

## Establishing the Safety Infrastructure for NPP in Mongolia

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### Introduction

Total energy supply of Mongolia is 5124.08 MWt as of 2012. 92.4% of total energy supply produces with coal, 0.56% with liquid fuel, and 0.01% with renewable energy sources, remained 6% imports from Russia. Mongolia operates seven Thermal Centralized Systems (TCS) with total capacity of 802 MWt, which provides dual; electricity and thermal power [1]. Energy demand in Mongolia is expected to increase, due to the dramatically expanding mining industry. It is absolutely impossible to supply such rapid growth having operated old technology and inefficient production which exists currently in Mongolia. Therefore Mongolian government is interested in utilizing nuclear energy and approved Nuclear Energy Law in 2009 [2]. National Development Strategy (2008-2021) stated as that the peaceful exploitation of the nuclear energy will be an important factor for the sustainable development of Mongolia [3]. Action Plan of the Government for 2008-2012 stated as that ...conduct a comprehensive research for use of nuclear energy, develop technical and economic feasibility study and improve radiation control and safety [4].

International community has developed appropriate approaches in the form of IAEA safety standards, which has a positive experience of regulation and safety. These approaches contribute to the creation of newcomers to nuclear power solid foundation of safety and confidence-building measures at the international level [5]. Egypt, Jordan, UAE, Kazakhstan, Vietnam, Indonesia and Malaysia have been involving in the international program. The IAEA Safety Standard Guide SSG-16 "Establish the Safety Infrastructure for a Nuclear Power Program" provides guidance on the implementation of the requirements of the relevant IAEA standards and as well as identified and recommended that the period of the formation of the safety infrastructure, the sequence necessary for safety operations, responsible government agencies, and major organizations participating [5].

To identify nuclear professional opinions on establishment of nuclear energy, a survey questionnaire on this matter was conducted for the nuclear related organizations in Mongolia. The survey results and analyses were used to establish the basis for developing nuclear safety infrastructure in Mongolia.

### Questionnaire Survey

SSG-16 safety infrastructure is divided into the 20 elements on the level of government, regulator,

operating organization and the content of the actions necessary to the implementation of each element. In table 1 shows questionnaire form used for our survey based on SSG-16.

Table 1. Questionnaire form used for survey

Q1	Is there a national atomic energy policy and strategy in your country? Yes No don't know
Q2	To what extent the following items are defined / regulated by Law on Atomic Energy? Human resource Individual Dosimetry control Verification/certification of dosimeter Environmental monitoring and analysis Management of radioactive waste Plan for radiation emergency preparedness Excellent Good Medium Poor don't know
Q3	How would you assess the current structure and activities of the organization in charge of implementation of the atomic energy policy? Excellent Good Medium Poor don't know
Q4	How well the regulatory environment of nuclear safety is formulated in your country? Excellent Good Medium Poor I don't know
Q5	If a nuclear power plant is to be built in your country, what would be the adequacy of necessary human resources? Sufficient Medium Poor don't know
Q6	Are regulation and/or a mechanism for radiation emergency preparedness in place? Yes No I don't know
Q7	How well the nuclear and radiation control is carried out? Excellent Good Medium Poor don't know
Q8	How independent the nuclear/radiation control agency is? High Medium Low don't know
Q9	How well formulated the regulatory environment for nuclear power and nuclear/radiation control is? Excellent Good Medium Poor don't know
Q10	For future development of the nuclear sector, how should we address/solve the human resource issues? What could be potential cooperation with the vocational training organizations?
Q11	What is the most optimal way for nuclear safety trainings to involve professional agencies and the public? As college/university subjects As training by Nuclear Energy Agency As training sessions As in-house trainings by organizations Other
Q12	What is the appropriate means for accurate information on nuclear power to reach the public? Public relations departments of professional organizations Mass media Internet Other

This is the first survey questionnaire to be completed on nuclear safety infrastructure from the

Mongolian nuclear professionals. Most of the nuclear professionals are youths, and 52% of the survey participants were youths whose ages were between 20 and 30, 24% were person whose ages between 31 and 40, and remaining 24% were person whose ages above 40. Fifty-two percent of participants were male. For working year, 52% of participants were person whose works in the organization less than two years year, 24% were person whose works more than four years. For occupation, 60% of participants were nuclear physics and technologist, 8% were geologist, 12% were chemist and 20% were other occupations.

### **Result**

The most of participants or 88% of all participants answered that Mongolia has national nuclear energy policy, strategy and the nuclear energy law (the law). But the law is only intended to utilization of radioactive mineral. Some staff seems that they don't have enough knowledge and experience on nuclear energy. The most of participants agreed that the law does not cover all necessary items regarding to nuclear energy. Hence the most of participants want to implement the law. For public information, 66% of all participants said that public relations departments of professional organizations can provide accurate information on nuclear power to public. 64% of all participants said that nuclear and radiation control in Mongolia is good carried out. 44% of participants said that independence of regulatory body is medium. 42% of participants said that the regulatory environment for nuclear power and nuclear/radiation control is formulated medium. 32% of all participants said that the regulatory environment for nuclear power and nuclear/radiation control is formulated poor. 56% of all participants said that regulation and mechanism for radiation emergency action plan in place is established well.

### **Suggestion and Conclusion**

Power Energy effective reform or introduction of nuclear reactors should be implemented in coming future to avoid this critical situation faces us. The most participants suggested that Mongolia may cooperate in the field of nuclear safety and infrastructure development with the Republic of Korea. Nuclear Energy Agency of the government of Mongolia has organized Nuclear Power Infrastructure Development (NUPID) training in cooperating with Seoul National University and other organizations in 2008, 2010 and 2012. There is a need to improve the nuclear energy law of Mongolia.

### **REFERENCES**

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