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Nuclear Power Newsletter

A newsletter of the Division of Nuclear Power
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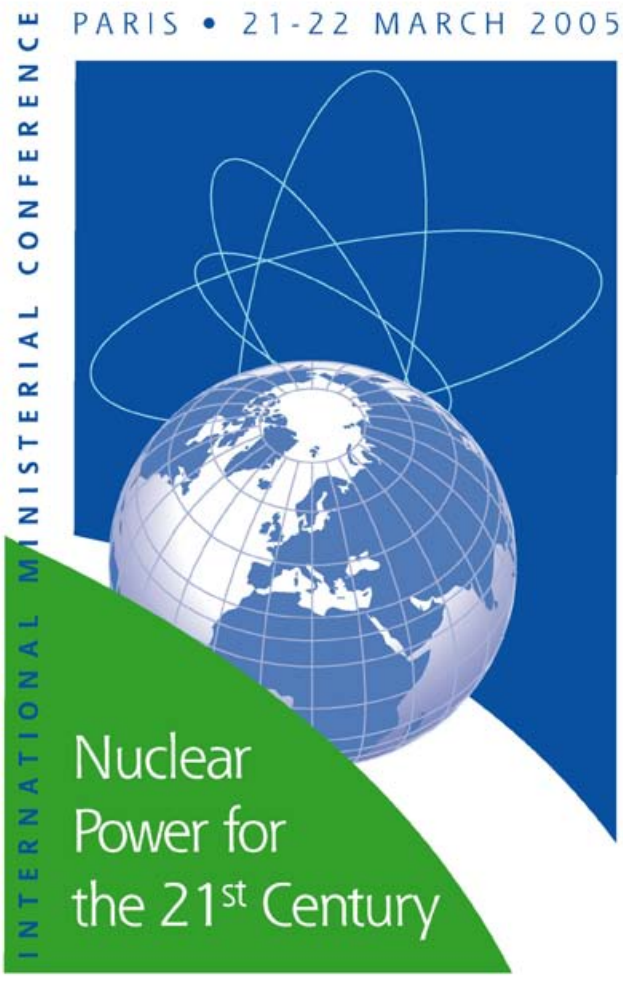
International Ministerial Conference "Nuclear Power for the 21st Century"

Thirty-four Ministerial presentations, representatives of 68 nations, 450 high-level delegates and 120 journalists combined to make the Paris Conference "Nuclear Power for the 21st Century" a strong indicator of the renaissance of nuclear power for peaceful purposes. The Conference identified the need for nuclear energy and all of the Ministerial speakers indicated that nuclear power is expected to play a significant part in the energy supply future for their countries.



The conference was organised by the IAEA to reflect, at international decision maker level on the need for energy, the environmental aspects of increased energy use and production, the opportunities for the deployment of nuclear power and the governance of the nuclear industry and fuel cycle.

This Conference followed the June 2004 Conference held in Obninsk, Russia, to celebrate the 50th anniversary of nuclear electricity production from the first nuclear power station to produce electricity for public use. The two Conferences together showed both the technical capability to expand the use of nuclear energy and the political support from a wide variety of countries for its application.

The Paris Conference included presentations by Ministers and two round-table sessions at which four main issues were discussed. Among these issues were the different assessments of energy need and the reasons for the growth of energy use in different global regions. The influence of current and future use of energy was also discussed. Papers from IAEA and a member of International Panel on Climate Change provided significant comments on the influence of energy use on climate change. A video presentation by the renowned environmentalist James Lovelock also urged the use of nuclear energy as probably the only method for providing large-scale energy increase without adversely impacting the climate.

The developments in the application of nuclear energy were discussed, and these included a call for the large international organizations, UN and World Bank, to take into account, in their aid programmes, the potential of nuclear power for the competitiveness of economies and the fight against climate change. Presentations addressed presently available technology and the developments in the technology to improve economic and safety performance.

There was widespread agreement on the need to maintain safety standards and to ensure a continuing international regime to prevent nuclear materials being misused.

At the conclusion of the conference the French Minister of Energy, as President of the conference, presented in a summary of the position that he believed reflected a broad convergence of the views, from the vast majority of participants, expressed at the conference. Among other issues, this statement noted that each State is free to define its own energy policy in accordance with its international obligations and indicated that a vast majority of participants affirmed that nuclear power can make a major contribution to meeting energy needs and sustaining the world's development in the 21st century for a large number of both developed and developing countries.

Information that includes papers presented at the conference can be found at www.parisnuclear2005.org. A CD with the papers and discussions will be available soon. Contact: R.I.Facer@iaea.org.

Message from the Director

Welcome to the second newsletter of 2005.

Since the last newsletter the Division has been very active. The most publicly visible event, to a large number of Member States, has been the International Ministerial Conference on Nuclear Power for the 21st Century in Paris. This conference has shown the very wide interest in nuclear power for the future; not only from countries which wish to continue their nuclear power development, but from many countries which are planning to introduce nuclear power for the first time, to produce either electricity or potable water, or both. We will continue to assist these countries to establish their own capability, either directly or through general support for technical and infrastructure development.

We are continuing to support technological advances to achieve an improvement in economics and safety; such as improvements in natural circulation using passive systems and pressure tube inspection techniques for water cooled reactors and work to establish the lessons learned from operational experience of fast reactor equipment and systems, which are extensively reported in this newsletter.

Within the INPRO project a series assessment studies for Innovative Nuclear Energy Systems (INSs) by the use of the revised INPRO methodology either on a national or multinational basis are starting. The activities in the current phase will also determine national, regional and global balances of demands, resources and infrastructure needs and will identify possible frameworks and implementation options for cooperation and collaboration between Member States for INS development, which could be performed during the next phase.

To strengthen nuclear power infrastructure we are working on activities to identify the minimum national infrastructure needs and schemes for regional sharing of infrastructure.

The senior team in the Departments of Nuclear Energy continues to discuss the key activities to improve its service to Member States. Arising from these meetings several activities have been put in hand which will be expected to lead to improvements in the performance of our work and will no doubt be presented and discussed in later issues of this report. A.Omoto@iaea.org

Nuclear Power Plant Operating Performance and Life Cycle Management

Continuous Process Improvement of NPP Operation

A Consultants Meeting on **On-line Monitoring of Sensor Performance in NPPs** was held at VIC, Vienna on 14-18 March with ten participants from seven countries. The purpose of the meeting was to finalize a TECDOC on on-line monitoring of instrument channels. This technique can provide an assessment of sensor performance, both in terms of dynamic (response time) and static (calibration accuracy) indicators. Elimination or reduction of unnecessary field calibrations can reduce associated maintenance labor costs, reduce personnel radiation exposure and reduce the potential for mis-calibration and calibration-induced channel trips. The TECDOC describes state-of-the-art technologies and new monitoring and signal processing procedures that can be applied while the plant and the instrumentation is "on-line".

The International Electrotechnical Commission (IEC) TC45 on Nuclear Instrumentation had its Plenary Meeting from 11 to 15 April 2005 in Busan, Republic of Korea. An IAEA liaison officer attended the meeting to discuss collaboration with IEC on NPP I&C and to present a report titled "IAEA Activities Related to Instrumentation and Control in Nuclear Power Plants".

A 3-year Technical Cooperation Project (ARG/4/089) has been launched this year to support the development of the prototype of the digital I&C system of the Reactor Protection System (RPS) of the CAREM-25 reactor being developed in Argentina. A project "kick-off" meeting, combined with an expert mission, was held on 21-23 February 2005 at CNEA in Bariloche, Argentina.

The 20th Meeting of the IAEA Technical Working Group on Nuclear Power Plant Control and Instrumentation (TWG-NPPCI) will be held on 23-25 May 2005 in Vienna. The objective of the meeting is to discuss current issues of instrumentation and control (I&C), to evaluate on-going programmes, to address new emerging challenges, and to make recommendations for future IAEA I&C programmes. Country reports on the national experience of Member States will also be presented. 45 participants from 26 Member States and three international organizations are expected to attend. Contact: O.Glockler@iaea.org.

From 31 January – 2 February 2005 a consultants meeting was held on **NPP outage management.** The objective of this meeting was to review two draft Agency documents; one a planned technical reports series document on outage management for NPPs, and the other a planned technical document on outage performance indicators for NPP operating organizations. Plans are to submit these documents for publication later in the year. Contact: T.Mazour@iaea.org.

A consultant meeting was held to review the 3rd draft of the TECDOC on Continuous improvement. The meeting participants updated the content of the document widening the scope of the document. A new chapter on structured approach to continuous improvement was added. The new draft put more focus on the senior management responsibility and giving guidance on establishing culture for continuous improvement. The final draft was prepared during the consultant meeting. The document is expected to be published in the second half of 2005. Contact: P.Vincze@iaea.org.

Integrated NPP Life Cycle Management

A technical meeting on **Life Management of Nuclear Power Plants** (Technical Working Group on Life Management of Nuclear Power Plants: TWG-LMNPP) was

held at VIC, Vienna from 21-23 February 2005 to summarize and to discuss developments in the field of plant life management (PLiM) of NPPs and to make recommendations on covering 2006-2009 (CRP, meetings etc.) in relation to the Agency's programmes. A total of 25 representatives from Member States and 2 international organizations attended. The identified priority issues reflect that the TWG-LMNPP is addressing exactly what the MS need, and is thus supplying the Agency with relevant, focussed, scientifically based, impartial and practical suggestions to assure safe, long term operation.

A Technical Report Series (TRS) - 429 on **Guidelines for Application of the Master Curve Approach to Reactor Pressure Vessel Integrity in Nuclear Power Plants** was published. The TRS has been developed under the CRP titled "Surveillance Programme Results Application to Reactor Pressure Vessel Integrity Assessment." This CRP is the fifth in a series of CRPs that have led to a focus on measuring the irradiated fracture toughness parameters using relatively small test specimens for assuring structural integrity of reactor pressure vessel (RPV) materials. The TRS has been written to allow utility engineers and scientists to directly

measure fracture toughness using small surveillance size specimens and apply the results using the Master Curve approach for RPV structural integrity assessment.

A workshop on **Recent Material Degradation and Related Managerial issues of NPPs** was held at VIC, Vienna from 15-18 February 2005 to provide an international forum to share recent technical knowledge and experience relating to material degradation problems, and to share lessons learned related on managerial issues. A total of 40 experts participated in the WS and 34 papers were presented on lessons learned, from recent events, results from research programmes, experiences and practices, ownership and responsibility, managing operational experience, and regulatory aspects. The proceeding will be published as an IAEA publication.

The publication on **Effects of Nickel on Irradiation Embrittlement of Light Water Reactor Pressure Vessel Steels** was prepared. The goal of this publication is to summarize the results of a Coordinated Research Project (CRP) aiming at understanding the mechanism of the deteriorating irradiation embrittlement effect of reactor pressure vessel steels of Ni-Cr-Mo-V or Mn-Ni-Cr-Mo types with a high nickel content (>1.5 wt%). Eleven institutes from eight different countries and the European Union participated in this research and six institutes conducted the irradiation experiments of the materials. In addition to the irradiation and testing of those materials, irradiation experiments of various national steels were also conducted.

Another IAEA-TECDOC is being prepared to summarize the result of the CRP titled **Evaluation of Radiation Damage of WWER Reactor Pressure Vessels (RPV) using Database on RPV Materials** to develop the guidelines of prediction of radiation damage of WWER-440 PRVs. This guideline will be used for assessment of irradiation embrittlement of RPV ferritic materials as a result of degradation during operation. Contact: K.S.Kang@iaea.org.

Databases to Support NPP Performance

A consultants meeting **on Revision of Design Characteristic Structures in PRIS** was held at VIC, Vienna from 7-10 February 2005 to revise the structure, content and level of detail of unit design characteristics currently included in the PRIS database. The revision should reflect also the latest development of PRIS and its external modules (non electrical application, decommissioning) and consider using unit schematics in the PRIS database. Additionally, the meeting was focused on proposing a concept of use of the PRIS design characteristics database. The meeting participants appreciated Agency's effort to revise and complete the "base" part of the PRIS database. It is believed, that this activity will result in database completion as well as in its better applicability as an important tool of performance analysis. Contact: J.Mandula@iaea.org.

It was decided to move one step forward with the modification/enhancement of Capital Cost Database in NEPIS (pursued jointly with US based Electric Utility Cost Group) and establish a pilot project to try collecting data for the current NEPIS reporting cycle (deadline for providing data 31 May 2005). The modification/enhancement of the database consists on additionally including detailed costs for significant capital projects on a unit basis, consolidate, where appropriate, capital accounts and definitions into one module, and insure that capital accounts and definitions for NEPIS are consistent. Contact: M.Condu@iaea.org.

A Consultants Meeting on **Developing an International Database of I&C Modernization Projects in NPPs** was held at VIC, Vienna on 4-6 April with eight participants from six countries. The structure of the database was established and the major I&C areas and the various project management issues to be included in the database were identified. A project plan and a questionnaire to be sent to participating utilities were also produced. The database will be implemented in a web-based format later this year. It will be populated with actual utility cases and followed-up with regular updates. Contact: O.Glockler@iaea.org.

Improving Quality Management System, Technical Infrastructure and Human Performance

Quality Management System

A technical meeting for **General Safety Requirements – Resolution of SSCs' comments** was held at VIC, Vienna from 8-10 February 2005 to review and resolve the comments given to DS338 by the Safety Standard Committees (NUSSC, RASSC, TRANSSC and WASSC) and finalize the 7th draft for submission to the Member States review. All the comments on DS338 received from members of the four SSCs, other external experts and IAEA staff were reviewed and resolved. In addition to the resolution of the comments the opportunity was taken to clarify some of the concepts in DS338 including: relationship between processes and procedures, structure of information in the Management System, use of terminology, relationship between self-assessment and independent assessment, and guidance on how to move from a system based upon the 50-C-Q to the new Management System in DS338. The text in DS338 was linked by reference to the revised Principle 9 from DS298. The changes introduced during the Consultancy and current status of draft DS338 were presented at the co-ordination meeting of the Scientific Secretaries for the Management System Series Standards Series documents, held on 09.02.2005. The new DS338 – Draft 7 was finalized taking into account all the comments and it is ready for

submission to Member States. Contact: P.Vincze@iaea.org.

Strengthening National and Regional Nuclear Power Infrastructures

The preparation profile for a document (IAEA-TECDOC) on **Management issues related to early closure or licensing renewal of a NPP** was developed. This guidance is directed to identify technical issues that influence socio-economic and environmental implications of decisions on continued reactor operation or early closure. The objective is to provide the management of nuclear utilities with information relevant for negotiating regulatory, financial and strategic planning in case of the early closure or the license renewal of a nuclear power plant. The document is targeted to senior managers from nuclear utilities and supplier organisations. Material produced by a Consultancy held in 2004 will be used. A writer was appointed. The preparation schedule foresees the review and finalization of the TECDOC by the end 2005. The Nuclear Power Engineering and the Planning & Economic Studies Sections jointly undertake this task.

Work is proceeding with the development of a document (IAEA-TECDOC) on **Minimum infrastructure necessary to enable Member States to adopt nuclear power**. The objective is to provide criteria for: a) a host country to consider when engaging in the implementation of nuclear power, and b) a supplier country to consider when assessing if the recipient country would be in an acceptable condition to begin the implementation of nuclear power. The scope covers the minimum infrastructure required until issuing of the construction license for a nuclear power project. Target users are senior managers from private utilities, suppliers/industrial organizations and regulatory bodies. The material from a Technical Meeting held in November 2004 will be used. A writer was appointed and the finalized TECDOC is scheduled by the end of 2005.

The development of a technical document on **Sharing of nuclear power infrastructure** was initiated. The aim is to address the situation where Member States may be denied the benefits of nuclear energy if the infrastructure requirements are too large or onerous for the national economy. However if co-operation could be achieved, the infrastructure could be shared and economic benefits gained by several countries acting jointly. A Consultancy meeting 9-11 May 2005 prepared the detailed outline (document preparation profile) for the development of the TECDOC. A writer was appointed to prepare the initial draft. Review and finalization of the TECDOC is planned by end 2005. Contact: N.Pieroni@iaea.org.

Effective Training to Achieve Excellence in Human Performance

From 14-17 March 2005 a Technical Meeting was held to **review guidelines on competency assessment of nuclear industry personnel**. Thirteen people attended the meeting from Canada, China, Germany, Hungary, India, Romania, Slovakia, Slovenia, Spain, UK and USA, as well as Agency staff from NENP and NSNI Divisions. The participants were primarily managers or senior specialists from the nuclear power sector of the nuclear industry, the examples they brought to the meeting were primarily from that sector. Participants identified sources of examples in other sectors including research reactors, regulatory bodies, technical support organizations, and other nuclear facilities, and also agreed to assist the Agency to solicit examples from these organizations. Plans are to submit this document for publication later this year.

From 1-4 March 2005 a Consultants Meeting was held to **assist the Agency to develop a lessons leaned document on human resource and training programmes for next generation NPPs**. Through this meeting an outline was developed for the proposed document. A Technical Meeting is planned from 5-9 December 2005 in Vienna to review the draft document. Contact: T.Mazour@iaea.org.

Training simulators, including full-scope simulators,

should be maintained current, upgraded and modernized to adequately provide capabilities for effective and reliable training and authorization of NPP personnel. The first consultants' meeting to develop a technical report on upgrade and modernization of NPP training simulators was held from 14-17 March 2005. A technical meeting hosted by the Government of the Federal Republic of Germany and organized in cooperation between the IAEA and the KSG Kraftwerks-Simulator-Gesellschaft mbH, to share information and further develop the technical report, will be conducted from 19-22 September 2005, in Essen, Germany.

From 17-21 October 2005 in Vienna there will be a technical meeting to share **good practices in effective training methods and state-of-the-art training tools** in the nuclear industry. Personnel from operating and training organizations, training tools' suppliers, regulators and technical support organizations are planed to attend. The meeting will include demonstrations of state-of-the-art training tools. It will be an excellent opportunity to discuss modern capabilities 'face-to-face, to establish new contacts and to share information on needs and experience. Contact: A.Kazennov@iaea.org.

Technology Developments and Applications for Advanced Reactors

Co-ordination of International Collaboration for the Development of Innovative Nuclear Technology

The IAEA's INPRO project has finalized the action plan and a roadmap (project plan) for its Phase 1B (second part). These documents contain the detailed descriptions of all INPRO activities to be performed in 2005-2006, complete with the exact schedule and resource allocation map. A simplified version of this plan explaining the objective and content of each task will be produced in May 2005 and distributed to all INPRO members and, upon a request, to those IAEA Member States that are not INPRO members at the moment.

Within the INPRO project, several studies for the assessment of selected innovative nuclear energy systems (INSs) with the use of the updated INPRO methodology (IAEA-TECDOC-1434) have shown a noticeable progress, among them:

(1) Joint assessment of INSs based on closed fuel cycle with fast reactors (Russia, France, China, India, Rep. of Korea, and Japan as an observer)

(2) Argentina's assessment of the introduction of a block of 700 MWe of nuclear electricity power production based on either the Canadian ACR 700 reactor or the Argentinean CAREM (Argentina and Canada, possible participation of other MS to be confirmed)

(3) The Republic of Korea's assessment on the whole fuel cycle of DUPIC in the area of proliferation resistance (the Republic of Korea, possible participation of other MS to be confirmed)

(4) Armenia's assessment of INS for a country with small grids (Armenia, possible participation of other MS to be confirmed)

A manual providing more detailed guidance on the application of the methodology is in the course of production.

Letters inviting other Member States to initiate new assessments of INSs of their choice using the updated INPRO methodology were sent to IAEA Member States. Contact: A.Omoto@iaea.org, V.Kuznetsov@iaea.org, or M.Moriwaki@iaea.org.

Small and Medium sized Reactors

The IAEA Publications Committee has approved for publication as a IAEA TECDOC the final report of a Technical Meeting held in Vienna on 7-11 June 2004 "Innovative Small and Medium Sized Reactors: Design Features, Safety Approaches and R&D Trends", to be printed later this year.

On 7-11 June 2005 the IAEA will convene a Technical Meeting on the review of passive safety design options for SMRs. This meeting has the objective to provide a forum for the exchange of information on the state-of-the-art in development and demonstration of the inherent and passive safety design options for Small and Medium Sized Reactors (SMRs) and to support the preparation of a relevant IAEA TECDOC. The meeting will be conducted in cooperation with the IAEA's Division of Nuclear Installations Safety.

Design descriptions of 54 innovative SMRs have been prepared by the designers in 12 Member States and submitted to the Agency and an IAEA report on the status of the innovative SMRs will be published later in 2005. The report will have two volumes with the second one being a dedicated report on small reactors without on-site refuelling. At the moment, a working material in a CD format with many of these design descriptions is being distributed according to individual requests from Member Sates. Contact: V.Kuznetsov@iaea.org

Technology Advances in Water Cooled Reactors for Improvement in Economics and Safety

Activities are conducted with the advice and support of the Technical Working Groups on Advanced Technologies for LWRs and HWRs (the TWG-LWR and the TWG-HWR) addressing a broad range of proven means and new approaches for improving economics of Advanced LWRs and HWRs. The following summarizes recent progress and plans:

1. Activities on Proven Means for Improving Economics

Efficient operation and maintenance / reducing outages: To support improvements in in-service inspection techniques for HWRs, a CRP on **Inter-comparison of Techniques for Pressure Tube Inspection and Diagnostics** is being conducted. Collaborative activities have focused on the inter-comparison of both proven and developmental diagnostic techniques, and associated methodologies, to detect and characterize flaws in HWR pressure tubes. Flaw characterizations conducted by participating organizations are almost complete. The findings will be published in a TECDOC.

Preparations were initiated to convene the final RCM from 17-21 October, 2005 at AECL, Canada.

2. Activities on New Approaches for Improving Economics:

Development of passive safety systems: To foster international collaboration on the enabling technology of passive systems that utilize natural circulation, a CRP on **Natural Circulation Phenomena, Modeling and Reliability of Passive Systems that Utilize Natural Circu-**

lation was started in 2004. The scope includes natural circulation for removal of core power under normal operation (start-up, nominal and shutdown) and accident conditions, and to provide cooling of the containment. Building on the shared expertise within the CRP, a draft TECDOC has been prepared describing the present state of knowledge on natural circulation in water-cooled NPPs and passive system reliability. It presents extensive information on phenomena, models, predictive tools and experiments that currently support design and analyses of natural circulation systems, and highlights areas where additional research is needed. It will serve to guide the planning and conduct of the CRP thereby focusing activities on advancing the state of knowledge. With the benefit of the results of the CRP, this document will be updated in the future to produce a TECDOC on the State-of-the-Art of natural circulation in water-cooled NPPs.

Preparations were initiated to convene the 2nd RCM at Oregon State University, Corvallis, USA from 29 August – 2 September 2005.

Improvement of the technology base for eliminating over-design: A CRP on **Establishment of a Data Base of Thermo-Physical Properties for Materials of LWRs and HWRs** has recently been completed. A TECDOC is in preparation presenting the data assessments and new measurements contributed by the participating organizations. Furthermore, the establishment of the web-based data-base is being carried out by Hanyang University of the Republic of Korea under the financial support of the Korean government, within Hanyang University's role as "IAEA's Designated Centre for Nuclear Material Data Base Management".

Expanded applications of water-cooled reactors: Planning is underway for a collaborative assessment, jointly with IAEA's Planning and Economic Studies Section, of **Advanced Applications of Water-Cooled Reactors**. The objective is to identify opportunities and challenges for water-cooled reactors to capture a substantial share of prospective applications beyond electricity production, including seawater desalination; district heating; steam for heavy oil recovery; hydrogen production; and high conversion of fertile material to fissile material. A Technical Meeting will be convened in October 2005.

Development of systems with higher thermal efficiency: A CRP on **Heat Transfer Behaviour and Thermo-hydraulics Code Testing for Super-Critical Water-cooled Reactors (SCWRs)** is being planned to begin in 2006. There is interest in both developing and industrialized countries in SCWRs, primarily because such systems would be more compact and would achieve higher thermal efficiencies (44-45%) than current evolutionary LWRs and HWRs (34-36%), and thereby have the promise of improved economic competitiveness. Coordination has been agreed with the OECD-NEA, and planning of the CRP is being coordinated with the Gen-IV SCWR Steering Committee. Objectives are to (1) establish a base of accurate data for heat transfer to super-critical fluids; and (2) test computer methods for analyses of SCWR thermo-hydraulic behaviour, and identify code development needs.

3. Other Activities – primarily for education

A presentation on "**Nuclear Power Reactors**" was made at IAEA's Seminar on Nuclear Science and Technology for Diplomats (IAEA-HQ, 14-15 March), which was attended by 170 participants, including 16 Ambassadors.

Preparations were initiated for the **Workshop on NPP Simulators for Education** (ICTP, Trieste, 31 October – 11 November 2005). Contact: J.Cleveland @iaea.org.

Technology Advances in Fast Reactors and Accelerator Driven Systems

Activities are conducted with the advice and support of the Technical Working Group on Fast Reactors (TWG-FR), addressing all technical aspects of FR and ADS research and development, design, deployment, operation, and decommissioning. The following summarizes recent progress and plans:

Two Technical Meetings (TMs), hosted by the State Scientific Center of the Russian Federation Institute for Physics and Power Engineering (IPPE), were held in Obninsk, Russia (14-18 February 2005), within the frame of our initiative on fast reactor data retrieval and knowledge preservation. The objective of the first TM was to prepare the CRP on **Analyses of and Lessons Learned from the Operational Experience with Fast Reactor Equipment and Systems**; the objective of the second TM was to exchange information on the various national fast reactor knowledge preservation activities and provide advice to the Russian colleagues. The first TM recommended focusing the first stage of the CRP on "fuels and materials behavior" and "steam generators". The second TM concluded that the large amount of knowledge accumulated by the Russian specialists in the fast reactor area was very valuable not only for Russia, but for the whole fast reactor world community, and emphasized the extreme importance of preserving this wealth of knowledge. The TM clearly identified the need of implementing task-oriented activities on data retrieval, as well as on preservation and systematization of this knowledge, and recommended establishment of a national fast reactor knowledge preservation programme in Russia.

Preparations were initiated to convene the **38th Annual Meeting of the TWG-FR**, hosted by the Instituto de Pesquisas Energéticas e Nucleares (IPEN), in São Paulo, Brazil, from 23 to 27 May 2005. The meeting provides a forum for information exchange on fast reactor research and development, and on research and technology development activities in the area of accelerator driven subcritical systems.

PFBR Construction Site, Kalpakkam, India (Credit: IGCAR)

The Project collaborates with the Division of Physical and Chemical Sciences in the preparation of the IAEA **International Symposium on Utilization of Accelerators**, to be held in Dubrovnik, Croatia from 5 to 9 June 2005, and is organizing a special session on **Accelerator Driven Systems**.

Within the frame of its activities in the area of innovative hybrid reactor systems, preparations were initiated to convene a Consultants Meeting on the **Potential of Fusion/Fission Sub-critical Neutron Systems for Energy Production and Transmutation** at Agency Headquarters, from 15 to 17 June 2005. Experts from France, Kazakhstan, Russia, Sweden, the UK, and the USA are expected to participate. The main objectives of the Consultancy are to (i) substantiate the discussion on the potential of fusion/fission systems to provide innovative solutions to spent nuclear fuel issues, and to utilize the current actinide inventories; (ii) discuss concrete steps that lead to a proof-of-principle for fusion/fission systems; and (iii) advise the Agency on its role and on possible activities to be implemented under IAEA aegis. Contact: A.Stanculescu@iaea.org.

Technology Advances for Gas Cooled Reactors

The IAEA Coordinated Research Project (CRP) on **core physics and thermal-hydraulic code benchmarks for High Temperature Gas Cooled Reactors (HTGRs)** has been extended until the end of 2006. Meanwhile, work continues on refining the current set of benchmarks and proposing additional ones by the various chief scientific investigators. Results will be analysed during the next Research Coordination Meeting (RCM), scheduled in Vienna (Sep. 5-9, 2005).

A set of benchmark cases on HTGR fuel performance under operational conditions, have been refined and sent out to all participants in the CRP on **Advances in HTGR coated fuel particle technology**. Results will be discussed during the next RCM, scheduled in Vienna (Oct. 17-21, 2005).

The IAEA is cooperating with NEA on their third information exchange meeting on nuclear hydrogen production, scheduled at JAERI, Japan (Oct. 5-7, 2005). Contact: M.Methnani@iaea.org.

Support for Demonstration of Nuclear Seawater Desalination

The third RCM in the framework of CRP on **Economic Research on, and Assessment of Selected Nuclear Desalination Projects and Case Studies** was held at Vienna on May 9-12, 2005. The first draft of the planned TECDOC was discussed. A new beta-release version of the DEEP software was also presented and reviewed during the RCM.

A project meeting, held in Karachi, Pakistan at the end of March 2005, has discussed PAEC design plans for a proposed KANUPP Nuclear Desalination Demonstration Project. The scope is to design and construct an MED distillation unit with a water production capacity of 4,800 m^3/d and couple it to the KANUPP nuclear power plant. The project, which is an extension of a TC interregional project (INT/4/134), is scheduled to be complete in a period of 24 months.

The final document of the TUNDESAL project on the **Technical and economical feasibility study of an integrated nuclear desalination project at the Skhira site** has been presented to the Tunisian government in a meeting held in Tunis on Mar. 15, 2005. Under the framework of the inter-regional on nuclear desalination (INT/4/134), CEA of France and representatives of the Tunisian nuclear, electricity and gas and water authorities have jointly undertaken the work, with the IAEA playing a supporting role.

Expert Missions for the TC National Projects (2005-06 cycle) of Indonesia were completed and detail work plan was finalized. The mission for UAE is planned for June 2005.

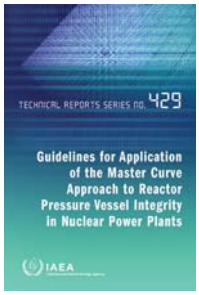
The next Technical Meeting on **Integrated Nuclear Desalination Systems** is planned for December 2005 at VIC, Vienna.

A Session on New energy-Nuclear is arranged during the IDA World Congress on Desalination & Water Reuse, being held on 11-16 September, 2005 at Singapore.

The final revised draft of the TECDOC containing the results of the CRP on **Optimization of the Coupling of Nuclear Reactors and Desalination Systems** was approved for publication (TECDOC-1444).

The Agency will be cooperating in the **WSTA 7th Gulf Water Conference**, Kuwait to be held on 19-23 November 2005. Contact: B.M.Misra@iaea.org, M.Methnani@iaea.org.

Recent Publications



Guidelines for Application of the Master Curve Approach to Reactor Pressure Vessel Integrity in Nuclear Power Plants

Technical Reports No. 429

The master curve approach for assessing the fracture toughness of a sampled irradiated material has been gaining acceptance throughout the world. This direct measurement approach is preferred over the correlative and indirect methods used in the past to assess irradiated reactor pressure vessel (RPV) integrity. The methodology has already been or is being assimilated into the ASME Boiler and Pressure Vessel Code, ASTM standards, USNRC regulations, German regulations (KTA 3203), IAEA PTS guidelines for WWER reactors as well as the VERLIFE "Unified Procedure for WWER Component Lifetime Assessment" and other industry guidance documents governing RPV integrity analysis.

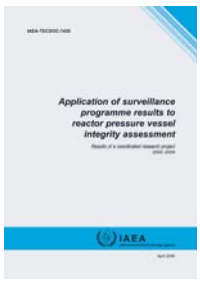
(2005) • ISBN 92-0-112104-0 • STI/DOC/010/429 • €39.00

The Power Reactor Information System (PRIS) and its Extension to Non-electrical Applications, Decommissioning and Delayed Projects Information

Technical Reports No. 428

The IAEA's PRIS contains detailed information on nuclear power plants worldwide since their start of commercial operation. It covers information, including reactor design characteristics, plant general specifications, operating experience data and non-electrical applications of nuclear power plants such as steam production and desalination. This report describes all the elements of PRIS and explains the rules, coding, terminology and definitions used in the system.

(2005) • ISBN 92-0-104704-5 • STI/DOC/010/428 • €28.00



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Meetings in 2005

Date	Title	Place	Contact
Jan. 17-Jan. 19	19th Meeting of the Technical Working Group on Gas Cooled Reactors (TWG-GCR)	Manchester, UK	M. Methnani
Feb. 14-Feb. 18	TM on the CRP on Analyses of and Lessons Learned from the Operational Experience with Fast Reactor Equipment and Systems TM to Coordinate the Agency's Fast Reactor Knowledge Preservation International Project in Russia	Obninsk, Russia	A. Stanculescu
Feb. 15-Feb. 18	TM / Workshop on Recent Material Degradation and Related Managerial Issues of Nuclear Power Plants	Vienna, Austria	K.S. Kang
Feb. 21-Feb. 23	TM on Exchange of Information on National NPP Life Management Programmes (TWG-LMNPP)	Vienna, Austria	K.S. Kang
Mar. 14-Mar. 17	TM to Review Guidelines on Assessment on NPP Personnel Training	Vienna, Austria	T. Mazour
Mar. 21-Mar. 22	IAEA International Conference on Nuclear Power for the 21st Century	Paris, France	R. I. Facer
May. 09-May. 12	RCM of CRP on "Economic research on, and assessment of selected nuclear desalination project and case studies"	Vienna, Austria	B.M. Misra
May 11-May 13	RCM of CRP on Master Curve Approach to monitor the fracture toughness of Reactor Pressure Vessel in NPPs	Budapest, Hungary	K.S. Kang
May. 23-May. 27	TM to Review National Programmes on Fast Reactors and Accelerator Driven Systems (ADS) (TWG-FR)	Sao Paulo, Brazil	A. Stanculescu
May. 23-May. 25	Meeting of the Technical Working Group on Nuclear Power Plant Control and Instrumentation (TWG-NPPCI)	Vienna, Austria	O. Glockler
Jun. 07-Jun. 09	TM to Develop Strategies and Tools for Predictive Maintenance	Vienna, Austria	H. Cheng
Jun. 13-Jun. 16	TM on Authorization of Control Room Personnel	Vienna, Austria	A. Kazennov
Jun. 13-Jun. 17	TM to Review passive safety design options for SMRs	Vienna, Austria	V. Kuznetsov
Jun. 27-Jun. 30	TM on the On-line Condition Monitoring of Equipment and Processes in NPPs Using Diagnostic Systems	Knoxville, USA	O. Glockler
Aug. 29-Sep. 02	RCM of CRP on natural circulation phenomena, modelling, and reliability of passive systems which utilize natural circulation	Corvallis, USA	J. Cleveland
Sep. 13-Sep. 16	TM on the Impact of Modern Technology on NPP I&C Systems	Chatou, France	O. Glockler
Sep. 19-Sep. 22	TM to Develop a Technical Report on Upgrade and Modernization of NPP Training Simulators	Essen, Germany	Mr. Kazennov
Sep. 26-Sep. 30	TM on Decommissioning of Fast Reactors after Sodium Draining	Cadarache, France	A. Stanculescu
Oct. 11-Oct. 14	TM to Prepare a technical document on 'Advanced Applications of Water-Cooled NPPs'	Vienna, Austria	J. Cleveland
Oct. 17-Oct. 21	TM to Disseminate Good Practices on the Use of Training Approaches, Techniques and Tools to Increase NPP Personnel Training Effectiveness	Vienna, Austria	A. Kazennov
Oct. 17-Oct. 21	TM to Review Experience and Options Relevant for Validation, Testing and Demonstration of Passive Safety Systems for SMRs	Vienna, Austria	V. Kuznetsov
Oct. 17-Oct. 21	RCM of CRP on Intercomparison of techniques for pressure tube inspection and diagnostics	Ontanio, Canada	P. Ingham
Oct. 17-Oct. 28	Workshop on Technology and Applications of Accelerator Driven Systems (ADS)	Trieste, Italy	A. Stanculescu
Oct. 31-Nov. 11	Workshop on Nuclear Power Plant Simulators for Education	Trieste, Italy	P. Ingham
Nov. 07-Nov. 11	RCM of CRP on benchmark analyses on up-to-date codes and methods to reduce the calculational uncertainty of the LMFR reactivity effects	Vienna, Austria	Y.I. Kim

Date	Title	Place	Contact
Nov. 07-Nov. 10	TM to Develop guidelines on training programmes for the next generation of NPPs	Vienna, Austria	T. Mazour
Nov. 22-Nov. 25	TM on Implementing and Licensing Digital I&C Systems and Equipment in NPPs	Espoo, Finnald	O. Glockler
Dec. 07-Dec. 09	12th Meeting of the Technical Working Group on Advanced Technologies for Light Water Reactors (TWG-LWR)	Vienna, Austria	J. Cleveland
Dec. 07-Dec. 09	8th Meeting of the Technical Working Group on Advanced Technologies for Heavy Water Reactors (TWG-HWR)	Vienna, Austria	J. Cleveland
TBD	TM to Develop guidance on design and operational requirements to enable the management of liabilities arising from decommissioning	TBD	R.I. Facer
TBD	RCM of CRP on review and benchmark of calculation methods for structural integrity assessment of reactor pressure vessels during pressurized thermal shocks	TBD	K.S. Kang
TBD	TM on General Safety Requirements - Resolution of Member States' Comments	Vienna, Austria	P. Vincze
TBD	TM to Develop guidance on the minimum infrastructure necessary to enable Member States to adopt nuclear power (INPRO) to be used	TBD	R.I. Facer
TBD	TM to Develop guidance on the potential for regional sharing of nuclear power infrastructure	Vienna, Austria	R.I. Facer
TBD	8th Steering Committee Meeting on INPRO	Vienna, Austria	R.I. Facer
TBD	TM to Describe INPRO related R&D needs related to the six defined case studies	Vienna, Austria	V. Kuznetsov
TBD	TM to coordinate six case studies for the assessment of INSs foreseen	TBD	V. Kuznetsov
TBD	TM / Workshop for Training on INPRO Methodology	Vienna, Austria	V. Kuznetsov
TBD	RCM of CRP on Small reactors without on-site fuelling	TBD	V. Kuznetsov
TBD	TM to Prepare a TRS Report on 'Advances in HWR Designs and Technologies' covering advanced HWR designs, advanced fuels and fuel cycle options	TBD	TBD
TBD	TM to Compare simulation results for abnormal transients for medium-sized HWRs	TBD	TBD
TBD	RCM of CRP on Analytical and Experimental Benchmark Analyses of Accelerator Driven Systems (ADS)	Minsk, Belarus	A. Stanculescu
TBD	RCM of the CRP on Analyses of and Lessons Learned from the Operational Experience with Fast Reactor Equipment and Systems	TBD	A. Stanculescu
TBD	RCM of CRP on "Assessment based on an unified methodology of thorium fuel in emerging nuclear systems"	TBD	Y.I. Kim
TBD	RCM of CRP on conservation and application of HTGR technology: Advances in HTGR fuel technology development	TBD	M. Methnani
TBD	RCM of CRP on "Prospects of potable water co-generation with HTGRs"	TBD	B.M. Misra
TBD	Workshop on Nuclear Desalination Technology and Economics	Trieste, Italy	B.M. Misra
TBD	TM on Integrated Nuclear Desalination Systems in blue book although included in our worksheets	TBD	B.M. Misra

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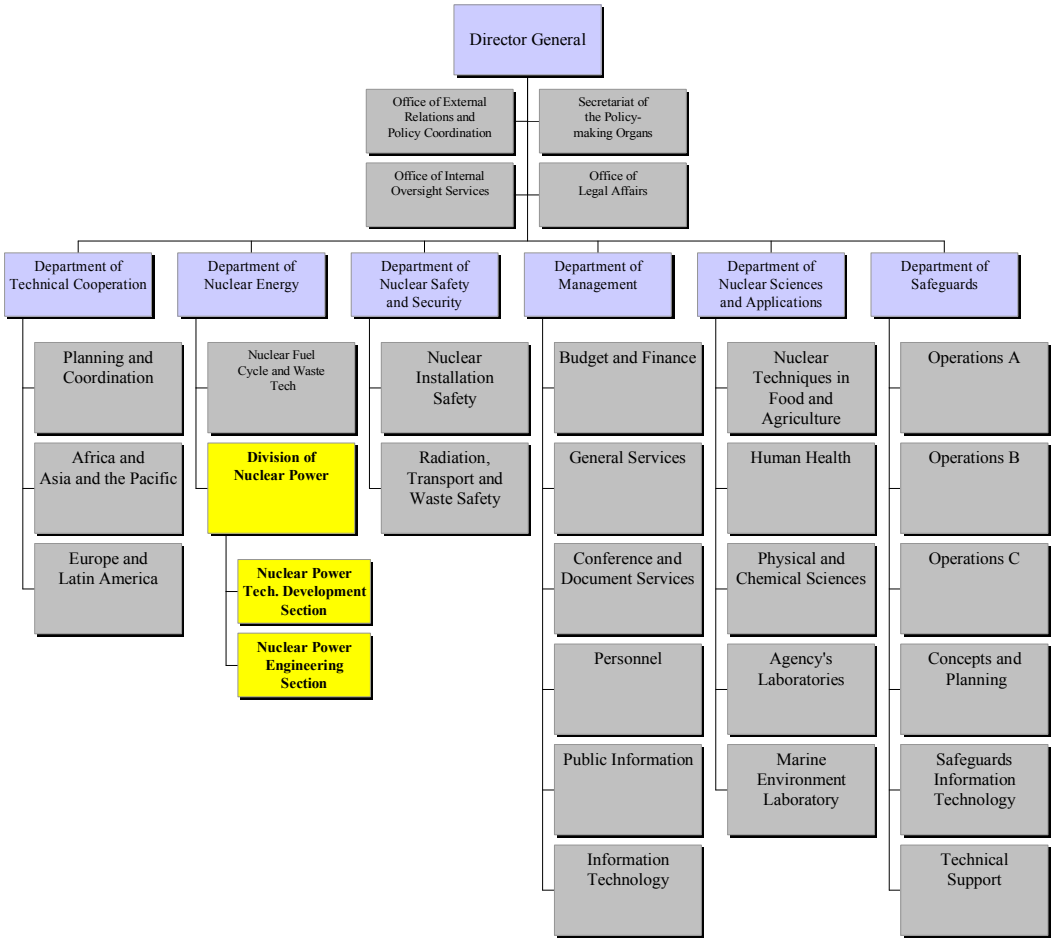
Division Introduction : NENP home: http://www.iaea.org/OurWork/ST/NE/NENP/index.html



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    http://www-adsdb.iaea.org/index.cfm
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- Technical Documents Published by NPTDS 1997-2004
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