

New publications

Economic and technical aspects of the nuclear fuel cycle

Nuclear Energy Data 2009/Données sur l'énergie nucléaire 2009

ISBN 978-92-64-04772-3. 120 pages. Price: € 35, US\$ 47, £ 29, ¥ 4 300.

This new edition of *Nuclear Energy Data*, the OECD Nuclear Energy Agency's annual compilation of essential statistics on nuclear energy in OECD countries, provides information on plans for new nuclear construction, nuclear fuel cycle developments and projections of installed nuclear capacity to 2035 in OECD member countries. This comprehensive overview of the current situation and expected trends in various sectors of the nuclear fuel cycle provides authoritative information for policy makers, experts and academics working in the nuclear energy field.

The Financing of Nuclear Power Plants

ISBN 978-92-64-07921-2. 74 pages. Price: € 30, US\$ 40, £ 25, ¥ 3 700.

Many countries have recognised that greater use of nuclear power could play a valuable role in reducing carbon dioxide emissions. However, given the high capital cost and complexity of nuclear power plants, financing their construction often remains a challenge. This is especially true where such financing is left to the private sector in the context of competitive electricity markets. This study examines the financial risks involved in investing in a new nuclear power plant, how these can be mitigated, and how projects can be structured so that residual risks are taken by those best able to manage them. Given that expansion of nuclear power programmes will require strong and sustained government support, the study highlights the role of governments in facilitating and encouraging investment in new nuclear generating capacity.

Nuclear safety and regulation

Nuclear Fuel Behaviour in Loss-of-coolant Accident (LOCA) Conditions State-of-the-art Report

ISBN 978-92-64-99091-3. 376 pages. Free: paper or web.

Considerable experimental and analytical work has been performed in recent years which has led to a broader and deeper understanding of phenomena related to loss-of-coolant accidents (LOCAs). Further, new cladding alloys have been produced, which might behave differently than the previously used Zircaloy-4, both under normal operating conditions and during transients. Compared with 20 years ago, fuel burn-up has been significantly increased. These and other factors have led the NEA Committee on the Safety of Nuclear Installations (CSNI) and its Working Group on Fuel Safety to produce this state-of-the-art report. The report should be of particular interest to nuclear safety regulators, nuclear power plant operators and nuclear fuel researchers.

Radiological protection

法令にみる環境放射線防護

Japanese version of *Environmental Radiological Protection in the Law*

ISBN 978-92-64-99098-2. 62 pages. Free: paper or web.

Evolution of the System of Radiological Protection

Discussion of New ICRP Recommendations, 4th Asian Regional Conference, Tokyo, Japan, 13-14 December 2007

ISBN 978-92-64-99088-3. 48 pages. Free: paper or web.

The evolution of the system of radiological protection is of great interest to governments and regulatory authorities, in particular in Asia. In this context, the Japanese government hosted a series of NEA conferences on this subject. The 4th Asian Regional Conference, held in Tokyo in December 2007, included key discussions of Japanese, Korean, Chinese and Russian views on the new International Commission on Radiological Protection (ICRP) recommendations, and on their interpretation in the international Basic Safety Standards and national regulations. This report summarises the most significant aspects of these discussions, providing keen insight into governmental and regulatory approaches to radiological protection in Asia.

放射線防護における科学的問題と新たな課題

Japanese version of *Scientific Issues and Emerging Challenges for Radiological Protection Report of the Expert Group on the Implications of Radiological Protection Science*

ISBN 978-92-64-99099-9. 120 pages. Free: paper or web.

Work Management to Optimise Occupational Radiological Protection at Nuclear Power Plants

ISBN 978-92-64-99089-0. 128 pages. Free: paper or web.

Since 1992, the Information System on Occupational Exposure (ISOE) has provided a forum for radiological protection professionals from nuclear power utilities and national regulatory authorities worldwide to discuss, promote and co-ordinate international co-operative undertakings for the radiological protection of workers at nuclear power plants. The ISOE objective is to improve occupational exposure management at nuclear power plants by exchanging relevant information, data and experience on methods to optimise occupational radiological protection. This report on work management provides practical guidance on the application of work management principles as a contribution to the optimisation of occupational radiological protection. It recognises that while work management is no longer a new concept, continued efforts are needed to ensure that good performance, outcomes and trends are maintained in the face of current and future challenges. The focus of this report is therefore on presenting the key aspects of work management that should be considered by management and workers to save time, doses and money, supported by updated practical examples from within the ISOE community. ISOE is jointly sponsored by the OECD Nuclear Energy Agency and the International Atomic Energy Agency (IAEA). ISOE Network: www.isoe-network.net.

Radioactive waste management

A Common Objective, a Variety of Paths

Synthesis and Main Lessons: Third International Conference on Geological Repositories, Berne, Switzerland, 15-17 October 2007

ISBN 978-92-64-99100-2. 40 pages. Free: paper or web.

High-level political, governmental and regulatory decision makers, as well as representatives of economic and social groups and implementing organisations met in Berne, Switzerland to present and to reflect on their collective experience towards meeting the challenge of implementing national disposal projects for placing radioactive waste in deep geological formations. This summary highlights the main lessons to be learnt and final recommendations to assist future developments in national radioactive waste management programmes seeking to meet both technical and social imperatives of modern society.

Third International Conference on Geological Repositories, Berne, Switzerland, 15-17 October 2007

ISBN 978-92-64-99101-9. Web only.

These proceedings include the papers presented at the conference as well as a summary which highlights the main lessons to be learnt and final recommendations to assist future developments in national radioactive waste management programmes seeking to meet both technical and social imperatives of modern society.

Approaches and Challenges for the Use of Geological Information in the Safety Case for Deep Disposal of Radioactive Waste

Third AMIGO Workshop Proceedings, Nancy, France, 15-17 April 2008

ISBN 978-92-64-99090-6. 76 pages. Free: paper (including a CD-ROM) or web.

A cornerstone of national decision making and societal acceptance of deep geological disposal of radioactive waste is confidence that such repositories can protect humans and the environment both now and in the future. The "safety case" is the synthesis of evidence, analyses and arguments that quantify and substantiate a claim that the repository will be safe after closure and beyond the time when active control of the facility is ensured. For deep geological disposal, studies of the geosphere form a principal component of the safety case. Geoscientific information is unique in that it can offer evidence and lines of reasoning that span geological timescales (millennia and even longer). The NEA Approaches and Methods for Integrating Geological Information in the Safety Case (AMIGO) project addresses the collection and integration of geoscientific evidence, analyses and arguments that contribute to an understanding of long-term safety. The third and final AMIGO workshop on "Approaches and Challenges for the Use of Geological Information in the Safety Case" underscored that geoscientific information plays a fundamental role in safety assessments. It is also increasingly used in the wider context of the safety case to provide evidence and arguments for the intrinsically favourable properties of a site, including its long-term stability. No single geoscientific argument "proves" safety, but rather each supports some key element of the safety case and provides enhanced confidence in the safety case. The workshop also considered the links and feedback among the safety case; design, engineering and construction issues; and geoscientific investigations.

Decommissioning of Nuclear Facilities (brochure)

It can and has been done

8 pages. Free: paper or web.

Considerable international experience gained over the last 20 years demonstrates that nuclear facilities can be safely dismantled and decommissioned once a decision is made to cease operations and permanently shut them down. This brochure looks at decommissioning across a spectrum of nuclear facilities and shows worldwide examples of successful projects.

International Experiences in Safety Cases for Geological Repositories (INTESC)

Outcomes of the INTESC Project

ISBN 978-92-64-99103-3. 76 pages. Free: paper (including a CD-ROM) or web.

A "safety case" is the synthesis of evidence, analyses and arguments that quantify and substantiate a claim that a geological repository for radioactive waste will be safe after closure and beyond the time when active control of the facility can be ensured. The NEA project on International Experiences in Safety Cases for Geological Repositories (INTESC) analysed existing safety cases, and their elements, to provide an overview of progress during the last decade, to identify key concepts and to give insight into regulatory expectations on the contents and review of safety cases. This report documents the outcomes of the INTESC project. It takes account of the responses to a detailed survey of NEA member countries as well as the results of a technical workshop. The project has shown that the purpose and concept of a safety case are generally understood, accepted and adopted by radioactive waste management programmes worldwide. Programmes are preparing safety cases in line with most of the elements suggested by the NEA, although there are some differences in interpretation and presentation. Some important trends are emerging, such as the use of safety functions and the role of a geosynthesis. Further development of some aspects and tools, such as quality assurance programmes and requirements management systems, can be expected as safety cases are further refined to support programmes moving towards implementation of geological disposal.

Nuclear law

Nuclear Law Bulletin No. 83 (June 2009)

ISSN 0304-341X. Yearly subscription (two issues): € 114, US\$ 150, £ 79, ¥ 16 500.

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, international agreements and regulatory activities of international organisations. Feature articles in this issue address "The Review Conference Mechanism in Nuclear Law: Issues and Opportunities", "National Implementation and Enforcement of Nuclear-Weapon-Free Zone Treaties" and "The Decommissioning of Asse II – Burden of the Past in the Federal Republic of Germany".

Nuclear science and the Data Bank

International Evaluation Co-operation

Evaluated Data Library for the Bulk of Fission Products (Volume 23)

ISBN 978-92-64-99092-0. 44 pages. Free: paper or web.

This publication reports the conclusions from the work undertaken by Subgroup 23 of the NEA Working Party on International Nuclear Data Evaluation Co-operation (WPEC), whose mission was to produce an international library of neutron cross-section evaluations for the most important fission products. These fission products are important in the operation of nuclear reactors because some of them contribute delayed neutrons that are useful for reactor control, whereas others have a very high neutron capture cross-section, thus inhibiting the nuclear reaction. The build-up of the fission product poisons determines the maximum duration a given fuel element can be kept in a reactor.

Inter-code Comparison Exercise for Criticality Excursion Analysis

Benchmarks Phase I: Pulse Mode Experiments with Uranyl Nitrate Solution Using the TRACY and SILENE Experimental Facilities

ISBN 978-92-64-99073-9. 172 pages. Free: paper or web.

The NEA Working Party on Nuclear Criticality Safety established an Expert Group on Criticality Excursion Analysis in 2001 to explore the performance of various transient codes to evaluate criticality accidents in a fissile solution. Inter-code comparison exercises among four transient codes (AGNES, CRITEX, INCTAC and TRACE) have been carried out with typical transient experiments using uranyl nitrate fuel solution. Two sets of benchmarks were carried out based on experimental programmes performed in the TRACY reactor in Japan, and the SILENE reactor in France. TRACY and SILENE have the same geometrical features: an annular cylinder with a central void tube for a transient rod and similar operational modes for reactivity insertion. The experiments selected are representative benchmarks for low- and high-enriched uranyl nitrate solution, about 10 wt% for TRACY and 93 wt% for the SILENE core. This report provides an analysis of the benchmark results obtained with four different codes. It will be of particular interest to criticality safety practitioners developing transient codes, notably since little experimental data is available and the existing transient codes are presently unavailable to the public.

Mixed-oxide (MOX) Fuel Performance Benchmark (PRIMO)

Summary of the Results for the PRIMO BD8 MOX Rod

ISBN 978-92-64-99085-2. 40 pages. Free: paper or web.

The plutonium produced during the operation of commercial nuclear power plants or that has become available from the dismantlement of nuclear weapons needs to be properly managed. One important contribution to the management process consists in validating the calculation methods and nuclear data used for estimates concerning power systems burning mixed-oxide (MOX) fuel. Another important contribution is the improved modelling of MOX fuel behaviour in such systems. Within the framework of the NEA Expert Group on Reactor-based Plutonium Disposition, a fuel modelling code benchmark test was carried out for MOX fuel, with irradiation data on the BD8 MOX rod of the PRIMO programme provided by SCK•CEN and Belgonucléaire. This report summarises the data provided and the fuel characteristics for the irradiation, and presents the calculation results provided by the contributors.

Nuclear Fuel Cycle Synergies and Regional Scenarios for Europe

ISBN 978-92-64-99086-9. 36 pages. Free: paper or web.

Regional strategies can provide a useful framework for implementing innovative nuclear fuel cycles. The appropriate sharing of efforts and facilities among different countries is necessary in today's context, as is taking into account proliferation concerns and resource optimisation. The preliminary studies examined in this report show that the expected benefits deriving from partitioning and transmutation (P&T), notably the reduction of radio-toxicity and heat load in a shared repository, can bring advantages to all countries of the region concerned, even when different nuclear energy policies are pursued. The studies also demonstrate that regional strategies tend to favour a nuclear "renaissance" in some countries. A regional approach is proposed in order to implement the innovative fuel cycles associated with partitioning and transmutation in Europe. The impact of different deployment strategies and policies in various countries is addressed. Regional facilities' characteristics and potential deployment schedules are also discussed. Further studies should be undertaken to investigate practical issues (fuel transport in particular) and institutional issues which will, without doubt, be very challenging.

Research and Test Facilities Required in Nuclear Science and Technology

ISBN 978-92-64-99070-8. 156 pages. Free: paper or web.

Experimental facilities are essential research tools both for the development of nuclear science and technology and for testing systems and materials which are currently being used or will be used in the future. As a result of economic pressures and the closure of older facilities, there are concerns that the ability to undertake the research necessary to maintain and to develop nuclear science and technology may be in jeopardy. An NEA expert group with representation from ten member countries, the International Atomic Energy Agency and the European Commission has reviewed the status of those research and test facilities of interest to the NEA Nuclear Science Committee. They include facilities relating to nuclear data measurement, reactor development, neutron scattering, neutron radiography, accelerator-driven systems, transmutation, nuclear fuel, materials, safety, radiochemistry, partitioning and nuclear process heat for hydrogen production. This report contains the expert group's detailed assessment of the current status of these nuclear research facilities and makes recommendations on how future developments in the field can be secured through the provision of high-quality, modern facilities. It also describes the online database which has been established by the expert group which includes more than 700 facilities.

The JEFF-3.1/-3.1.1 Radioactive Decay Data and Fission Yields Sub-libraries

JEFF Report 20

ISBN 978-92-64-99087-6. 148 pages. Free: paper or web.

The Joint Evaluated Fission and Fusion (JEFF) Project is a collaborative effort among NEA Data Bank member countries to develop a reference nuclear data library for use in different energy applications. Radioactive decay data forms an integral part of the nuclear data requirements for nuclear applications. In 2005, a completely revised library, JEFF-3.1, was made available. The updated JEFF-3.1.1 Radioactive Decay Data and Fission Yields Sub-libraries were released in 2007. This report describes the development, contents and initial validation of the JEFF-3.1 Radioactive Decay Data and Fission Yields Sub-libraries, including the 2007 update, JEFF-3.1.1, of these sub-libraries.

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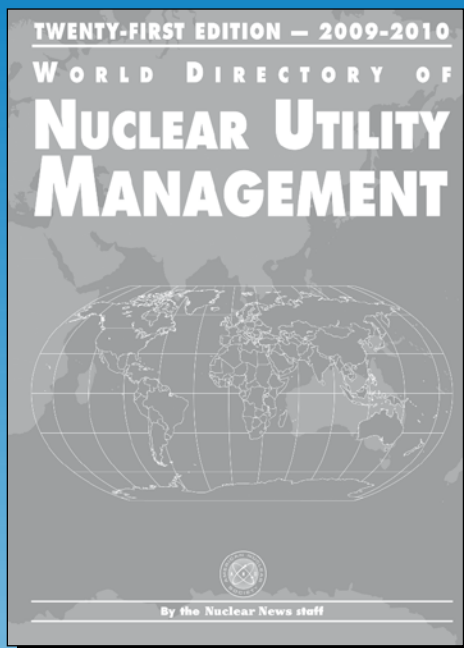


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PRINTED IN FRANCE – ISSN 1605-9581

2009/2010

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