

# Assessing the Effectiveness of Nuclear Regulatory System in India

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## 1. Introduction

The Fukushima accident brought up the issue of regulatory effectiveness in the fore. One of the causes of the accident has been attributed to the problems in effectiveness of the Japanese regulatory system. Regulatory reform is underway in Japan and in other countries many efforts have also been made to improve the effectiveness and independence of the regulatory bodies. It is important that the regulatory bodies make self-assessment of their weaknesses and strengths, to achieve the ultimate regulatory goal of assuring acceptable level of nuclear safety.

In this paper an assessment has been done for the effectiveness of Indian nuclear regulatory system as implemented by the Atomic Energy Regulatory board (AERB). A number of good practices of AERB have been found and some areas have been identified where improvements are necessary.

## 2. Scope

In this study assessment of the effectiveness of AERB was carried out. The Indian nuclear regulatory standards were compared against IAEA standards as the international benchmark for safety. OECD-NEA reports [1] on regulatory effectiveness have been referred for selection of indicators to assess the effectiveness of Indian regulatory system for nuclear power plants. The scope of the work did not cover the areas of fuel cycle activities, waste facilities, radioactive sources (medical and industrial) and decommissioning.

## 3. Regulatory Effectiveness

The operator has prime responsibility for safe operation; however, the actions of the regulator contribute to this objective. A regulator's direct contribution to nuclear safety is difficult to demonstrate. Nevertheless, it is important to provide insights into the regulator's performance in meeting its overall mission and objectives.

As per the IAEA definition, a regulatory body is effective when it ensures that an acceptable level of safety is being maintained by the regulated operating organizations; takes appropriate actions to prevent degradation of safety and to promote safety improvements; performs its regulatory functions in a timely and cost effective manner as well as in a manner that ensures the confidence of the operating

organizations, the general public and the government; and strives for improvements to its performance.

## 4. The Regulatory Effectiveness Indicators

The Regulatory Effectiveness Indicators have been categorized under two main headings - direct and indirect.

### 4.1 Direct Indicators

The direct performance indicators measure the regulator's own activities and tend to use data generated within the regulatory body itself. It verifies that regulatory work was performed in accordance with the regulator's mission, strategy and plans; work is done according to internal quality procedures and policy; measures performance of work; determines the perception of various stakeholders and staff towards regulatory processes; promotes the use of detailed work plans for regulatory activities. Other elements include qualitative assessments of regulatory activities and stakeholder feedback, which give an indication of the quality of regulatory performance [2][3][4].

### 4.2 Indirect Indicators

The indirect performance indicators rely on the performance of other stakeholders, principally the licensees. The indirect indicators [5] are very well developed by the licensees and a lot of data is already available with them. This data had been readily used for the indirect assessment of the regulatory effectiveness.

### 4.3 Development of Performance Indicators

A number of direct performance indicators were developed and used to assess the effectiveness of the Indian regulatory system. The direct performance indicators were divided into five broad headings as per the IAEA definition of the effective regulator as described in section 3. Some of the examples of the indicators which were used for the assessment are listed in the table 1.

Table 1. Categories of Indicators with examples in each category

Cat 1	Ensures that an acceptable level of safety is being maintained by the regulated operating organizations
	Regulations and Guides are published, up-to-date, clear and comprehensive.

	Planned inspections are carried out.
	Safety assessments are carried out.
Cat 2	Develops and maintains adequate level of competence
	The training and professional development of regulatory staff is carried out.
Cat 3	Takes appropriate actions to prevent degradation of safety and to promote safety improvements
	An active programme of safety-related research is developed and implemented.
Cat 4	Performs its regulatory functions in a timely and cost effective manner
	Regulatory obligations with regard to communicating with other stakeholders are in accordance with policy.
	Enforcement actions taken by the regulator are in accordance with policy.
	Timeliness, clarity and openness of regulatory processes and procedures criteria and goals are met.
Cat 5	Strives for continuous improvements in its performance
	Feedback from stakeholders and licensees in the regulatory process is obtained, analysed and utilised on a regular basis.
	The results of regulatory processes are reviewed and evaluated and used to modify the strategic direction.

### 5. Assessment of regulatory effectiveness

The assessment of the regulatory effectiveness of AERB had been carried out as per the indicators developed during the study taking OECD-NEA report as benchmark [1] and per the guidance provided in the IAEA documents [2][3][4]. All the indicators were assessed and the performance of AERB on each indicator was ranked on a scale of one to ten. The AERB standards were taken as reference [6][7] as well as AERB safety reports were reviewed and peer discussions with the AERB staff was carried out for the assessment.

After the assessment of each indicator certain areas were identified where the performance of AERB was satisfactory, also those areas were identified which warranted attention or were in need of improvement.

Among the good practices identified by this study some of them are mentioned below:

- The regulatory body of India has a clear and structured national approach for nuclear safety.
- AERB performs detailed and comprehensive safety assessment of all the nuclear power plants.
- Enforcement actions are taken whenever warranted as per the policy.

Among the areas which need improvements, the major ones are mentioned as follows:

- Development of a management system in the areas of resource management, as well as requiring descriptions of the internal safety culture, and organizational change management.
- Enhancement to the licensing process are needed to clarify and strengthen the safety information in license amendments and assessment reports.
- Enhancement of the public awareness programs and information available to public through the AERB websites and other interfaces.

- Enhancement in the transparency by providing more information about the regulatory activities and programs on the AERB website.
- Development of a mechanism for taking feedback from all the stakeholders to continuously improve the processes so as to provide better satisfaction of the stakeholders.

### 6. Discussions

Use of performance indicators provided a better holistic picture of the work situation, allowed an increased focus on long term matters and provided a basis for adjusting priorities within the work plan and planning system, allowed the identification of poor performance and triggered corrective actions, allowed a more informed allocation of resources with appropriate adjustments in accordance with the mission, allowed more effective communication with internal and external stakeholders, fostered an improved understanding of expectations by internal and external stakeholders, promoted a better focus on regulatory outcomes.

### 7. Conclusion

In this study, the effectiveness of Indian Nuclear Regulatory system was carried out by developing a number of performance indicators based on the IAEA and OECD-NEA documents. After the assessment a number of good practices were identified and recommendations and suggestions that indicate where improvements are necessary or desirable to continue enhancing the effectiveness of regulatory function were made. It is concluded that regulatory effectiveness of the Indian nuclear regulatory system should be further enhanced at various areas. It is also recommended that the IRRS mission of IAEA should be invited to India so as to have better insight into the regulatory practices of India.

### 8. References

- [1] Direct Indicators of Nuclear Regulatory Efficiency and Effectiveness, OECD, 2004
- [2] Effective Nuclear regulatory Systems, Proceedings of an international conference Cape Town, South Africa, December 2009.
- [3] Assessment of regulatory Effectiveness, peer discussions on regulatory effectiveness, IAEA, 1999
- [4] Quality Assurance within Regulatory Bodies, IAEA TECDOC-1090
- [5] IAEA, Tecdoc-1141, Operational safety Indicators for nuclear power plants (2000).
- [6] AERB safety Code "Regulation of Nuclear and Radiation Facilities"
- [7] AERB safety guides on operation under (AERB/SG/O-1 to O-16)