

**REPORT TO THE 46TH REGULAR SESSION
OF THE IAEA GENERAL CONFERENCE
FROM THE 5TH SCIENTIFIC FORUM**

Mr. President

1. The 5th Scientific Forum, organized during the 46th Regular Session of the IAEA General Conference, took place in the Austria Center, Vienna, on 17-18 September 2002, and focused on three topical issues: Nuclear Power – Life Cycle Management; Managing Nuclear Knowledge; and Nuclear Security. Each of the three sessions consisted of presentations by leading experts in the field, followed by panelists' comments and then discussions with participants. Also each session was moderated by a leading expert in the respective field.
2. The discussion on Nuclear Power- Life Cycle Management was devoted to two sub-topics, namely Life Extension of Nuclear Power Plants and Decommissioning. The nuclear industry is, at present, at a crucial juncture, where it has to decide about the future of the first generation of nuclear plants, which are approaching the end of their licensed service life. At the same time, long term experience and new advances have established that it is possible to extend the life of nuclear plants beyond their initially licensed life by another 20-30 years. While some utilities and regulatory bodies have already gone ahead with license renewal or extension, many others are still exploring various possibilities concerning these processes.
3. The session addressed key issues, concerns and trends in the life cycle management of nuclear power plants – from construction to operation and then to decommissioning. Measures to cope with ageing plants, licence renewal, expected growth in electricity demands and the need to find sustainable long term solutions for closed or ageing nuclear facilities were presented, including

examples of experience from FORATOM, Japan, the United Kingdom, the United States, the Russian Federation and Hungary.

4. Life extension is considered to bridge the gap between ageing and new plants and between energy demand and supply. It is technically feasible, economically attractive and able to be regulated successfully. Nuclear power plants are capital intensive and therefore extension of their operating life will provide a very significant financial advantage besides avoiding new generation capacities. The cost of an NPP life extension, according to Russian experience, is around US \$160–200/kW installed capacity, while in the US the process costs 10 – 15 M US\$ per unit, excluding any cost of additional hardware since plant upgrade is not part of the licence renewal process.
5. Information from the European Commission's Green Paper on the Security of Energy Supply and current policy development indicates that the potential growth of the European Union together with the reduction of nuclear energy as plants reach the end of their life would lead to an increase in CO2 emissions by 31 % and a dependency for the enlarged Union on imported energy of 60 %. In the United States, ten licences have been renewed to permit a 60 year operational life; nearly half of the existing plants have submitted licence renewal applications and many more were expected to do so.
6. For decommissioning, it is not efficient or reasonable for each country to develop its own technologies and approaches. The costs of decommissioning are high and may place a heavy burden on national budgets. The most cost effective approach includes the use of proven practices rather than each organization developing new techniques. Decommissioning should be a key consideration in the design of new facilities, which would save much time and effort and reduce the risks of exposure during decommissioning.

7. It is essential to recruit and maintain a strong and highly skilled workforce to ensure secure, safe and economic future licence renewal and plant decommissioning operations. The motivation of this workforce should be a major concern of the facility management. This should ensure that the operational culture of the plant is maintained at a high level as the plant is seen to be reaching the end of its economic life, and plant activities involve restoring the environment rather than creating energy.

8. The IAEA could act as a catalyst to enable the dissemination of experience in licence renewal and decommissioning activities to all Member States. In addition, the IAEA should identify proven practices in licence renewal and procedures that have been demonstrated, to achieve efficient review of applications. The IAEA should produce guidance on the scope of safety and environmental reports in support of licence renewal and on standards and proven practice required to achieve safe and economic operations during decommissioning. The issues arising from this session require further consideration. It is proposed that these issues are presented to SAGNE (Standing Advisory Group on Nuclear Energy), TWG (Technical Working Group) on Plant Life Management and the proposed TGDE (Technical Group on Decommissioning) so that advice can be sought and given on future actions to be taken.

9. The second session of the Forum focused on Managing Nuclear Knowledge and served to re-enforce the view that nuclear knowledge is a timely subject of strategic importance. It is an issue that concerns all Member States that use nuclear technologies for either power or non-power applications. It needs to be addressed to ensure the continued safe use of these technologies.

10. Throughout the discussions, participants, keynote speakers and panellists strongly endorsed the key findings from the meeting of senior officials on Managing Nuclear Knowledge held in June 2002, in particular with regard to:

- the urgency of the problem,
- the clear understanding that all nuclear technology and its innovation relies on nuclear knowledge, and
- the importance of addressing succession planning and preserving knowledge.

11. It was the consensus view that preserving and enhancing nuclear knowledge is a topic on which the Agency is well suited to take a leading role, particularly in terms of promoting Member States' increased awareness of the issues involved, and in facilitating international and regional collaboration. A proposal was made for the Agency to establish, as soon as possible, a working group to address these issues, including giving practical advice on both the programme and its implementation. Also, participants emphasized that this new activity needs to be equipped with sufficient resources and funding, and that extrabudgetary contributions by Member States as well as resources from the Regular Budget would be needed.

12. The moderator of the session noted that a resolution on "Knowledge Management" would be submitted to the General Conference. The very large number of Member States co-sponsoring this resolution in the Committee of the Whole clearly shows the great importance Member States assign to that topic.

13. Problems were identified and possible innovative solutions proposed, including long distance education, clusters and networks and a knowledge management portal. Now, it is time to take action and to give increased attention to knowledge management activities in the Agency, notably in terms of funding and resource allocation.

14. In the session on Nuclear Security, the keynote speakers spoke on issues related to risk assessment, the control of radioactive sources and new approaches to protecting nuclear material and facilities. It was noted that security was not a new concern for the nuclear industry, which had long considered the threat of theft of [special] nuclear material and sabotage. Extensive measures had already been taken in the field of physical protection. Furthermore, nuclear power plants have the strongest defensive capabilities to be found in the commercial world: the result of inherent defensive capabilities arising from designs to withstand extreme events. Nonetheless, further measures are needed to improve security measures, to identify and mitigate vulnerabilities, and to refine the assessment of potential threats.
15. Identifying and evaluating potential threats and the consequent assessment of risks have an added impetus since the events of last September. Preventative measures result from an assessment of the threat and risk. To these could be added precautionary measures, which address the consequences of an event without being able to fully assess the risk that it will occur. Security assessment is not like establishing a safety case, which could rely on redundancy and sound scientific knowledge, separation and diversification, and identification of common mode failures.
16. It was noted that there was a distinction to be made between threats which should be addressed by the State; (e.g. aircraft hijacking, or attacks significant military capabilities), and those which are facility related; (e.g. a direct assault on a nuclear plant by a small group), which would be the subject of the Design Basis Threat and are the responsibility of the operator. The boundary between the two is not clear and must be clarified.

17. The session also considered the competing interests of maintaining public access to information with the need to protect information. But confidentiality must also be maintained to avoid providing assistance to an attacker.
18. On the issue of radiological sources and their potential to be used in radiological dispersion devices (RDDs or ‘dirty bombs’) the session considered the risks and consequences. The difficulties in Kazakhstan of identifying and controlling radioactive sources provided a case study in the problems of other States, which found themselves in a similar position. The issues are lack of effective controls, lack of detection equipment, imperfect application of established procedures, and lack of appropriate intergovernmental agreements. The solutions included enhanced accountancy and legislative framework for radiation sources, increased physical protection of sources, improved international co-operation on combating illicit trafficking and better response measures. The session recognized a need to establish ‘cradle-to-grave’ control of radiological sources and that the issue of orphan sources could be solved by ensuring that there was an appropriate ‘grave’ for sources which had outlived their usefulness.
19. Ideas for enhancing physical protection measures on both a regional and a global scale were proposed. The former included establishing regional networks to exchange information and experience among States. The latter included establishing a list of priorities, which would include revising INFCIRC/225 and developing new security recommendations, along the same lines, for the protection of radiological sources. Such sources are covered by safety guidance but not security guidance covering physical protection. The session recognized the threat of terrorist use of RDDs and the priority of establishing security measures applicable to the radiological sources, which offered the greatest threat. The session also noted a proposal for an International Conference to discuss the threat posed by the potential misuse of radiological materials. Facilities in need of enhanced protection might also be prioritised; assistance may be available

under the G8 initiative. Other ideas included creating a multilateral security co-operation system, which intended to facilitate the exchange of information, measures to improve co-operation among nuclear regulators, security forces and intelligence agencies, tagging and tracking the movement of radioactive sources and financial incentives for operators to improve physical protection measures at nuclear facilities.

20. The 5th Scientific Forum addressed three key issues for the nuclear community. In order to ensure the security of nuclear materials, it is necessary to continue safe and economic nuclear operations with the retained knowledge for the future. Proposals have been made for several actions by the Agency and these are commended to you.