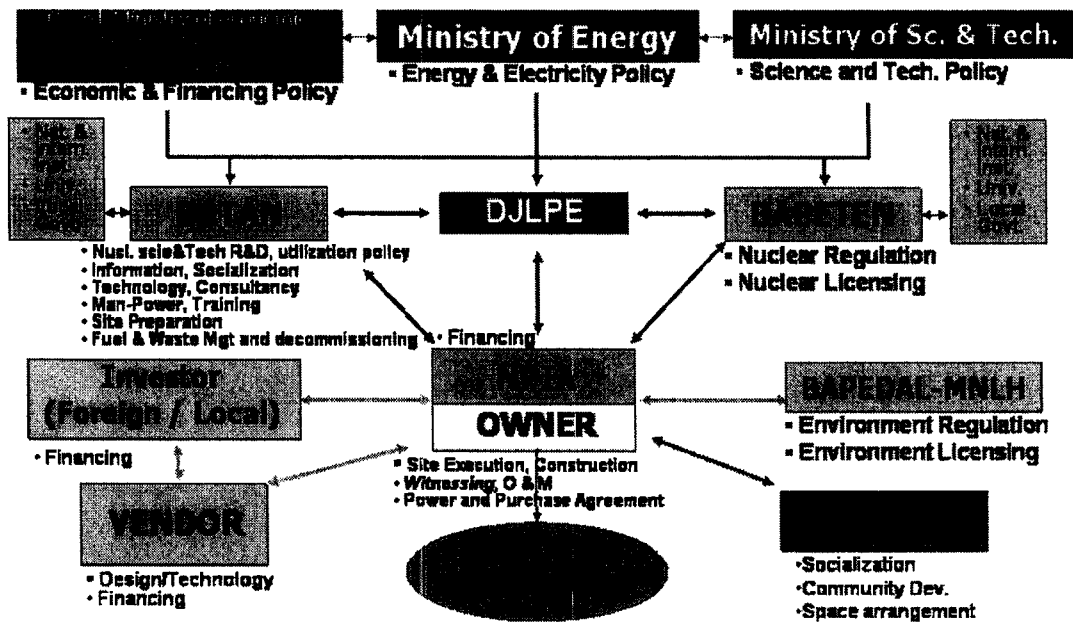


FIG. 3. Proposed NPP Organization.

Abbreviations:

- BAPEDAL : Environmental Impact Controlling Agency
- BKHH : Bureau for Cooperation, Legal and Public Relation
- BP : Bureau for Planning
- BSDM : Bureau for Human Resources
- BU : Bureau for General Affaires
- DJLPE : Directorate-General of Electricity and Energy Utilization
- IPP : Independent Power Producer
- PATIR : Center for Application of Radiation and Isotope Technology
- PDT : Basic Research and Application
- PHLPN : Utilization of R&D Results and Public Information of Nuclear Science and Technology
- PKTN : Center for Nuclear Technology Partnership
- PPEN : Center for Development of Nuclear Energy
- PPGN : Center for Development of Nuclear Geology
- PPIN : Center for Development of Nuclear Informatics
- PRPN : Center for Engineering and Nuclear Components
- PRR : Center for Radioisotope and Radiopharmaceutical
- PRSG : Center for Multi Purpose Reactor
- PSJMN : Center for Standardization and Quality Assurance
- PTAPB : Center for Accelerator and Material Process Technology
- PTBIN : Center for Nuclear Industry Material
- PTBN : Center for Nuclear Fuel Technology
- PTDBNR : Development of Nuclear Fuel Cycle and Engineering
- PTEN : Development of Nuclear Energy and Technology
- PTKMR : Center for Radiation Safety Technology and Metrology
- PTNBR : Center for Nuclear Material and Radiometry

PTLR : Center for Radioactive Waste Technology
PTRKN : Center for Reactor Technology and Nuclear Safety
Pusdiklat : Center for Education and Training

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