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CNS-RM-2002/02

## **Convention on Nuclear Safety**

**Second Review Meeting of the Contracting Parties 15-26 April 2002**  
**Vienna, Austria**

### **SUMMARY REPORT**

#### **General background**

1. As of 15 April 2002, fifty-three States and one regional organization of an integration or other nature had ratified the Convention on Nuclear Safety, which had entered into force on 24 October 1996. The new Contracting Parties to the Convention since the first Review Meeting in 1999 are Cyprus, Sri Lanka, the United States of America and the European Atomic Energy Community (EURATOM). Indonesia will become a Contracting Party on 11 July 2002. The second Review Meeting pursuant to Article 20 of the Convention was held at the Headquarters of the International Atomic Energy Agency (IAEA), being the Secretariat under the Convention, from 15 to 26 April 2002. The President of the Review Meeting was Mr. Miroslav Gregorič, the Director of the Slovenian Nuclear Safety Authority (SNSA).
2. Forty-six Contracting Parties participated at the Review Meeting, namely: Argentina; Armenia; Australia; Austria; Belarus; Belgium; Brazil; Bulgaria; Canada; Chile; China; Croatia; Cyprus; Czech Republic; Denmark; Finland; France; Germany; Greece; Hungary; Ireland; Italy; Japan; Korea, Republic of; Latvia; Lithuania; Luxembourg; Mexico; the Netherlands; Norway; Pakistan; Peru; Poland; Romania; Russian Federation; Slovakia; Slovenia; South Africa; Spain; Sweden; Switzerland; Turkey; Ukraine; the United Kingdom; the United States of America; and EURATOM. Indonesia ratified the Convention on 12 April 2002 and thus could not participate as a full Contracting Party at this Review Meeting. However, in accordance with Section IV of the Guidelines regarding the Review Process, Indonesia was invited to attend the final plenary sessions at the Review Meeting. The Nuclear Energy Agency of the Organisation for Economic Cooperation and Development was invited to attend as an observer. The large number of participants - over 400 compared to 150 at the first Review Meeting - clearly indicates the very great interest in and special importance attached to the Convention by Contracting Parties.
3. Six months before the Review Meeting, Contracting Parties submitted National Reports on steps and measures taken to implement Convention obligations. In the

A/2

following months the Contracting Parties reviewed each other's reports, and exchanged written questions and comments. At the Organizational Meeting, held in September 2001, Contracting Parties organized themselves into six Country Groups, each group including countries with nuclear power programmes of different sizes, as well as countries not having nuclear power reactors. The Country Groups met for five days and discussed in depth each National Report, with each Contracting Party receiving answers to the questions they had put. These answers provided additional information on the steps and measures taken in each country.

4. Six Contracting Parties, namely Bangladesh, Lebanon, Mali, the Republic of Moldova, Singapore and Sri Lanka, did not comply with the basic obligations of the Convention to submit a National Report and attend the Review Meeting, while Portugal submitted a National Report but did not attend the Meeting. A number of Contracting Parties submitted their reports later than the deadline, and in a few cases the submissions were too late to allow the preparation of written questions by other Contracting Parties. Some Contracting Parties did not attend the full Review Meeting.
5. At the time of the second Review Meeting, from a total of 448 power reactors worldwide, the Contracting Parties represented 428. Since the first Review Meeting four power reactors had been permanently shut down and nine new power reactors had reached first criticality in the Contracting Parties.
6. In the light of the events of 11 September 2001, the issue of assuring the security of nuclear installations from terrorist attacks was a matter of significant concern to Contracting Parties. However, noting that security and physical protection matters do not lie within the scope of the Convention, and that the sensitivity of information related to the issue would make it difficult to conduct meaningful discussion in this forum, the Review Meeting decided that consideration of this issue be excluded from the scope of the Country Group sessions. Contracting Parties were encouraged to address this issue in other appropriate international fora and in bilateral consultations.
7. Since the last Review Meeting, there have been a number of internal and external changes in the world nuclear industry which have the potential to affect nuclear safety. These developments confirm the value of holding a Review Meeting every three years to permit timely assessment of the impact of such changes on the implementation of the Convention's provisions on nuclear safety.

#### **Observations on the achievement of the general objectives of the review process**

8. The Contracting Parties recalled that the main purpose of the Review Meeting was to review the nuclear safety status of each Contracting Party, focusing on the steps and measures already taken and in progress to implement the obligations as stipulated in Chapter 2 of the Convention. The primary objective of the Convention

is to achieve and maintain a high level of nuclear safety worldwide, through the enhancement of national measures and international co-operation.

9. The Contracting Parties noted that it was not their task in this review process to review the safety of individual nuclear installations. The Contracting Parties also noted that they had to rely on the accuracy and completeness of the information provided by each Contracting Party in its National Report and in its answers to the questions asked of it. Additional clarification was provided by the Contracting Parties on issues raised during the meeting. Specific clarification was offered on certain issues identified by Contracting Parties during the First Review Meeting.
10. The Contracting Parties noted that adherence to this Convention entails two basic commitments by each Contracting Party:
  - To prepare and make available a National Report for review; and
  - To subject its National Report to a peer review by the other Contracting Parties.

Thus, being a Contracting Party to this Convention implies:

- Including in the National Report a self-assessment of steps and measures already taken and in progress to implement the Convention obligations;
  - Taking an active part in an open and transparent review of its National Report and the Reports of other Contracting Parties; and
  - A commitment to a continuous learning and improving process, something which is a key element of a strong safety culture.
11. The Contracting Parties noted that, as a consequence of the incentive character of the Convention, an important objective of the review process would be to observe and take note of successive improvements, where appropriate, in the implementation of Convention obligations. Clear improvement in the review process was observed, as demonstrated by the quality of National Reports, the number of Contracting Parties posing written questions, the number of countries participating in other Country Group sessions, the number of questions received (which showed a threefold increase compared to the first Review Meeting), the increased scope of questions and the provision of written responses by all Contracting Parties to the questions asked.
  12. The Contracting Parties observed that the National Reports submitted were in most cases of high quality and provided ample information on steps and measures taken and in progress to implement the obligations stipulated in Chapter 2 of the Convention. However, it was observed that some Contracting Parties did not clearly identify the actual changes that had taken place in response to the issues identified at the first Review Meeting. This led to extended discussion in some Country Groups sessions.

13. All questions asked by Contracting Parties in the review process were addressed by the respondent Parties and written answers were provided to written questions. The discussions in the Country Group sessions and the Plenary sessions were open and constructive, illuminating issues of special interest, providing additional insights with regard to national safety programmes, and generally demonstrating the strong commitment of each participating Contracting Party to the review process under the Convention and to the safety objectives of the Convention.
14. The Contracting Parties noted that the reports, questions and answers exchanged in connection with this Meeting provided them with a unique worldwide overview of the status of nuclear safety in forty-six Contracting Parties.
15. The Contracting Parties noted that the Convention and the Review Meeting had also proved to be of value to Contracting Parties without nuclear power reactors, for reasons such as having reactors near their borders, or planning a nuclear programme, or operating research reactors, or for emergency planning purposes. Although research reactors are not covered by the Convention, some Contracting Parties gave information on the status of and arrangements for the safe operation of their research reactors.
16. As a final general observation, the Contracting Parties noted with satisfaction that their second Review Meeting provided strong evidence that a main objective of this incentive Convention is being achieved; namely that the self-assessment process, starting with ratifying the Convention and preparing National Reports and taking into account the results of the first Review Meeting, had initiated steps and measures by many Contracting Parties to improve implementation of their obligations and to further enhance nuclear safety.

### **Observations on factors of special interest**

17. Contracting Parties took note of trends in several countries with regard to factors and circumstances external to nuclear safety as such, but which nevertheless, may have an impact on nuclear safety. Such factors included:
  - Deregulation of electricity markets and changes of ownership; and
  - Changes in markets affecting the nuclear industry and changing priorities in university research in several regions of the world, with consequent effects on the availability of competence in nuclear science and technology.
18. It was noted that in situations where a nuclear power plant is scheduled to shut down in a few years time, appropriate measures have to be taken by, and resources provided to, both the operator and the regulator to ensure operational safety until closure. Practical experience in handling such situations was presented by some Contracting Parties, and Contracting Parties were invited to report on the evolution of such situations at the next Review Meeting.

### **Observations on the legislative and regulatory framework (Articles 4, 7 and 9)**

19. The legislative framework is well established in most countries. Since the first Review Meeting new legislation has been adopted or existing legislation improved in several Contracting Parties in line with the provisions of the Convention. In general, new legislative frameworks are aimed at improving the "de jure" independence of the regulatory body. Examples of areas to which increased attention was paid in new legislation are: establishing an independent regulatory body; emergency preparedness; decommissioning; and radiation protection provisions consistent with the International Commission on Radiological Protection's 1990 Recommendations (ICRP 60) and the International Basic Safety Standards published by the IAEA (BSS).
20. It was also reported that several Contracting Parties are in the process of adopting new legislation and regulations, some of them with the assistance of the IAEA services. Some Contracting Parties also have yet to update their regulations to take account of recent developments such as the recommendations of ICRP 60 and the BSS. However, in some Contracting Parties, legislation and regulations required by the Convention have not yet been promulgated. Contracting Parties were invited to provide further information in their next National Reports on development of new, or changes in, legislative and regulatory frameworks.
21. Several Contracting Countries reported that the IAEA safety standards provided good bases for preparing national regulations.

### **Observations on the regulatory body (Article 8)**

22. Since the first Review Meeting, several Contracting Parties have restructured their regulatory body to more closely meet the requirements of the Convention. It was observed that several regulatory bodies had been given increased responsibilities, covering the areas of radiation safety and waste safety as well as nuclear safety.
23. Some Contracting Parties explained the use of technical support organizations (TSOs) to perform some assessment tasks on behalf of the regulatory body. In this respect, some Contracting Parties reported that their regulatory bodies do not have TSOs of their own. In these cases, a point of interest which is to be reported on at the next Review Meeting is how such regulatory bodies obtain adequate expertise without conflict of interest.
24. It was reported that modernization programmes helped in maintaining and increasing staff competence and motivation. Several Contracting Parties reported on the issue of maintaining competence of the regulatory body in the light of competitive job markets and the retirement of competent staff. This issue is even more important in cases where nuclear energy programmes are stagnating or

declining. Contracting Parties were invited to provide further information in their next National Reports on maintaining competence and motivation of staff needed for safe regulation and operation of nuclear installation.

25. For some Contracting Parties questions as to the effective independence and administrative position of their Regulatory Bodies are still relevant. The effective independence of regulatory bodies is considered an essential element in nuclear safety. Generally, the regulatory bodies of Contracting Parties appeared to act in a clearly independent way in a “de facto” sense, relying on well established management policies. Clear improvements have been reported in legal and regulatory infrastructures. Nevertheless it was noted that in several cases it would be desirable to further improve the “de jure” and “de facto” independence of the regulatory body. Further information would be welcome on the independence achieved, “de facto” and “de jure”.
26. The status and position of regulatory bodies remains an important topic to be dealt with in future National Reports and Review Meetings. Although improvement was reported in the human and financial resources of regulatory bodies, further attention should be given to this issue. This focus is especially needed in those countries where the salaries that the regulatory body can offer its staff are low compared to the salaries offered to staff of equivalent levels in the industry.
27. Contracting Parties reported on their national regulatory strategies. Some Contracting Parties reported on using probabilistic safety assessment (PSA) as an additional tool in optimizing their regulatory or inspection activities and some reported on their use of different performance indicators, whether they be quantitative or qualitative, to monitor the safety of their nuclear installations. The advantages and limitations of regulations of a detailed prescriptive nature as compared to less prescriptive, goal oriented approaches and the complementary use of risk assessments were discussed. Contracting Parties agreed to review their experience and report at the next Review Meeting.
28. It was reported that some governments have decided to shut down plants which are operated according to current regulatory requirements, before the end of their planned operating lifetime.
29. Some Contracting Parties are faced with the challenge of regulating nuclear installations of several designs.
30. Some Contracting Parties reported on the challenges associated with licensing new reactor concepts. Contracting Parties would welcome further information at future Review Meetings on the implementation of Article 18 of the Convention (addressing design principles) with respect to new reactor concepts.
31. The importance of international co-operation between regulatory bodies for the enhancement of nuclear safety through bilateral and multilateral mechanisms was

emphasized by all Contracting Parties. Several such new bilateral agreements were concluded between Contracting Parties in the reporting period, and many international peer reviews, such as IAEA safety missions and review services and missions conducted in view of the European Union enlargement process, have been performed. Contracting Parties were invited to provide further information in their next National Reports on international co-operation on a bilateral and multilateral basis among regulatory bodies.

32. International peer reviews were considered to be effective tools for supporting regulatory improvement programmes. Several Contracting Parties found International Regulatory Review Team missions of the IAEA particularly useful in enhancing the effectiveness of their regulatory body. The importance of international co-operation was emphasized as a way of sharing common experiences and exchanging information. Regulatory bodies in countries having nuclear programmes of limited size found international co-operation particularly beneficial. International co-operation will also enable regulatory bodies to decide, when considered useful, whether and how to contract technical support from foreign organizations. Contracting Parties would welcome additional information in the next National Reports regarding maintaining and enhancing the competence of regulatory bodies.
33. It was noted that there is a trend towards implementation of quality management systems in regulatory bodies. Contracting Parties would welcome further information on this topic at future Review Meetings.
34. Although this subject is formally outside the scope of the Convention, some Contracting Parties emphasized how a clear, open and proactive policy of providing information to the public on regulatory requirements, decisions and opinions contributes to the establishment of an independent, competent and credible regulatory body. In this respect, several Contracting Parties reported on providing such information including National Reports and answers to questions from Review Meetings and summaries inspection reports to the public as a sign of improving openness and transparency.

## **Observations on the safety of nuclear installations**

### **Operating nuclear installations (Articles 6, 10, 12, 13 and 19)**

35. Many Contracting Parties have carried out or are carrying out detailed safety assessments of their existing nuclear power plants, and upgrading programmes if needed, particularly for older plants designed and constructed to earlier standards. There is a trend towards increased use of periodic safety review (PSR) for such purposes as licence renewal, ageing management and plant life extension. In some Contracting Parties, nuclear power plants are backfitted to meet the current standards applied in the country of origin or to internationally defined reference levels. Operating licences for some older units were issued based on new safety

analysis reports. However, some nuclear installations still do not have a fully updated safety analysis report that has been reviewed by the regulatory body.

36. Detailed safety assessments have been used to identify safety upgrades which improve the safety of the installations. PSA has been used by many Contracting Parties as an additional tool to identify safety upgrades, and in some cases to prioritize them.
37. Substantial safety upgrade programmes have been completed in many Contracting Parties. In several cases, the safety improvements brought the plants into line with appropriate safety standards. However, some nuclear installations are still expected to implement the planned safety improvements with a firm schedule as approved by the regulatory body. In several Contracting Parties, seismic re-evaluation and upgrading has been completed or is in progress.
38. Several Contracting Parties reported on important events that occurred in their nuclear installations since the first Review Meeting, and the resulting lessons shared with other Contracting Parties. It was noted that a large contributor to these events was related to human performance and organizational issues. Contracting Parties were invited to provide further information in their next National Reports on important events in their nuclear installations.
39. Contracting Parties emphasized the importance of an active, forward-looking safety management for maintaining and improving safety at their nuclear installations, as well as for improving safety culture. Various approaches to monitoring the quality of safety management and safety culture were discussed.
40. In several Contracting Parties, improvements in the area of containment capability and tightness were reported. Nevertheless, several Contracting Parties have significant safety improvements still to be implemented in this area.
41. It was noted that safety reviews are being conducted by regulatory bodies in response to plant life extensions which are being considered in several Contracting Parties. Contracting Parties would welcome additional information in the next National Reports regarding the content of safety review processes for plant life extension and conclusions of the review(s).
42. Measures for severe accident management are in various stages of development and implementation in many Contracting Parties. It was noted that different approaches are used, e.g. with regard to improving the capability of the containment to cope with severe accidents. Further information on the details and actual experience with these different approaches would be welcomed in the next National Reports.
43. Several Contracting Parties reported completion of the construction and licensing of new spent fuel storage facilities.



44. Further and more detailed information on the status of safety improvement programmes would be welcomed in the next National Reports.

**Financial and human resources - national infrastructure (Article 11)**

45. It was noted that a sound economic basis for the nuclear utility owning and operating the plant is a prerequisite for financing an effective safety programme. In the present changing energy market in many countries, it is important that utility managers as well as regulatory bodies understand the potential effects on safety of severe financial constraints.
46. Industry funding now appears to have stabilized in all but a few Contracting Parties. Most Contracting Parties now also had adequate provisions in place for financing safety improvement programmes while some indicated that difficulties remained in obtaining the required financial resources.
47. There is a continuing trend towards increased use of simulator training, commissioning of new plant specific simulators, implementation of new operating procedures, including symptom based procedures, and guidelines for severe accident management.
48. Several Contracting Parties reported on the status of their decommissioning funds or on the establishment of such funds since the first Review Meeting. These funds in most cases are financed through fees taken from sales of electricity.

**Assessment and verification of safety (Articles 14, 17 and 18)**

49. In most countries periodic safety reviews (PSRs) are conducted on a regular basis, ten years being a typical interval. PSRs often include re-evaluation of the site characteristics, seismic re-evaluation, consideration of other external factors and ageing management programmes, in addition to the usual update of the safety analysis, evaluation of the plant against current safety standards and review of operating experience.
50. Probabilistic safety assessment (PSA) is used by most Contracting Parties with nuclear installations for identification of areas of potential improvement in the design, plant upgrading or regulatory effectiveness. Many Contracting Parties reported on the results of plant specific level 1 PSAs including internal and external events. Some PSAs for low power and shutdown modes and level 2 PSAs were also reported. Contracting Parties were invited to provide further information in their next National Reports on their use of PSA.
51. External peer reviews of operational performance (IAEA, World Association of Nuclear Operators, etc.) are widely used and the implementation of their recommendations is in some cases monitored by the regulatory body.

52. There is a wider use of safety performance indicators by industry and by regulatory bodies.
53. Decommissioning plans are under development in several Contracting Parties and some Contracting Parties reported on the regulatory review and approval of decommissioning plans.

**Radiation protection (Article 15 and 19 (viii))**

54. The ALARA principle (As Low As Reasonably Achievable) is applied by all Contracting Parties with regard to occupational doses and releases to the environment. New laws covering radiation protection have been introduced by many Contracting Parties. The recommendations of ICRP 60 and the International BSS are already applied or are planned to be applied by Contracting Parties. However, full implementation of these recommendations is not complete in some countries and seems to be taking longer than is desirable. Data provided by Contracting Parties show a general reduction in the collective doses and in releases to the environment. Some Contracting Parties reported relatively high occupational doses, many of which were connected with extensive backfits to older plants.
55. Clear improvement was reported in the safety of on-site radioactive waste management.
56. Some Contracting Parties announced that they are currently reviewing their regulatory limits for radioactive discharges, now also addressing chemical discharges, with a view to reducing them. Other Contracting Parties expressed the view that ALARA objectives can be achieved without reducing the regulatory limits.
57. Contracting Parties would welcome an update on the evolution of trends in occupational doses and releases to the environment and on exchange of online monitoring data in the next National Reports.

**Observations on emergency preparedness (Article 16 and 17 (iv))**

58. Integrated emergency response plans are in place in all Contracting Parties with a nuclear power programme. Response plans are tested with varying frequencies. International exercises are performed on a regular basis. Several Contracting Parties reported on clear progress achieved in the area of emergency preparedness since the first Review Meeting, including measures for informing the public, establishment or upgrading of crisis centres, establishment of intervention levels, emergency planning zones, early warning systems and ways of distributing stable iodine.
59. For several Contracting Parties without nuclear installations, the main focus of reporting was on emergency planning and on channels of communication with neighbouring countries operating nuclear installations and on active participation in

international emergency exercises. Many of these countries have also developed extensive monitoring and response capabilities.

60. Several bilateral agreements and arrangements with neighbouring countries regarding emergency preparedness were concluded during the reporting period. Such agreements or arrangements would be welcomed in those cases where nuclear installations are located in the vicinity of national borders and such a mechanism is not already in place.
61. In the next National Reports, information would be welcomed on improvements made in the area of emergency preparedness, including the results of national and international exercises.

### **Final conclusions and recommendations**

62. The Contracting Parties concluded that the review process - starting with the self-assessment involved in producing the National Reports, followed by the review of National Reports by other Contracting Parties, with exchange of questions, comments and answers, and finally the open discussions at the Review Meeting - had proven to be of great value to the enhancement of nuclear safety worldwide. The review process demonstrated the value of the comprehensive exchange of nuclear safety information between peers.
63. As described earlier in this report, the Contracting Parties concluded that the review process had demonstrated the strong commitment by all to the objectives of the Convention. Significant progress had been observed since the first Review Meeting in the areas of legislation, regulatory independence, financial resources for regulatory bodies and operators of nuclear installations, implementation of safety improvements in installations built to earlier safety standards, and emergency preparedness.
64. Commitments have been made by Contracting Parties to complete the important safety improvements identified in the review process as planned. As described earlier in this report, other areas that warrant special attention include: safety management and safety culture; plant ageing and upgrading; maintaining competence; and effectiveness of regulatory practices. Even though additional steps are required in order to reach the principal objective of the Convention - to achieve and maintain a high level of safety at all nuclear installations - it is nevertheless noted that all Contracting Parties participating in the Review Meeting are taking steps in the right direction, and that the review process of the Review Meeting has provided valuable guidance in that respect.
65. A number of nuclear installations are in operation or under construction in States that are not Contracting Parties to the Convention. Recognizing the value of the

review process under the Convention, the Contracting Parties encouraged such States to join the Convention as soon as possible.

66. The Contracting Parties agreed that the timely submission of the National Reports and of questions and answers on these reports was a key element in the success of the Review Meeting process. Contracting Parties are urged to comply with the agreed dates identified in respect of the third Review Meeting. The Contracting Parties are urged to take the appropriate steps to fully take part in further Review Meetings.
67. Finally, the Contracting Parties reconfirmed their commitment to the objectives and obligations of the Convention, and their commitment to make all reasonable efforts to provide the additional information called for in the next National Reports.

Miroslav Gregorič  
President