

ILK

**INTERNATIONALE
LÄNDERKOMMISSION
KERntechnik**

Baden-Württemberg · Bayern · Hessen



ILK Statement

on BMU Project

„Update of Nuclear Regulatory Guidelines“

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 currently consists of 9 scientists and experts from Finland, France, Germany, Switzerland and USA. The ILK acts as an independent and objective advisory body to the three 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.

Already in 2005, the ILK had dealt with the requirements which have to be addressed on updated general nuclear regulatory guidelines. The ILK recommendation ILK-22 made a total of 10 recommendations. Faced with the advancing solidification of the BMU-project, the ILK has dealt with current revision B of the draft guidelines. In the current publication, which was adopted after the 45th ILK meeting held on March 19th, 2007 in Frankfurt, the ILK presents the results of this assessment. The ILK recommends that the current draft should not be enforced. Instead, a new draft should be prepared which should take into account the customary international standards for a regulatory guideline, the results of the WENRA harmonization process and the recommendations made in ILK-22 and in this statement.

The chairman



Dr.-Ing. Erwin Lindauer

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Introduction

In 2003, the German Federal Environment Ministry (BMU, "Bundesumweltministerium") initiated the project "Update of the nuclear regulatory guidelines". It was the task of the GRS (Gesellschaft für Anlagen- und Reaktorsicherheit) as the main contractor to work out proposals for the update of the non-legislative nuclear regulatory guidelines [1]. These proposals are currently published as revision B and include a total of 11 modules under the title "Fundamentals for the safety of nuclear power plants - Safety requirements according to the state of the art in science and technology" [2].

Already in 2005, the International Committee on Nuclear Technology (ILK, "Internationale Länderkommission Kerntechnik") had dealt with the requirements which have to be addressed on updated general nuclear regulatory guidelines. The ILK recommendation ILK-22 made a total of 10 recommendations [3]. As these recommendations have thus far not been visibly implemented in the current Revision B of the 11 modules [2], faced with the advancing solidification of the BMU-project, the ILK has again dealt with this topic and the results of the deliberations are summarized in this document. Section 1 repeats essential functions of regulatory guidelines. Section 2 assesses the current draft by the BMU with the help of some examples. Finally, section 3 contains the conclusions and recommendations of the ILK.

1 Function of a set of regulatory guidelines

The requirements on the safety of German nuclear power plants are stipulated in the Atomic Energy Act [4] and the legal ordinances that are based on it. They use unspecified legal terms. It is the task of the responsible authorities to specify in licenses and supplementary license conditions, if necessary, which technical measures fulfill these requirements. The compliance is monitored in the oversight process.

The nuclear regulatory guidelines do not lay any legal foundations. They elucidate which criteria the authority needs to take into account or to apply in its decision-making, or whether certain designs of technical systems and the mode of operation of a nuclear power plant comply with legal requirements. In this way, the regulatory guidelines take on an important function with regard to legal certainty. On the part of the authorities, they help to ensure that comparable issues in different proceedings are dealt with in a similar manner. They give the licensee the chance to prepare for the expected requirements in the planning process. In the event of a dispute, the regulatory guidelines may achieve significance for court decision-making.

A consequence of the elucidating function is that specificity and unambiguity are essential features of a regulatory guideline. This is usually achieved by a number of design features:

1. use of specific auxiliary verbs for clarification
 - which requirements have to be fulfilled for a safe operation of the plant (must-requirement),
 - which requirements should be fulfilled but which can be deviated from given plausible justifications (should-requirement),
 - which requirements are allowed to develop suitable solutions (recommendation).

The IAEA gives special emphasis to the first group and states, for example:

"The principal purpose of establishing a system of regulations is to codify safety requirements of general applicability. ... They should establish at least those requirements considered by the regulatory authority to be necessary for achieving and maintaining safety." [5]

2. wording of requirements in such a way that their fulfilment can be objectively determined. The requirements do not, by any means, have to be narrowly defined but can also cover clear objectives. Very abstract general objectives are not suitable as a requirement. They may, however, be mentioned to clarify the intention of the body drafting the guidelines.
3. specification by the guidelines of the way in which compliance with requirements is determined.

Due to the specifics of the situation in Germany, two additional expectations are placed on a set of guidelines:

- since both the federal government and individual German states are involved in the licensing and oversight procedures, the guidelines have to specify the joint assessment of all participants.
- since the guidelines are to be exclusively applied to plants which have already been licensed, they should elucidate how the assessment of differences between new requirements that may not have existed previously and the current state of the plants is undertaken and which measures are to be applied.

The authority's assessment of the compliance of technical and organisational measures with legal requirements is subject to change over time and this also applies to the regulatory guidelines. The ILK will not state its views on legal disputes regarding the extent to which such developments can be applied to plants that have already been licensed. Instead, it will comment the draft submitted by the BMU from a superordinate safety-related perspective. This statement does not take into account details of the draft safety requirements.

2 Discussion of the draft submitted by the BMU

The BMU evidently does not pursue the above-mentioned objectives in its draft. In its explanatory comments, it is stated that the safety requirements describe an "ideal plant condition or plant operation" [1] and do not contain any benchmarks for exercising judgment or testing commensurability by the authorities.

Accordingly, the safety requirements are written in the indicative mode, i.e. they abstain from distinguishing between levels of bindingness. This is an unusual and, to our knowledge, worldwide unique approach for presenting a regulatory guideline. In this regard the draft of the regulatory guideline does not live up to its own claim of representing the international state of the art in science and technology, but, instead, takes an internationally unique position.

According to the BMU, these safety requirements shall replace existing guidelines such as the "Nuclear Power Plant Safety Criteria" [6] or the "RSK Guidelines for Pressurized Water Reactors" [7]. These documents clearly establish necessary requirements. Therefore it is disconcerting that these requirements and benchmarks are now renounced. Instead, indeterminate safety requirements are specified which have an undefined binding character and it is solely the responsibility of the individual authority to exercise judgment. This may have the effect that different authorities will act in a dissimilar manner. Thus an indeterminate specification exists in combination with an undefined application, which is likely to hinder rather than aid a uniform approach in Germany.

A few examples can illustrate this substantial room for interpretation:

- **Module 1** partly describes general requirements for the safety levels 1 to 3. Whether and which of these are to be regarded as requirements in particular for levels 1 and 2 and whether and which proofs are to be given is undefined.

With regard to the documentation, a condition is described that is partly only applicable to the new construction of a plant. It is not clear to what extent the existing documentation should be subsequently adapted to the regulatory guideline. In many cases the safety-related benefit of a such an adaptation would be questionable.

- **Module 7** provides especially large room for interpretation of internal accident management measures.

In this module a wealth of events is listed that are to be taken into account in the planning of internal accident management measures. Measures are mentioned that are at least to be implemented for an ideal plant (representing a certain logical paradox in itself); a series

of requirements on the measures to be implemented are set and the scope and demands on verification are described. These extensive individual determinations contrast with the lack of a description showing which conclusions are to be drawn according to which benchmarks from the nationwide investigation of incidents. Mention is only made of the general limitation that the internal accident management measures are oriented towards the possibilities inherent in the installed systems engineering.

The main reason of the indeterminacy is that the draft, in agreement with the commentary given by the BMU, leaves unspecified whether the accident management measures are to be regarded as measures for risk minimization - as had been the case to date - or as a part of the required precaution against damages.

The ILK takes the view that the approach taken thus far has proven its worth. The German plants have a very good standing in the implementation of accident management measures, also by international comparison. The probabilistic safety studies (PSA) display values¹, also with regard to older plants, that lie in a range that the IAEA recommends for new plants.

In the view of the ILK, it is appropriate to continue to specify precisely defined requirements on the safety level 3 measures required for precaution and furthermore to provide accident management measures with which, taking into account the given possibilities, a meaningful reduction of the residual risk is flexibly aimed for but cannot be fixed in advance via regulations. Accident management measures should not be included in the required precaution.

- **Module 8** – Organization – contains ideal descriptions, which partly reflect necessary requirements to achieve the safety goals, for example, requirements that management identifies itself with the safety policy and takes on a role model function, that companies represent learning organizations, etc. However, concrete specifications which are essential for the implementation and assessment of a regulatory guideline are missing. The plant organization must support the achievement of the safety goals in an optimal way. It can be doubted that the organization as described in Module 8 can be directly derived from them.
- **Module 10** describes, with regard to internal and external impacts, the separation of redundant trains and of cables with different functionalities implemented in the newer plants. Older plants where these measures were not implemented in the same manner have subsequently resorted to other and partly very cost intensive measures in order to achieve the same safety goal, such as additional systems, special designs of emergency systems, etc. It would be helpful to address this situation for existing plants in the new regulatory guidelines. In contrast, for example, the requirement to ensure shielding by structures and chosen materials is hard to understand, since structures for existing plants are a given and cannot be modified.

¹ This refers mainly to CDF (core damage frequency) values

It is also remarkable that even the current revision B of the safety requirements contains the succinct statement regarding the topic of airplane crash: "*At this time no requirements are specified for this topic*"². The ILK considers it unacceptable that a part of the requirements is simply left undefined when a new regulatory guideline is adopted.

In addition to the above-mentioned aspects of a lack in determinacy, further points should be outlined:

- PSA is not adequately considered in the BMU draft of the regulatory guidelines. In particular, it is not consulted as a means to assess different technical solutions. However, for this purpose it represents the best instrument even when deviations of older plants from newer regulatory guidelines need to be assessed. The marginal role of PSA in the existing draft does not correspond to international practice.
- An additional instrument which is increasingly used in international practice, yet which remains unaccounted in the BMU draft: Quantification of conservative values through best-estimate calculations with margins of uncertainty from which the safety factors or margins can be deduced.
- The text of the existing BMU draft differs substantially from the regulations currently in force. In particular, the attempt to systematize the requirements more strongly than before – and in the view of the ILK often without sufficient reason – using the concept of safety levels contributes to this. Even state of affairs where no change of content is apparently intended are formulated differently from existing guidelines. Therefore, given the expansive scope of the regulatory guideline there is a substantial risk that it contains errors and indeterminacies that will only be identified later when applied in the concrete case.

² Module 10, Section 2.2.2.1 Airplane crash

3 Summary and recommendation on further proceeding

The ILK takes the view that the safety requirements on NPPs as expounded in the BMU draft are not suited to support the implementation of the Atomic Energy Act. In earlier recommendations, the ILK expressed that it is in favour of updating the nuclear regulatory guidelines. The existing draft contains many meaningful elements in support of this objective, such as the inclusion of the non-power operating modes as well as the greater attention given to issues of organization and management. The ILK considers the following aspects as the main deficits of the draft:

- The structure and the design of the safety requirements, which are geared to an ideal plant, do not correspond to common international standards for regulatory guidelines. The wording does not bring about any clarity of requirements but instead creates uncertainty in terms of their application. In this way, it remains unclear how the WENRA reference levels are to be integrated into the national regulatory guidelines although the implementation of these requirements is considered by BMU to be an important function of the new regulatory guideline.
- The demarcation between the necessary precaution and the minimization of the residual risk is not specified, resulting in the risk of including accident management measures into the required precaution.
- The involvement and impact of stakeholders (authorities, technical experts, licensees, manufacturers) falls substantially short of common international procedures despite the use of current information technology (cf. also Recommendation 7 from ILK-22 [3]).
- Up to now it is not discernible if and to what extent the new regulatory guidelines will be subject to an international peer review (cf. also Recommendation 10 from ILK-22 [3]).
- A guideline for the application of the new regulatory guidelines on existing plants is missing (cf. also Recommendation 9 from ILK-22 [3]).
- The minor role of PSA and the missing consideration of best-estimate calculations with uncertainty margins are in contradiction to international practice.
- Requirements on "Airplane crash" are not mentioned.
- Current IT technologies are not appropriately covered: Requirements on a com-

puter-aided safety information system, which will include e.g. the safety alarms and the accident overview measuring systems, are missing.

- Vague formulations, also with regard to a uniform national application to existing plants, are detrimental to nuclear oversight.
- The general goal to use the current draft to specify clear requirements with tiered bindingness and thus to also provide for guidelines for the execution of nuclear oversight activities has not been achieved.

Therefore, the ILK recommends that the current draft should not be enforced. In order to determine if and where relevant, which additional proofs or measures are necessary to reach the goal of the intended revision of the regulatory guidelines, a joint understanding between the federal government and the individual German states should be achieved and a new draft should be prepared. This new draft should take into account the customary international standards for a regulatory guideline and also address the recommendations made in ILK-22 [3] as well as the above-mentioned points, in particular the results of the WENRA harmonization process.

The ILK appreciates the approach currently taken by the BMU, along with the states, to draft a nuclear plant safety ordinance which shall specify the principles of the regulatory guideline.

Annex 1: References

- [1] BMU (Bundesumweltministerium): *"Grundlagen für die Sicherheit von Kernkraftwerken - Sicherheitsanforderungen nach dem Stand von Wissenschaft und Technik - Erläuterungen des Bundesministerium für Umwelt, Naturschutz und Reaktorschutz"*, no revision index/date; <http://regelwerk.grs.de/downloads/erlaeuterung.pdf>
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- [7] RSK (Reaktor-Sicherheitskommission): *"RSK Guidelines for Pressurized Water Reactors"*, 3rd edition, October 14, 1981 (BAnz 1982, No. 69a) with amendments in section 21.1 (BAnz 1984, No. 104), in section 21.2 (BAnz 1983, No. 106) and in section 7 (BAnz 1996, No. 158a) with correction (BAnz 1996, No. 214)

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(Members are listed in alphabetical order)

- 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)
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- ILK-12** Internal ILK-Report on the Intentional Crash of Commercial Airliners on Nuclear Power Plants (March 2003)
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- ILK-19** ILK Statement on the Regulator's Management of the Licensee Self-Assessments of Safety Culture (January 2005)
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