# New publications

## Economic and technical aspects of the nuclear fuel cycle

### Actinide and Fission Product Partitioning and Transmutation

#### Seventh Information Exchange Meeting, Jeju, Republic of Korea, 14-16 October 2002

*ISBN 92-64-02125-6 – Free on request.*

During the last decade interest in partitioning and transmutation (P&T) has grown in many countries around the world. In the years to come, P&T is expected to be one of the key technologies for nuclear waste management, together with geological disposal. In order to provide experts a forum to present and discuss state-of-the-art developments in the P&T field, the OECD Nuclear Energy Agency (NEA) has been holding biennial information exchange meetings on actinide and fission product partitioning and transmutation since 1990. This book and its enclosed CD-ROM contain the proceedings of the 7th Information Exchange Meeting held in Jeju, Republic of Korea, on 14-16 October 2002. The meeting covered the broad spectrum of developments in the field, such as the role of P&T in advanced nuclear fuel cycles; developments in partitioning; developments in accelerators, materials and fuels; the performance of transmutation systems and their safety; R&D needs, including benchmarks, data improvement and experiments; and the role of international collaboration. More than 100 papers were presented during the meeting. These proceedings also contain a summary of the panel discussion on perspectives for the future development of P&T.

### Decommissioning Nuclear Power Plants

#### Policies, Strategies and Costs

*ISBN 92-64-10431-3 – Price: € 40, US$ 46, £ 27, ¥ 5 100.*

The decommissioning of nuclear power plants is a topic of increasing interest to governments and the industry as many nuclear units approach retirement. It is important in this context to assess decommissioning costs and to ensure that adequate funds are set aside to meet future financial liabilities arising after nuclear power plants are shut down. Furthermore, understanding how national policies and industrial strategies affect those costs is essential for ensuring the overall economic effectiveness of the nuclear energy sector. This report, based upon data provided by 26 countries and analysed by government and industry experts, covers a variety of reactor types and sizes. The findings on decommissioning cost elements and driving factors in their variance will be of interest to analysts and policy makers in the nuclear energy field.

### Nuclear Electricity Generation: What Are the External Costs?

*ISBN 92-64-02153-1 – Free on request.*

Broad economic analysis becomes increasingly important in the context of market deregulation and integration of environmental and social aspects in policy making. External costs will remain a challenge for policy makers as long as they are not assessed and recognised in a reliable and

fair way across all sectors of the economy. This report provides insights into the internalised and external costs of nuclear generated electricity and alternative sources. This book will be of interest to policy makers and analysts in the field of energy and electricity systems. It contains authoritative information and data that could assist in their decision-making processes as well as support more in-depth analyses and academic research.

## Nuclear regulation and safety

### Nuclear Regulatory Review of Licensee Self-assessment (LSA)

*ISBN 92-64-02132-9 – Free on request.*

Licensee self-assessment (LSA) by nuclear power plant operators is described as all the activities that a licensee performs in order to identify opportunities for improvements. An LSA is part of an organisation's holistic management system, which must include other process elements. Particularly important elements are: a process for choosing which identified potential improvements should be implemented and a process of project management for implementing the improvements chosen. Nuclear regulators expect the licensee to run an effective LSA programme, which reflects the licensee's "priority to safety". Based on contributions from members of the NEA Committee on Nuclear Regulatory Activities (CNRA), this publication provides an overview of the current regulatory philosophy on and approaches to LSA as performed by licensees. The publication's intended audience is primarily nuclear safety regulators, but government authorities, nuclear power plant operators and the general public may also be interested.

## Radiation protection

### Effluent Release Options from Nuclear Installations

#### Technical Background and Regulatory Aspects

*ISBN 92-64-02146-9 – Free on request.*

Radioactive effluent releases from nuclear installations have generally been substantially reduced in recent years, well below regulatory requirements. At the same time, international and intergovernmental agreements and declarations, as well as national policies, continue to seek to optimise and further reduce such releases. Nevertheless, due to societal concerns about levels of radioactivity in the environment, the management of effluent releases from nuclear installations remains high on the agenda of public discussion. This report provides basic technical information on different options for managing and regulating radioactive effluent releases from nuclear installations during normal operation. It should contribute to national and international discussions in this area and be of particular interest to both nuclear regulatory authorities and nuclear power plant operators.

### The Future Policy for Radiological Protection

#### Workshop Proceedings, Lanzarote, Spain, 2-4 April 2003

*ISBN 92-64-10570-0 – Price: € 27, US$ 31, £ 19, ¥ 3 700.*

The international system of radiological protection is currently being revised with the aim of making it more coherent and concise. The International Commission on Radiological Protection

(ICRP) has published its draft reflections on the system's evolution, and has opened discussions with the radiological protection community in order to seek a broad range of stakeholder input. This open dialogue among stakeholders will help bring about a common level of understanding of the issues at stake and contribute to the evolution of new ICRP recommendations. These proceedings present a significant block of stakeholder input, comprising the views of policy makers, regulators, radiological protection professionals, industry and representatives of both non-governmental and intergovernmental organisations.

## Occupational Exposure Management at Nuclear Power Plants

### Third ISOE European Workshop, Portoroz, Slovenia, 17-19 April 2002

*ISBN 92-64-02135-3 – Free on request.*

The Information System on Occupational Exposure (ISOE), a joint initiative of the OECD Nuclear Energy Agency (NEA) and the International Atomic Energy Agency (IAEA), has become a unique worldwide programme on the protection of workers in nuclear power plants, including a network for the exchange of experience in the area of occupational exposure management, and the world's largest database on occupational exposure from nuclear power plants. Each year, an international workshop or symposium offers a forum for radiation protection professionals from the nuclear industry, operating organisations and regulatory authorities to exchange information on practical experience with occupational radiation exposure issues in nuclear power plants. These proceedings include the presentations made at the Third ISOE European Workshop on Occupational Exposure Management at Nuclear Power Plants, held in April 2002 in Portoroz, Slovenia.

## Possible Implications of Draft ICRP Recommendations

*ISBN 92-64-02131-0 – Free on request.*

The Committee on Radiation Protection and Public Health (CRPPH) of the OECD Nuclear Energy Agency (NEA) has, since its inception, worked to develop and improve international norms in the area of radiological protection of the public, workers and the environment. International radiological protection norms continue to evolve, with significant new steps having been taken by the International Radiological Protection Commission (ICRP). Since the issuance of its 1990 recommendations, which form the basis of the international system of radiological protection, the ICRP has continued to add to them. The sum of these recommendations has become overly complicated and at times incoherent. In 1999 the ICRP therefore began to re-evaluate its recommendations with the aim of consolidation, simplification and clarification. New ICRP recommendations are due to be published in 2005. This document, which is supported by the NEA Committee on Radiation Protection and Public Health, and by the NEA Radioactive Waste Management Committee, provides detailed suggestions with regard to the proposed ICRP framework. The stakeholder views expressed in this report have been presented to the ICRP at the second NEA/ICRP Forum in April 2003, and have persuaded the ICRP to reintroduce several key concepts into its proposed new system.

## Short-term Countermeasures in Case of a Nuclear or Radiological Emergency

*ISBN 92-64-02140-X – Free on request.*

Nuclear emergency planning, preparedness and management are essential elements of any country's nuclear power programme. The timely and appropriate implementation of short-term countermeasures can, in case of a nuclear emergency with a release of radioactive material, considerably reduce the doses the public could receive in the vicinity of the nuclear installation.

This report summarises information on national emergency preparedness and planning in NEA member countries for the implementation of short-term countermeasures such as evacuation, sheltering and iodine prophylaxis. The information presented may be used to better understand and to compare existing national approaches, procedures, practices and decisions, which may vary among countries due to different national habits, cultural specificity and societal needs. This report may also assist member countries interested in achieving international harmonisation of short-term countermeasures.

## Radioactive waste management

### Engineered Barrier Systems (EBS) in the Context of the Entire Safety Case

#### Workshop Proceedings, Oxford, UK, 25-27 September 2002

*ISBN 92-64-10354-6 – Price: € 45, US$ 52, £ 30, ¥ 5 700.*

A joint NEA-EC workshop entitled "Engineered Barrier Systems (EBS) in the Context of the Entire Safety Case"was organised in Oxford on 25-27 September 2002 and hosted by United Kingdom Nirex Limited. The main objectives of the workshop were to provide a status report on engineered barrier systems in various national radioactive waste management programmes considering deep geological disposal; to establish the value to member countries of a project on EBS; and to define such a project's scope, timetable and *modus operandi*. This report presents the outcomes of this workshop.

### Features, Events and Processes Evaluation Catalogue for Argillaceous Media

*ISBN 92-64-02148-5 – Free on request.*

The OECD/NEA Working Group on the Characterisation, the Understanding and the Performance of Argillaceous Rocks as Repository Host Formations for the disposal of radioactive waste (known as the "Clay Club") launched a project called FEPCAT (Features, Events and Processes CATalogue for argillaceous media) in late 1998. This report provides the results of work performed by an expert group to develop a FEPs database related to argillaceous formations, whether soft or indurated. It describes the methodology used for the work performed, provides a list of relevant FEPs and summarises the knowledge on each of them. It also provides general conclusions and identifies priorities for future work.

### The French R&D Programme on Deep Geological Disposal of Radioactive Waste

#### An International Peer Review of the "Dossier 2001 Argile"

*ISBN 92-64-02136-1 – Free on request.*

This report presents the conclusions of the international review team established by the NEA Secretariat at the request of the French government to perform a peer review of the *Dossier 2001 Argile*. The latter was produced by the French National Agency for Radioactive Waste Management (Andra) to describe the research, development and demonstration activities in the French programme on the disposal of high-level and long-lived radioactive waste in a deep geological repository excavated within an argillaceous formation.

## Public Confidence in the Management of Radioactive Waste: The Canadian Context

### Workshop Proceedings, Ottawa, Canada, 14-18 October 2002

*ISBN 92-64-10396-1 – Price: € 45, US$ 52, £ 30, ¥ 5 700.*

Public confidence is significantly affected by social considerations, such as public participation in decision-making processes, transparency of activities, access to information, effective and appropriate mitigation measures, development opportunities and social justice issues. In order to increase public confidence, there is a need to fully understand social concerns and to design an effective strategy on how to address them. This is particularly so in relation to radioactive waste management decision making. A workshop held in Ottawa in October 2002 brought together a wide range of Canadian stakeholders to present their views and to debate related issues with delegates from radioactive waste management programmes in 14 countries. This third interactive workshop of the NEA Forum on Stakeholder Confidence focused on key areas such as the social concerns at play in radioactive waste management, how these concerns can be addressed, and development opportunities for local communities. These proceedings provide a summary of the workshop, the full texts of the stakeholder presentations and detailed reports of the workshop discussions.

## Public Information, Consultation and Involvement in Radioactive Waste Management

### An International Overview of Approaches and Experiences

*ISBN 92-64-02128-0 – Bilingual – Free on request.*

Institutions involved in radioactive waste management face a rapidly evolving environment stemming from societal changes, including new information technology and new roles for the media. As in many environmental areas, a demand for public participation in decision making creates a need for new approaches to involving stakeholders. This report addresses stakeholder dialogue, consultation and information practices by radioactive waste management institutions at the start of the 21st century. It will provide both the practitioner and the non-specialist with a valuable baseline of detailed, comparative information. It can be used to assess the state of the art in the field as well as to provide a historical perspective when assessing future progress.

## The Regulator's Evolving Role and Image in Radioactive Waste Management

### Lessons Learnt within the NEA Forum on Stakeholder Confidence

*ISBN 92-64-02142-6 – Free on request.*

Of all the institutional actors in the field of long-term radioactive waste management (RWM), it is perhaps the regulatory authorities that have restyled their roles most significantly. Modern societal demands on risk governance and the widespread adoption of stepwise decision-making processes have influenced the image and role of regulators. Legal instruments both reflect and encourage a new set of behaviours and a new understanding of how regulators may best serve the public interest. This report, based on the work of the NEA Forum on Stakeholder Confidence, presents findings of relevance to regulators and examines their role within a robust and transparent RWM decision-making process. Detailed international observations are provided on the role of regulatory authorities; characteristics of the regulatory process; attributes that help achieve public confidence; and regulatory communication approaches.

## Nuclear law

### Nuclear Law Bulletin No. 71

#### Volume 2003/1

*2003 Subscription (2 issues + supplements) – ISSN 0304-341X – Price: € 80, US$ 80, £ 50, ¥ 9 400.*

Considered to be the standard reference work for both professionals and academics in the field of nuclear law, the *Nuclear Law Bulletin* is a unique international publication providing its subscribers with up-to-date information on all major developments falling within the domain of nuclear law. Published twice a year in both English and French, it covers legislative developments in almost 60 countries around the world as well as reporting on relevant jurisprudence and administrative decisions, bilateral and international agreements and regulatory activities of international organisations.

#### Supplement to No. 71: Bulgaria

*ISBN 92-64-10378-3 – Price: € 21, US$ 24, £ 14, ¥ 2 700.*

## Nuclear science and the Data Bank

### Benchmark on Beam Interruptions in an Accelerator-driven System

#### Final Report on Phase I Calculations

*ISBN 92-64-02138-8 – Free on request.*

In accelerator-driven system (ADS) development, it is important to evaluate temperature variations caused by beam trips as they can result in a temperature transient that would lead to thermal fatigue in the structural components of the subcritical system. A series of benchmarks is therefore being organised by the OECD Nuclear Energy Agency (NEA) for a lead-bismuth-cooled and MOX-fuelled accelerator-driven system. This report provides a comparative analysis of the Phase I calculation results of the beam trip transient benchmark. In subsequent phases of the benchmark, temperature transients in different power densities and under irradiated fuel conditions will also be investigated. This report and those to follow will be of particular interest to ADS designers, including subcritical system physicists as well as accelerator scientists.

### Benchmark on Deterministic Transport Calculations Without Spatial Homogenisation

#### A 2-D/3-D MOX Fuel Assembly Benchmark

*ISBN 92-64-02139-6 – Free on request (includes a CD-ROM).*

One of the important issues regarding deterministic transport methods for whole core calculations is that homogenised techniques can introduce errors into results. On the other hand, with modern computation abilities, direct whole core heterogeneous calculations are becoming increasingly feasible. This report provides an analysis of the results obtained from a challenging benchmark on deterministic MOX fuel assembly transport calculations without spatial homogenisation. A majority of the participants obtained solutions that were more than acceptable for typical reactor calculations. The report will be of particular interest to reactor physicists and transport code developers.


## CINDA 2003

### The Index to Literature and Computer Files on Microscopic Neutron Data

*ISBN 92-64-02144-2 – ISSN 1011-2545 – Free on request.*

CINDA, the Computer Index of Neutron Data, contains bibliographical references to measurements, calculations, reviews and evaluations of neutron cross-sections and other microscopic neutron data; it also includes index references to computer librairies of numerical neutron data available from four regional neutron data centres.The CINDA bibliography allows its users to find the references to specific types of cross-section information or other microscopic data from neutron-induced reactions, for any given target nucleus. In this publication CINDA entries are sorted first by element and mass number and then by cross-section or other quantity. Within these isotopes and quantity groups, the entries are sorted by date of publication.

## International Evaluation Co-operation

### Volume 9: Fission Neutron Spectra of Uranium-235

*ISBN 92-64-02134-5 – Free on request.*

This report has been prepared by Subgroup 9 which was set up in 1998 with the aim of investigating discrepancies found between microscopic and macroscopic data for the uranium-235 fission neutron spectrum. In addition, it was noted that the most recent evaluation of this spectrum had been performed in 1988 and had been based on only one experiment. It was thus felt necessary to review the existing evaluations, taking into account new experimental data and improved calculations methods.

## International Nuclear Data Evaluation Co-operation

### Complete Collection of Published Reports as of October 2003 (CD-ROM)

*Free on request.*

The NEA International Nuclear Data Evaluation Co-operation programme brings together evaluation projects being carried out in Japan (JENDL), the United States (ENDF), western Europe (JEFF) and non-OECD countries (BROND, CENDL and FENDL). The Nuclear Data Section of the International Atomic Energy Agency (IAEA) sponsors the participation of evaluation projects from non-OECD countries. The Co-operation programme was established to promote the exchange of information on nuclear data evaluations, measurements, nuclear model calculations, validation, and related topics, and to provide a framework for co-operative activities between the participating projects. The Co-operation programme assesses needs for nuclear data improvements and addresses those needs by initiating joint evaluation and/or measurement efforts. Expert groups are established to solve specific common nuclear data problems. Each expert group produces a final report of its findings. The present CD-ROM contains a full collection of the expert group reports as of October 2003.

## PENELOPE 2003 – A Code System for Monte Carlo Simulation of Electron and Photon Transport

### Workshop Proceedings, Issy-les-Moulineaux, France, 7-10 June 2003

*ISBN 92-64-02145-0 – Free on request.*

Radiation is used in many applications of modern technology. Its proper handling requires competent knowledge of the basic physical laws governing its interaction with matter. To ensure its safe use, appropriate tools for predicting radiation fields and doses, as well as pertinent regulations, are required. One area of radiation physics that has received much attention concerns

electron-photon transport in matter. PENELOPE is a modern, general-purpose Monte Carlo tool for simulating the transport of electrons and photons, which is applicable for arbitrary materials and in a wide energy range. PENELOPE provides quantitative guidance for many practical situations and techniques, including electron and X-ray spectroscopies, electron microscopy and microanalysis, biophysics, dosimetry, medical diagnostics and radiotherapy, as well as radiation damage and shielding. The proceedings contain the extensively revised teaching notes of the second workshop/training course on PENELOPE held in 2003, along with a detailed description of the improved physics models, numerical algorithms and structure of the code system.

## Plutonium Management in the Medium Term

### A Review by the OECD/NEA Working Party on the Physics of Plutonium Fuels and Innovative Fuel Cycles (WPPR)

*ISBN 92-64-02151-5 – Free on request.*

The decision to re-use plutonium generated in thermal reactors is a strategic one for a utility, and is closely tied to its spent fuel management strategy. One option is to reprocess the spent fuel in existing reprocessing plants and immediately re-use the plutonium. Another option is to postpone re-use of the plutonium by placing the irradiated fuel in interim storage. The availability of different types of reactors determines the timescales for the present, medium-term or long-term future re-use of plutonium. Current commercial reprocessing plants are all designed to separate the remaining plutonium at discharge for re-use. Historically, the rationale was to recover sufficient plutonium to enable a build-up of fast reactors, which were expected to be deployed as uranium reserves became scarce and prices rose. For a variety of reasons, but principally that of the low price of uranium ore, fast reactors have not yet been deployed commercially and projected timescales for doing so have been postponed everywhere. This report reviews the technical options available for plutonium management during this interim period. Presenting the consensus views of experts in this field, it is intended to serve as a reference source for researchers as well as utilities.

## Pressurised Water Reactor Main Steam Line Break (MSLB) Benchmark

### Volume IV: Results of Phase III on Coupled Core-plant Transient Modelling

ISBN 92-64-02152-3 – Free on request.

This benchmark is based on a well-defined problem concerning a pressurised water reactor (PWR) main steam line break, which may occur as a consequence of the rupture of one steam line upstream of the main steam isolation valves. This event is characterised by significant space-time effects in the core caused by asymmetric cooling and an assumed stuck-out control rod during reactor trip. It is based on reference design and data from Unit 1 of the Three Mile Island nuclear power plant (TMI-1). It includes a description of the event sequence with set points of all activated system functions and typical plant conditions during the transient. This report summarises the results contributed by international participants to Phase III of the exercise addressing best-estimate, coupled core-plant transient modelling.

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