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**NEA/CNRA/R(2000)2**



Organisation de Coopération et de Développement Economiques  
Organisation for Economic Co-operation and Development

**OLIS : 10-Apr-2000**  
**Dist. : 12-Apr-2000**

**English text only**

PARIS

**NUCLEAR ENERGY AGENCY  
COMMITTEE ON NUCLEAR REGULATORY ACTIVITIES**

**NEA/CNRA/R(2000)2  
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**WORKING GROUP ON INSPECTION PRACTICES (WGIP)**

**COMMENDABLE PRACTICES FOR REGULATORY INSPECTION ACTIVITIES**

**89833**

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## ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

Pursuant to Article 1 of the Convention signed in Paris on 14th December 1960, and which came into force on 30th September 1961, the Organisation for Economic Co-operation and Development (OECD) shall promote policies designed:

- to achieve the highest sustainable economic growth and employment and a rising standard of living in Member countries, while maintaining financial stability, and thus to contribute to the development of the world economy;
- to contribute to sound economic expansion in Member as well as non-member countries in the process of economic development; and
- to contribute to the expansion of world trade on a multilateral, non-discriminatory basis in accordance with international obligations.

The original Member countries of the OECD are Austria, Belgium, Canada, Denmark, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The following countries became Members subsequently through accession at the dates indicated hereafter: Japan (28th April 1964), Finland (28th January 1969), Australia (7th June 1971), New Zealand (29th May 1973), Mexico (18th May 1994), the Czech Republic (21st December 1995), Hungary (7th May 1996), Poland (22nd November 1996) and the Republic of Korea (12th December 1996). The Commission of the European Communities takes part in the work of the OECD (Article 13 of the OECD Convention).

## NUCLEAR ENERGY AGENCY

The OECD Nuclear Energy Agency (NEA) was established on 1st February 1958 under the name of the OEEC European Nuclear Energy Agency. It received its present designation on 20th April 1972, when Japan became its first non-European full Member. NEA membership today consists of 27 OECD Member countries: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Luxembourg, Mexico, the Netherlands, Norway, Portugal, Republic of Korea, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The Commission of the European Communities also takes part in the work of the Agency.

The mission of the NEA is:

- to assist its Member countries in maintaining and further developing, through international co-operation, the scientific, technological and legal bases required for a safe, environmentally friendly and economical use of nuclear energy for peaceful purposes, as well as
- to provide authoritative assessments and to forge common understandings on key issues, as input to government decisions on nuclear energy policy and to broader OECD policy analyses in areas such as energy and sustainable development.

Specific areas of competence of the NEA include safety and regulation of nuclear activities, radioactive waste management, radiological protection, nuclear science, economic and technical analyses of the nuclear fuel cycle, nuclear law and liability, and public information. The NEA Data Bank provides nuclear data and computer program services for participating countries.

In these and related tasks, the NEA works in close collaboration with the International Atomic Energy Agency in Vienna, with which it has a Co-operation Agreement, as well as with other international organisations in the nuclear field.

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## **COMMITTEE ON NUCLEAR REGULATORY ACTIVITIES**

The Committee on Nuclear Regulatory Activities (CNRA) of the OECD Nuclear Energy Agency (NEA) is an international committee made up primarily of senior nuclear regulators. It was set up in 1989 as a forum for the exchange of information and experience among regulatory organisations and for the review of developments which could affect regulatory requirements.

The Committee is responsible for the programme of the NEA, concerning the regulation, licensing and inspection of nuclear installations. The Committee reviews developments which could affect regulatory requirements with the objective of providing members with an understanding of the motivation for new regulatory requirements under consideration and an opportunity to offer suggestions that might improve them or avoid disparities among Member Countries. In particular, the Committee reviews current practices and operating experience.

The Committee focuses primarily on power reactors and other nuclear installations currently being built and operated. It also may consider the regulatory implications of new designs of power reactors and other types of nuclear installations.

In implementing its programme, CNRA establishes co-operative mechanisms with NEA's Committee on the Safety of Nuclear Installations (CSNI), responsible for co-ordinating the activities of the Agency concerning the technical aspects of design, construction and operation of nuclear installations insofar as they affect the safety of such installations. It also co-operates with NEA's Committee on Radiation Protection and Public Health (CRPPH) and NEA's Radioactive Waste Management Committee (RWMC) on matters of common interest.

## **FOREWORD**

These commendable practices are extracts from the topics, which were discussed by WGIP and were thought to be reference for Member countries. These are neither international standards nor guidelines. Each country should determine inspection practices, considering its own historical, social and cultural backgrounds, and the commendable practices can be useful reference when each country improves its inspection practices.

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## **Regulatory Inspection Practices on Fuel Element and Core Lay-out at NPPs**

Ref.: Report published as NEA/CNRA/R(97)4, February 1998

### **COMMENDABLE PRACTICES FOR REGULATORY INSPECTION ACTIVITIES RELATED TO FUEL ELEMENT AND CORE LAY-OUT AT NPPS**

The following commendable practices are derived from the evaluation of the individual countries' inspection programmes covering the essential safety considerations within regulatory inspection of fuel elements and core layout.

1. **Quality Assurance of nuclear fuel**  
The regulatory inspection authority inspects the licensee's programme on quality assurance for fabrication of new fuel.
2. **Composition of core**  
For fuelling operations carried out while the reactors are shutdown, the regulatory inspection authority inspects and reviews the licensee's calculation of the safety parameters of the planned new core composition. As a minimum, reviews are performed before the start up of the reactor for the next operation cycle after major fuel exchange and reload.
3. **Verification of core properties**  
The regulatory inspection authority inspects the required licensee's tests and physical measurements relevant to safety. These tests are performed before and during start up and during operation to verify the calculated core properties and the safety margins.
4. **Operation regime for fuel defects**  
The regulatory inspection authority agrees with the licensee on safety margins and requirements to continue operating the reactor if fuel defects occur. Reloading of fuel known to be leaking is not recommended or should be strictly limited.
5. **Inspection of fuel after unloading**  
The regulatory inspection authority inspects the licensee's programme to inspect used fuel after unloading and reviews the results.

## **Inspection of Licensee Activities in Emergency Planning**

Ref.: Report published as NEA/CNRA/R(98)2, April 1998

### **COMMENDABLE PRACTICES FOR REGULATORY INSPECTION OF LICENSEE ACTIVITIES IN EMERGENCY PLANNING**

The following commendable practices are derived from the evaluation of the individual countries' inspection programmes covering the essential safety considerations within regulatory inspection of licensee activities in emergency planning.

1. A legal requirement exists specifying that licensees have on-site emergency plans in place and the regulatory body has the authority to approve and inspect against them.
2. The inspection teams are multi-disciplinary having knowledge in emergency planning and in pertinent technical areas, e.g., radiation protection.
3. Emergency planning inspections form part of the core set of inspections, in that they are done on a routine basis.
4. Emergency planning inspections check plans and programmes for viability, focusing on document validity, equipment availability and communications.
5. The regulatory body observes plant-wide exercises at regular intervals focusing upon attainment of objectives.
6. The allocation of resources to an exercise observation is determined by considering scenario complexity as well as the exercise objectives.

## **Comparison of the Inspection Practices in Relation to the Control Room Operator and Shift Supervisor Licenses**

Ref.: Report published as NEA/CNRA/R(98)1, April 1998

### **COMMENDABLE PRACTICES FOR REGULATORY INSPECTION OF CONTROL ROOM OPERATOR AND SHIFT SUPERVISOR LICENSES**

1. Where licences or authorisations for control room work are granted by operating organisations or accreditation bodies which are independent of the regulatory authority, the regulatory authority inspects the process leading to the granting and renewal of such licences or authorisations.
2. The framework for the granting, renewal and withdrawal of licences or authorisations is periodically reviewed for continued adequacy and to enable new information to be included.
3. The regulatory authority ensures that full scope and up-to-date plant specific simulators are used for the training of control room operators and shift supervisors. The guideline of qualification, requalification and upkeeping of the competence is reviewed periodically to introduce the update information.

### **COMMON PRACTICES FOR REGULATORY INSPECTION OF CONTROL ROOM OPERATOR AND SHIFT SUPERVISOR LICENSES**

1. The regulatory body / operating organisation carries out the license / authorisation examination for operator and supervisor.
2. The regulatory body / operating organisation establishes the framework for granting, renewal of licences or authorisations, including requirements such as basic education, work experience, training programmes, technical examinations, and continued control room working.
3. A training programme, which includes training on a simulator, has to be completed, a simulator examination and a written or oral technical examination has to be passed before a licence or authorisation is granted. Relevant work experience and a satisfactory result from an examination are also required.
4. For renewal or continuation of a licence or authorisation, satisfactory completion of a refresher-training programme, including simulator training, is required as well as a minimum continuous level of control room working and a satisfactory result from an examination.



## **Regulatory Practices for Decommissioning of Nuclear Facilities with Special Regard of Regulatory Inspection Practices**

Ref.: Draft Report tabled for approval at 1999 CNRA annual meeting

### **COMMENDABLE PRACTICES FOR REGULATORY INSPECTION FOR DECOMMISSIONING OF NUCLEAR FACILITIES**

Practices related to the regulatory body:

1. The regulatory body considers a legal requirement for timely decommissioning and removal of redundant nuclear facilities. The removal of nuclear facilities at the earliest stage after the termination of operation is expected to reduce radiological risks and the burden on future generations.
2. The regulatory body imposes a licence condition as early as for the operation of nuclear facilities for submission of preliminary decommissioning considerations (feasibility study) by the licensee. Such data are to be revised regularly by the licensee during plant operation.
3. The regulatory body has the power to direct the licensee to start decommissioning activities after final closure of a plant for the interest of safety.
4. The regulatory body agrees on a fixed time schedule in the case of delayed decommissioning including starting dismantling the facility after this period.
5. Within the scope of the regulatory regime a requirement for accumulating funds for decommissioning and associated waste management is stated, even for premature shut-down of nuclear facilities. The inspection authority has provisions to inspect on this.
6. The regulatory body requests the licensee to describe the foreseen use of dismantling techniques in the decommissioning plan for review by the regulatory body. Any change has to be justified and to be discussed with the regulatory body.
7. The regulatory body develops an integrated approach for clearance criteria to release waste material from licensed activities taking into consideration internationally accepted guidance on acceptable radiation exposure and optimisation. This serves to manage released material safely and to keep the amount of radioactive waste to be disposed off small.
8. The regulatory body requires the licensee to justify any delay of decommissioning (safe store period) being based on a good balance between the benefits and the drawbacks of delaying the dismantling phase.
9. The regulatory body develops its own view in terms of safety even if the time span of safe store may not be legally regulated. The regulatory body requires the licensee to present a dismantling plan and strategy in due time before the end of such period.

Practices related to the inspection authority:

1. The inspection authority requests an inventory list of material in the plant to be decommissioned including the amount and nature of radioactive contents ("radiological atlas" of the plant) to be compiled by the licensee, updated regularly and made available to the inspection authority for

information. This allows improved planning of decontamination, dismantling and waste management and correspondingly is valuable information for regulatory inspection.

2. The inspection authority structures its inspection programme by the decommissioning steps of the licensee in order to enhance the effectiveness of regulatory inspection.
3. The inspection authority requests the licensee to implement a work order procedure, e.g., as required and already in place for maintenance work during operation. This is a valuable tool for the licensee to control the individual decommissioning tasks, the involved safety considerations, the radiation protection and industrial safety for the personnel and gives information to the inspection authority for inspection items.
4. The inspection authority includes in its inspection strategy provisions for unexpected findings, which must be considered and duly dealt with to ensure proper managing of safety by the licensee.
5. The inspection authority inspects the licensee's provisions for retaining of all relevant documentation and knowledge about the actual status of the facility, of relevant information from the operational phase, and for storage of documentation and handling over in case of change of ownership.

## **Regulatory Inspection Activities Related to Older Operating NPPs, Risk Evaluation and Licensee Resource Commitment**

Prague Workshop 1998 (Ref.: Report published as NEA/CNRA/R(99)2, March 1999)

### **COMMENDABLE PRACTICES FOR REGULATORY INSPECTION ACTIVITIES RELATED TO OLDER OPERATING NUCLEAR POWER PLANTS**

1. Periodic safety reviews (PSRs) that are carried out by licensees every 10 years provide a systematic framework for prompting consideration of meeting modern safety standards, management and human factors issues, maintenance and replacement issues and the inspection requirements of ageing plant. The regulatory authority agrees the scope of PSRs with the licensee and ensures that these reviews are carried out.
2. The regulatory authority ensures that the licensee addresses human factors issues as part of the PSR process. Succession management is encouraged.
3. The licensee is responsible for safety and accordingly should strive to meet modern safety standards. The licensee proposes changes to obsolete and ageing plant based on an ageing management programme. The regulatory authority regulates the changes and, where appropriate, insists that they be carried out if the plant is to be allowed to continue to operate.
4. The licensee is responsible for identifying maintenance, inspection and testing requirements (including methods, coverage and frequency) of safety related plant and for ensuring that these requirements are met. The licensee is also responsible for component lifetime monitoring and informing the regulatory authority of safety issues. In all cases the regulatory authority regulates these activities and intervenes, where appropriate, to ensure that changes are made if the plant is to be allowed to continue to operate.
5. The licensee provides a maintenance, inspection and testing programme which reflects the claims of any updated safety case and which produces reliable results. The regulatory authority does not hesitate to intervene where appropriate.

## **Regulatory Inspection Activities Related to Older Operating NPPs, Risk Evaluation and Licensee Resource Commitment**

Prague Workshop 1998 (Ref.: Report published as NEA/CNRA/R(99)2, March 1999)

### **COMMENDABLE PRACTICES FOR REGULATORY INSPECTION ACTIVITIES RELATED TO RISK EVALUATION**

1. PSA risk insights are combined with non-PSA risk insight inputs (e.g. deterministic engineering requirements, operating experience and programme requirements) to determine inspection priorities. Effective use of PRA insights requires basic PSA-training for inspectors and for the regulatory authority management, and availability of PSA-information in a form that is understandable and free of jargon.
2. The PSA-information being used is derived by a PSA-specialist from a detailed PSA-analysis. The PSA-information is provided in the format of 1) WHAT are the most risk-significant systems, components, operator actions and initiating events and 2) WHY these are the most risk-significant.
3. The explanation of WHY includes the most likely combinations of system and component failures, operator errors and initiating events. The PSA-information can then be used to expand the scope of inspection in a risk-informed manner when a single failure or deficient condition is detected.
4. Confidence in the use of PSA can be developed by allowing inspectors to validate the usefulness of PSA through experience over time and setting up a feedback system to all users and developers of PSA-information. This is most effective when goals/policy have been established for the use of PSA and communicated to all (basic PSA-trained) managers and inspectors .
5. When a PSA is used in regulatory/inspection applications it is important to define who is responsible to maintain the PSA, to recognise that the regulatory authority and the licensee may use the PSA for different purposes, and to ensure that the regulatory authority has sufficient technical ability to reproduce/verify the adequacy of the PSA.

## **Regulatory Inspection Activities Related to Older Operating NPPs, Risk Evaluation and Licensee Resource Commitment**

Prague Workshop 1998 (Ref.: Report published as NEA/CNRA/R(99)2, March 1999)

### **COMMENDABLE PRACTICES FOR REGULATORY INSPECTION ACTIVITIES RELATED TO LICENSEE RESOURCE COMMITMENT**

1. In order to ensure that a licensee is capable of being responsible for safety, the regulatory authority monitors the licensee's management arrangements related to safety such as organisational structure, resources and management policies.
2. The regulatory authority ensures that the licensee has management of change arrangements, which require changes to management arrangements to be systematically analysed before implementation and to be implemented safely. The regulatory authority ensures that the management of change arrangements require the licensee to address both short term and long term effects on safety.
3. The regulatory authority ensures that the licensee tells the regulatory authority about all changes to management arrangements, which are safety significant before changes are implemented by the licensee. On receipt of this information, the regulatory authority does not hesitate to intervene if the proposed changes are detrimental to safety.
4. When a licensee uses contractors for safety related work, the regulatory authority checks that the licensee retains overall responsibility for safety. It is important to check that the licensee has sufficient knowledge to judge whether the contractor is doing the right work and has sufficient resources to manage the contract and to ensure that the work is completed satisfactorily in accordance with quality assurance arrangements.
5. When a licensee uses contractors, the regulatory authority verifies that the licensee ensures that contractors' staff are adequately trained and experienced for safety related work and, according to national practice, that the health and safety of contractors' staff are safeguarded for example, by consideration of cumulative radiation dose records and radiological protection measures for high dose-rate areas.