

Baden-Württemberg · Bayern · Hessen



ILK Summary Report

of the 2nd International ILK Symposium "Harmonisation of Nuclear Safety Approaches A Chance for Achieving more Transparency and Effectiveness?"

Munich, 28th and 29th October, 2003

Für deutsche Fassung bitte umdrehen!

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Foreword

The International Committee on Nuclear Technology (Internationale Länderkommission Kerntechnik, ILK) was established by the three German states of Baden-Württemberg, Bavaria and Hesse in October 1999. It is currently composed of 12 scientists and experts from Germany, France, Sweden, Switzerland and USA. The ILK acts as an independent and objective advisory body to the German states on issues related to the safety of nuclear facilities, radioactive waste management and the risk assessment of the use of nuclear power. In this capacity, the Committee's main goal is to contribute to the maintenance and further development of the high, internationally recognised level of safety of nuclear power plants in the southern part of Germany.

Over the last few years the issue of harmonization of safety approaches in the field of nuclear engineering has become an important topic in the European Union, but also internationally. The ILK has therefore decided to make this important issue the centerpiece of the 2nd International ILK Symposium. In the view of the ILK this summary report presents the main statements of the symposium. It complements the comprehensive proceedings [17] of the symposium and was adopted on the 29th ILK meeting on May 24, 2004 in Stuttgart.

The Chairman

Dr. Serge Prêtre

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1 Introduction

The 2nd International ILK Symposium entitled:

Harmonisation of Nuclear Safety Approaches A Chance for Achieving more Transparency and Effectiveness?

was held on October $\mathbf{28^{th}}$ and $\mathbf{29^{th}}$ 2003 at the Hotel Bayerischer Hof in Munich, Germany.

The ILK's expectation for the Symposium was that it would provide an opportunity for exchanging information and views about recent developments in the harmonisation of nuclear safety practices and standards. International aspects relating to harmonisation, especially those concerning the European Union (EU), would be put forward and discussed. In order to cover interdisciplinary aspects a number of speakers from other industries were invited, next to presentations from the area of nuclear technology. The presenters were from the European Union and the US. The Symposium further sought to identify the basic principles, methodologies and policies that can improve the transparency and effectiveness of nuclear safety practices within the framework of harmonized approaches. Moreover, it aimed to provide experts with a forum for an international and multidisciplinary exchange of ideas and experience.

The Symposium was divided into three sessions, each including a series of presentations and a final round table discussion:

Session 1 "Achievements and Needs"

Session 2 "Basic Approaches"

Session 3 "Strategic Solutions and Policies"

All presentations [1] to [16] are included in the proceedings [17]. This report summarizes the main results of this Symposium: Chapter 2 provides a brief summary of each of the presentations of the three sessions and chapter 3 presents a summary of the panel discussions, which followed each session.

2 Summary of Presentations

2.1 Session 1

In the first presentation, Ms, de Palacio [1] pointed out that the harmonization of nuclear safety within the EU achieves considerable significance as a result of the enlargement of the EU. The objective of the EU legislative proposals is to guarantee a high level of nuclear safety within the enlarged EU and at the same time to enable the European nuclear industry to evolve within a stable, uniform legal framework. Therefore, it is necessary to give force of EU law to general principles unanimously accepted on the international scene and in particular within the IAEA. However, the issue is not to develop specific European standards and requirements. It is especially worth mentioning that according to Ms. de Palacio, a legally binding EU instrument is the only option which will give sufficient assurance to European citizens of a high level of nuclear safety within an enlarged EU. It is an additional overall goal of harmonization to increase the transparency in nuclear safety and radioactive waste management and thereby to increase the public acceptance of nuclear energy. However, in the ILK's opinion, efforts to harmonize nuclear safety alone will not suffice to influence the public perception of nuclear energy in the long term or even to modify its public or political acceptance, for instance in Germany.

Mr. Lacoste [2] in his presentation also emphasized the need for the harmonization of nuclear safety approaches especially in European countries since the context for nuclear energy has changed (e.g. deregulation). The national regulators need to co-operate more closely due to the many topics shared among countries with nuclear installations. Nevertheless, nuclear safety remains a national responsibility. According to Mr. Lacoste, there are two ways of achieving harmonization, the top-down process and the bottom-up process. The legislative proposals of the EU represent a top-down process, whereas the work of WENRA ("Western European Nuclear Regulators Association") represents a bottom-up process. In the approach taken by WENRA, the regulators collaborate and try to establish a common safety approach. Bottom-up processes should be given preference in order to achieve real and accepted harmonization.

The already mentioned IAEA ("International Atomic Energy Agency") safety standards were presented in detail by Mr. Lipar [3]. IAEA safety standards which in the past were targeted at developing countries now represent current best safety practices and are the result of rigorous international consensus building processes. According to Mr. Lipar, the IAEA safety standards should be seen as the global reference for nuclear, radiation protection, radioactive waste and transport safety. Therefore, one may draw the conclusion that the IAEA standards represent a good basis for harmonisation as outlined in the foregoing presentations. Mr. Graham [4] began his presentation with the interesting statement that harmonization does not necessarily mean "that in an orchestra all (musicians) are playing the same note", but instead should be understood as a cohesive and structured approach towards a common aim. Correspondingly, harmonization does not imply that all participants must have the same detailed standards. Mr. Graham furthermore pointed out that it is frequently difficult to compare the risks involved in two different activities. However, approaches for controlling risk should be comparable in different areas so that investment and public protection are not distorted. Besides, regulation in society today cannot just entail controlling risks; it should also address confidence and trust in the process of control and in the approach of the regulator.

Mr. Werner [5] stated in his overview of the current status of risk management in process industries that there is a need for harmonization. In the chemical industry, harmonization has reached a high standard in Europe. The standards define the major parameters while at the same time offering enough flexibility for continuing the use of established practices on the national and local level. This conclusion affirms Mr. Graham's above-mentioned statement [4]. However, according to Mr. Werner, one should proceed cautiously since additional harmonization may in some cases merely create additional regulations which do not necessarily create more safety. As far as the method of risk communication is concerned different technologies (e.g. chemical industry, nuclear industry) could learn from each other. However, for cross-disciplinary harmonization, one should avoid trying to apply the same detailed technical methods.

2.2 Session 2

In the first presentation of the second session, Prof. Kappos [6] underlined that risk assessment should be clearly differentiated from risk management, in order to avoid mistaking the scientific process of risk assessment with the often politically influenced decisions of risk management. The results of the German risk commission presented by Prof. Kappos especially include a detailed, prescriptive approach to risk assessment and the establishment of a national risk council. These results seem to arise mainly from an administrative background, based on the factual situation in Germany. However, in the ILK's opinion, these aspects provide few new suggestions to further harmonization in the field of nuclear engineering.

Two case studies illustrated concrete examples of the precautionary principle: the first concerned the case of BSE ("Bovine Spongiform Encephalopathy", presented by Mrs. Dressel [7]) and the second outlined the work of the ICRP ("International Commission on Radiological Protection", presented by Ms. Schieber [8]). As beca-

me apparent also in the subsequent panel discussion, the precautionary principle has advantages in terms of being able to provide a rapid first response to a specific new situation. However, on the other hand, these decisions often seem geared only towards a single objective (e. g. health or environmental protection), thereby running the risk of neglecting other important objectives, such as labor market or economical interests. Therefore, while this approach might have its virtues in certain situations, the ILK believes that it should not be applied in an undifferentiated way. A well-understood precautionary principle is based on pluralistic expertises. One good example thereof is the ALARA ("As low as reasonably achievable") or optimization principle of radiation protection defined by the ICRP. The aim of this principle is to manage the radiation risk in a "reasonable" way, by taking into account economic and social factors in the evaluation of radiation protection actions.

In the presentation on defense in depth, Prof. Apostolakis [9] argued that in its early development, the nuclear industry implemented very conservative design criteria and operational rules, which can be viewed as an application of the now-called precautionary principle. The cornerstone of this "structuralist" approach was the principle of defense in depth, which, in general terms, means the use of multiple barriers for the prevention of accidents and the mitigation of their consequences. With the advent of PSA ("Probabilistic Safety Assessment") it was found that, in some instances, the structuralist approach of defense in depth was not as conservative as it had been perceived and, in other instances, it led to unnecessary requlatory requirements. PSA identifies accident sequences and quantifies their frequencies thus allowing a "rationalist" approach to safety in which the focus is on what is important to maintaining very low frequencies of accidents. It is now recognized that both the structuralist and rationalist safety philosophies have merits. The structuralist approach provides protection against unexpected events and processes that may not have been modeled in the PSA. The rationalist approach provides an integrated picture of the plant in which frequencies of accident sequences are quantified. The risk-informed regulatory framework that is being implemented by the U.S. NRC ("Nuclear Regulatory Commission") combines both the structuralist and rationalist approaches to safety. However, the best way to combine precaution with PSA insights remains a challenge.

Mr. Pietrangelo [10] focused on the role of probabilistic risk assessment (PRA; in Europe: PSA) in the U.S. The guiding principle of using risk insights and performance-based approaches to improve the safety focus of the regulatory process and to reduce unnecessary regulatory burden was illustrated using several examples, covering the range of inservice inspections and maintenance to technical specifications and license amendments. Most impressive was the number of voluntary applications of PRA by the licensees which actually resulted in adjusted

regulatory requirements, an approach which is largely unheard of in Germany. However, PRA did not provide the sole basis for these decisions to reduce regulations in the U.S. but instead an integrated decision making process was used. In the ILK's opinion, when comparing the American with the European approaches, in Europe PRA-applications are frequently imposed on licensees. In addition, these applications in Europe appear to lead towards additional regulations rather than being used to optimise and prioritise regulations to the joint advantage of regulator and licensee. It furthermore appears that it is difficult to reduce (deterministic) regulatory requirements even if this is supported by probabilistic findings.

The final presentation by Mr. Magne [11] followed a similar approach, yet placed its focus on Europe and France and the UK in particular. Probabilistic safety criteria have been employed only in a few instances in some European countries and often not in a way comparable to that in the U.S. The use of risk-informed application also takes on varying forms between the European countries, with only the probabilistic safety review being used in all countries. Thus, while the approaches taken are quite similar in most European countries, there is no standardization or harmonization of the criteria, the employed methods and the applications. This fact holds true for both licensees as well as the regulatory authorities. However, there is a trend in Europe to use more PSAs in the decision making process. This trends leads to blend probabilistic and qualitative (or deterministic) analyses in integrated global approaches.

2.3 Session 3

Prof. Renn [12] pointed out that risk communication not only serves to make people aware of potential risks and to assist in building trust, but that it also supports a responsible and preventive risk management to identify and involve major stakeholders and affected parties. The challenges of risk management in terms of complexity, uncertainty and ambiguity have to be addressed in different ways. A risk management escalator model was presented which identifies the necessary measures and actors for the different challenges. The processes of public participation applied to date have been impaired by issues such as fair and adequate representation of all interests, assurance of competencies or the interface with legal decision making bodies. An interesting model for a cooperative discourse designed to face these challenges was presented. Within this hybrid model values, options and concerns are expressed by the stakeholders, while the factual assessment of impacts and consequences is made in pluralistic expert workshops. An evaluation by a randomly selected citizen panel would be the final step. While there have been several cases employing this approach in the past, none of them was related to nuclear energy. It would be quite interesting to see whether an approach of this kind could be successful in this field as well.

The next presentation by Mrs. Charnley [13] provided a look at how risk governance is applied in the U.S., focusing on the underlying criteria and methods rather than on aspects of public participation. Using nuclear waste facilities as an example, she pointed out that in the U.S. such waste is defined by the source and not by risk, thereby entailing that different governmental agencies, often with their own agendas, are in charge of very similar nuclear waste. By comparing exposure limits and the underlying framework conditions (e.g. routes of exposure or toxicity) for chemicals and for radioactive materials, it becomes apparent that risk is assessed quite differently even in related fields. This in turn might lead the public to distrust risk governance as it is often perceived to be inconsistent and not transparent. Mrs. Charnley concluded that a transparent, risk-based approach is needed, using risk as the common currency, thereby also enabling comparisons over different (technical) areas.

Mr. Oborne [14] presented the results of an OECD ("Organisation for Economic Cooperation and Development") project [18] with participants from several European nations, Canada and the U.S. on emerging systemic risk. The approach used in this project is forward-looking, cross-sectoral and inter-disciplinary, thereby resulting in some fairly general recommendations towards risk management. These findings include for example a call for more international cooperation and a recommendation for an enhanced role of the private sector in risk management. Voluntary efforts towards harmonization and "legally non-binding principles" are regarded as an opportunity to improve sharing the load between those profiting from risky activities and those suffering from them. One recommendation which might be directly applicable to the field of nuclear engineering, is to develop a better risk awareness and safety culture, based on the finding that risk management often tends towards the extremes of either an expert-based or a populist approach. This OECD project also discussed the need for a greater willingness to enter into a dialog as well as for restoring faith in the authorities. In this way, a direct connection to the previous arguments made by Prof. Renn [12] and Mrs. Charnley [13] was established. Another aspect which might be well worth looking into is the recommendation to examine the consistency of policies across risk areas and to prioritize risks.

A very different point of view was provided by Prof. Ossenbühl [15] who looked at the significance of quantitative risk information in jurisdiction, especially under German law. The German Atomic Energy Act provides that precautionary measures against damages have to be undertaken according to the state-of-the-art in science and technology, but without explicitly, quantitatively or qualitatively, elaborating on this state. On the other hand, the regulation and standards which do stipulate this state-of-the-art are not normatively binding in terms of German jurisdiction. This, in turn, leads the courts basing their decisions on the process of risk decision making, where the aspects of suitability and objectiveness of the data underlying the decision as well as the question of whether the administrative decisions are sufficiently conservative are taken into account. In comparison, the actual riskrelated decision itself that is based on these aspects is not subject to legal review.

The last presentation by Mr. Huggard [16] addressed the effectiveness of risk legislation, especially at the level of the European Union (EU). For this purpose, a process known as regulatory impact assessment was established which systematically assesses the effectiveness and the impact of legislation. The process takes into account factors like the dynamic nature of regulation or the actual strength of scientific capacity around government regulation, thereby improving the communication and understanding of options and consequences by regulators. At the same time, this self-reflective meta-knowledge of the regulator about itself improves communication. All regulatory proposals must be accompanied by an explanatory memorandum, as a formal document. However, analyses of a representative sample of these have shown that, for instance, scientific differences were rarely addressed and even fewer direct scientific arguments were used. Consequently, regulatory impact assessments also have the potential to improve aspects of communication and trust.

3 Summary of Panel Discussions

Session 1

In the panel discussion of session 1 it was mentioned that the IAEA provides IPSA ("International probabilistic safety assessment") as a service for the review of PSAs; panelists pointed out that aspects of human performance and management issues are not yet covered in PSAs. In addition it is sometimes difficult to compare the PSA results of similar plants due to technical differences. The idea that risk tolerability, placing all risks into a common perspective, might be suited to put the use of nuclear energy into a broader perspective, was not agreed upon. It was pointed out, that tolerability and the combination of risk frequencies and consequences are very difficult concepts for the general public. Politics and the public perceive the risk of nuclear energy as being different than other risks which is confirmed by the use of special safety bodies and regulations for nuclear energy in all countries of the EU.

The nuclear and chemical industries seem to have similar obligations in some areas, like waste management or dismantling, as well as similar approaches, like defense in depth. However, there are also major differences, because the risks are often felt to be less severe in the chemical industry. There, most detail regulations are at the national rather than the European level. It was stressed that any regulation at the European level should replace national standards rather than adding an additional layer of regulations. Not all panelists shared the fear of additional bure-aucracy due to the projected European harmonization. A European harmonization of nuclear safety using a top-down approach could actually complement the bottom-up approach that is being built by WENRA and applied by IAEA. Rather than stating mandatory standards at the EU level it might be more beneficial to define good practices and allow for different approaches in different countries.

As a summary of this panel it was stated that a certain degree of harmonization is necessary for nuclear energy, but it should incorporate an international perspective, broader than only the EU perspective, and learn from the essential exchange of information with other industries.

Session 2

The panel discussion of Session 2 focused on the importance of and applications for PSA in the USA. It was stated that while events like Davis-Besse shake the confidence in PSA, they point to the fact that PSAs do not cover aspects like safety culture. Thus, it becomes important to use a risk-informed integrated decision-

making process, which would include also management and human factors issues. The U.S. NRC does not require PSAs; instead PSAs are voluntary on the part of the licensees and will be employed more and more as they represent today's state-ofthe-art. In the USA, there is no consensus between regulators and operators about the use of level 2 PSAs, but the industry perceives that level 1 PSAs will bring more benefits for the regulatory process. Currently there are no attempts to do level 3 PSAs, which might be needed to facilitate comparisons with other technologies. In order to facilitate this comparison, an integrated decision-making process and an expert panel that provides a collective consideration of such issues has been used in the USA. Nuclear facilities in the USA other than reactors do use a form of performance assessment or integrated safety analysis, which combines elements of PSAs and deterministic approaches. Regarding the topic of harmonization, it was stated that well-defined goals have to be established first. Finally it was questioned whether the precautionary principle does indeed constitute a "principle".

Session 3

In reference to Prof. Ossenbühl's [15] presentation, aspects of value appreciation and the evaluation of the contents of regulatory decisions during legal proceedings were initially addressed. It was pointed out that in legal proceedings in Germany only the process of risk assessment and the general suitability of the database is considered. However, only the given authority is responsible for the actual decision, perhaps with reference to other, in part, institutionalized bodies or commissions. Legally there is no difference between implied (e.g. qualitative) and explicit (e.g. quantitative) risk assessments.

The subject of the participation of stakeholders in participation models addressed by Prof. Renn in his talk [12] led to the question as to what should or must be required of these stakeholders. It was shown that there must first be an acceptance of such processes and a willingness to learn on the part of all involved. The requirements above and beyond this depend on what type of discourse is involved: in a discourse regarding information and facts, the expert knowledge of the persons involved is decisive, while, for example, who is affected and to what extent are key factors in a discourse on the uncertainties of consequences. With regard to social acceptance of these procedures, it seems to be essential that the relevant procedures are specified and legitimized (see also work of the risk commission, Kappos [6]). Regarding stakeholder participation, the judicial perspective (Ossenbühl [15]) advocates rethinking the legal situation. The case that stakeholder participation might undermine constitutional structures was pointed out. The opinions of the podium participants differed greatly regarding the question as to how the term risk will continue to develop over the coming years and what challenges these changes will pose. Various aspects were addressed, including: the increasingly complicated interrelationship between systems, the significance of symbolic risk associations and the related emotional assessment, the trust in governments and non-governmental organizations (NGOs), the increased impact of probabilistic risk assessments and the necessity of balanced decisions that take into consideration the various social groups.

As expected, there were no concrete answers to the question of how the terms "fairness", "efficiency" and "transparency" should be defined and assessed and how these aims should be pursued. The extent to which the concept for life saving costs – which was developed and is being pursued in the USA (Administration, OMB) and Great Britain (HSE) – could also play a role in Germany remained open.

4 References

The following references [1] to [16] are published in the proceedings [17] of the 2nd International ILK symposium.

- [1] de Palacio, L.: "Perspectives of European Harmonisation of Nuclear Safety Approaches"
- [2] Lacoste, A.-C.: "National and International Safety Standards: The French Perspektive"
- [3] Lipar, M.: "Status and Trends in IAEA Safety Standards"
- [4] Graham, P.: "Harmonisation of Regulatory Risk Based Control Regimes"
- [5] Werner, A.: "Industrial Needs in Harmonisation of Risk Management"
- [6] Kappos, A.: "Harmonization of the Assessment of Environmental Health Risks and Standards"
- [7] Dressel, K.: "Case Studies on the Application of the Precautionary Principle: Bovine Spongiform Encephalopathy ("Mad Cow Disease")"
- [8] Schieber, C.: "The ICRP Approach to Low Level Radiation Risk"
- [9] Apostolakis, G.: "The Precautionary Principle and Defence-in-depth"
- [10] Pietrangelo, T.: "Probabilistic Risk Assessment and its Role in U.S. Regulation: Status, Trends and Prospects"
- [11] Magne, L. and Shepherd, C.: "Status of Probabilistic Safety Assessment: Methodology and Applications in Europe"
- [12] Renn, O.: "The Role of Stakeholder Involvement in Risk Communication"
- [13] Charnley, G.: "Objectives and Experience of Risk Governance in the USA"
- [14] Oborne, M.: "Interdisciplinary Approaches of OECD to Risk Governance"
- [15] Ossenbühl, F.: "Die Bedeutung quantitativer Risikoinformationen in der Rechtsprechung"
- [16] Huggard, J.: "Strengthening Risk Regulation"
- [17] ILK: Proceedings 2nd International ILK Symposium: Harmonisation of Nuclear Safety Approaches - A Chance for Achieving more Transparency and Effectiveness?; Augsburg, 2004 (ISBN: 3-926956-47-X)
- [18] OECD: "Emerging Risks in the 21st Century: An Agenda for Action"; Paris, August 2003

ILK Commitment

Task

Article 2 of the Administrative Agreement between the German states Baden-Württemberg, Hesse, and the Free State of Bavaria dating from July 1999 reads as follows:

"The Committee advises the German states of Baden-Württemberg, Bavaria, and Hesse independently and objectively at the very highest scientific level in the field of safety, waste disposal and risk assessment of nuclear facilities. The Committee is not subject to orders of the German states of Baden-Württemberg, Bavaria and Hesse."

Background

Nuclear power plants and other nuclear facilities are operated and also newly constructed worldwide both today and in the foreseeable future. In Germany, too, according to the Atomic Energy Act currently in force, a number of nuclear power plants will continue to be in operation for many years to come. For this reason, the ILK believes that it is vital for nuclear safety* to be assured at the highest standards and that it should be given the necessary priority and be kept abreast of international developments. Our goal is to achieve an optimised, effective and balanced set of safety measures and to place them into a broader framework.

It is in this way that we wish to support the regulatory authorities of the 3 German states funding the ILK by providing independent, objective, timely, and useful advice to assist their efforts to create optimal licensing practices and regulatory procedures. We take on the questions suggested by the states, offer them a competent international forum in which to discuss current issues, and inform them about international developments in the field of nuclear safety. We can also select our own study topics.

We consider it to be important to take the international state of knowledge and the best practice into account for all topics concerning nuclear safety. It is for this reason that the ILK is international in composition.

We make the results of our advisory activities available to the regulatory authorities of the three states but also to other interested parties and to the general public.

In this text "nuclear safety" is understood in its broadest sense to encompass radiation protection and the safe disposal of radioactive waste, in addition to reactor safety.

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Objectives

With our contributions, we strive to:

<u>Maintain safety</u>

We wish to maintain the high safety standard of German nuclear power plants under prevailing conditions and, where necessary, to further improve it, e.g., by dealing with issues such as the identification of safety performance indicators (including indicators of declining safety performance). Our efforts are directed towards the technical, organizational, and human performance elements as well as their interactions.

- <u>Support the implementation of safety-related advances</u>
 We continue to be committed to safety-related research and advances in nuclear science and engineering and their appropriate practical implementation.
- Promote safety culture and scientific/technological competence

We are committed to the advancement of safety culture in nuclear engineering and to maintaining the necessary personnel competence.

Promote international cooperation

We regard as indispensable the involvement of German institutions in international activities dealing with current issues in nuclear science and engineering, as well as with international regulatory practice. Correspondingly, we advocate that Germany is to remain open and actively participate in international co-operation.

- <u>Support European harmonization of safety standards and practices</u>
 We are convinced that the European harmonization of requirements on nuclear safety and disposal of nuclear waste represents a clear step forward. We support this development also within an international framework.
- Advance nuclear waste disposal

The safe disposal of radioactive waste is necessary regardless of political positions regarding nuclear energy. This issue should not be handed down to the next generation.

 <u>Comprehensively assess nuclear energy and its risks against the background</u> of sustainable development

We wish to contribute to the assessment of benefits and risks of various energy sources and electricity production means with the goal of identifying sustainable energy supplies. This assessment should include the current state of knowledge regarding energy sources and should be fully transparent. The assessment of the risks from nuclear energy and the entire fuel cycle, as well as a comparison of these risks with those associated with other energy sources, should be part of this evaluation. 1. Prof. Dr. George Apostolakis, USA

Professor of Nuclear Engineering and Engineering Systems at the Massachusetts Institute of Technology (MIT) in Cambridge, USA

2. Prof. Dr. phil., Dr.-Ing. E.h. Adolf Birkhofer, Germany

Managing Director of ISaR Institute for Safety and Reliability GmbH Holder of the Chair for Reactor Dynamics and Reactor Safety at the Technical University of Munich

3. Ms. Annick Carnino, France

Former Director of the Division of Nuclear Installations Safety at the IAEA

- 4. **Prof. Dr.-Ing. Dr.-Ing. E. h. Dr. techn. h. c. Josef Eibl, Germany** Former Director of the Institute for Massive Construction and Building Material Technology at the University Karlsruhe
- 5. **Prof. Dr.-Ing. habil. Hans Dieter Fischer, Germany** Holder of the Chair for Communication Theory at the Ruhr-University Bochum
- 6. Ing. Bo Gustafsson, Sweden Former Managing Director of SKB International Consultants AB founded in 2001 as the international branch of SKB
- 7. Prof. Dr. rer. nat. habil. Winfried Hacker, Germany Former Professor for General Psychology at the Technical University of Dresden
- 8. Prof. Dr.-Ing. habil. Wolfgang Kröger, Switzerland Holder of the Chair for Safety Technology at the ETH Zurich
- 9. Dr.-Ing. Erwin Lindauer, Germany (Vice Chairman) Former Chief Executive Officer of the GfS Gesellschaft für Simulatorschulung mbH and the KSG Kraftwerks-Simulator-Gesellschaft mbH

10. Dr. Serge Prêtre, Switzerland (Chairman)

Former Director of the Swiss Nuclear Safety Inspectorate (HSK, Hauptabteilung für die Sicherheit der Kernanlagen)

11. Prof. Dr.-Ing. habil. Eberhard Roos, Germany

Holder of the Chair for Material Testing, Material Science and Material Properties at the University Stuttgart Director of the State Materials Testing Institute, University Stuttgart

12. Prof. Dr. Frank-Peter Weiß, Germany

Professor of Plant Safety at the Technical University Dresden Director of the Institute for Safety Research at the Research Centre Rossendorf

(Members are listed in alphabetical order)

ILK Publications

- ILK-01 ILK Statement on the Transportation of Spent Fuel Elements and Vitrified High Level Waste (July 2000)
- ILK-02 ILK Statement on the Final Storage of Radioactive Waste (July 2000)
- ILK-03 ILK Statement on the Safety of Nuclear Energy Utilisation in Germany (July 2000)
- ILK-04 ILK Recommendations on the Use of Probabilistic Safety Assessments in Nuclear Licensing and Supervision Processes (May 2001)
- ILK-05 ILK Recommendation on the Promotion of International Technical and Scientific Contacts of the Nuclear Safety Authorities of the German States (October 2001)
- ILK-06 ILK Statement on the Draft Amendment dating from July 5, 2001 to the Atomic Energy Act (October 2001)
- ILK-07 ILK Statement on Reprocessing of Spent Fuel Elements (November 2001)
- ILK-08 ILK Statement on the Potential Suitability of the Gorleben Site as a Deep Repository for Radioactive Waste (January 2002)
- ILK-09 ILK Statement on the General Conclusions Drawn from the KKP 2 Incidents associated with the Refueling Outage of 2001 (May 2002)
- ILK-10 ILK Statement on the Handling of the GRS Catalog of Questions on the "Practice of Safety Management in German Nuclear Power Plants" (July 2002)
- ILK-11 ILK Recommendation on Performing International Reviews in the Field of Nuclear Safety in Germany (September 2002)

- ILK-12 Internal ILK-Report on the Intentional Crash of Commercial Airliners on Nuclear Power Plants (March 2003)
- ILK-13 ILK Statement on the Proposals for EU Council Directives on Nuclear Safety and on Radioactive Waste Management (May 2003)
- ILK-14 ILK Statement on the Recommendations of the Committee on a Selection Procedure for Repository Sites (AkEnd) (September 2003)
- ILK-15 ILK Recommendation on the Avoidance of Dependent Failures of Digital I&C Protection Systems (September 2003)
- ILK-16 ILK Statement on Sustainability Evaluation of Nuclear Energy and other Electricity Supply Technologies (January 2004)
- ILK-17 ILK Statement on Maintaining Competence in the Field of Nuclear Engineering in Germany (March 2004)
- ILK-18 ILK Summary Report of the 2nd International ILK Symposium "Harmonisation of Nuclear Safety Approaches – A Chance for Achieving more Transparency and Effectiveness?" (May 2004)
 - CD with presentations held at the ILK Symposium "Opportunities and Risks of Nuclear Power" in April 2001
 - Proceedings of presentations held at the 2nd ILK Symposium "Harmonisation of Nuclear Safety Approaches – A Chance for Achieving more Transparency and Effectiveness?" in October 2003