Note:
This is a translation of a letter from the ESK Chairman to the Federal Office for the Safety of Nuclear Waste Management (BfE).
In case of discrepancies between the English translation and the German original, the original shall prevail.

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Research strategy and research agenda of the BfE
Online consultation, email dated 02.11.2018

Dear Sir/Madam,

With the email mentioned in the subject line, you asked the ESK to comment actively and critically on the planned research activities of the BfE within the framework of an online consultation. On the basis of the documents provided by you, the ESK has discussed the issue intensively and has come to the following assessment of the research activities planned by you:

The ESK considers that the research strategy and agenda of the BfE assesses the significance of research activities as an important basis for exercising the tasks of the BfE appropriately. It considers the BfE's staged approach to deriving research and development needs (long-term strategy, medium-term agenda, annual research plans) to be appropriate, as it strikes a balance between continuity and flexibility in view of a waste management strategy that is progressing. The ESK is of the view that the research fields mentioned in the documents basically cover the aspects that are essential in the coming years. The ESK supports the statements on the quality claim (Section 1.3 of the research agenda) and on the prioritisation of research activities (Chapter 2 of the research agenda) as well as on the development and regular review and updating of the research agenda and research plan. It supports the efforts of the BfE to enable itself to fulfil its tasks through systematic and planned research or research funding.

The ESK is of the view that a significant concretisation of the statements of the research agenda will be necessary in the preparation of the research plan. On the one hand, it will be necessary to clarify the description

of research fields and objects. In particular, however, there is also a need to prioritise research topics and to schedule them with regard to the requirements of the German waste management strategy. The ESK notes that the documents of the BfE not only describe research but also development activities and suggests that this should also be made clear in the titles of the documents.

In addition, the ESK sees a need for clarification in four strategic areas:

1. Alignment of research and development to the role of the BfE:
   With the Site Selection Act (StandAG) and the Act on the Reorganisation of Responsibility in Nuclear Waste Management (AtEntsorgG), the organisational framework for nuclear waste management in Germany was reformed and the various organisations, including the BfE, were assigned their respective roles and responsibilities. The research activities of the individual organisations must be oriented towards these roles and areas of responsibility and be directed towards the fulfilment of the respective tasks. In its final report, the Commission on Storage of High-Level Radioactive Waste distinguished between different pillars of research:

   - generation of scientific findings and technical developments directly required for the site selection procedure at the project implementer itself,
   - research intended to ensure the regulatory authority has appropriate project-related expertise,
   - research initiated by the societal bodies engaged in the site selection process,
   - independent research focussed on fundamental issues.

   The ESK agrees with this approach and misses a corresponding orientation and alignment of the BfE research planning in the research strategy and agenda of the BfE: The BfE defines its own departmental research as that research which "specifically provides government actors with scientific findings as a basis for decision-making for the fulfilment of their tasks". However, the objectives and role of the research-related activities of the BfE are not defined with respect to tasks; the necessary differentiation from the activities of other organisations is mentioned but not made. Research topics and issues are defined in a general way without becoming clear whether, to what extent and in what depth the BfE plans to carry out research on these topics and issues itself or fund it, or whether the BfE sees it in the remit of other organisations.

   The ESK is of the view that direct facility-related research must primarily be carried out by the respective project implementer, operators or applicants, and research programmes must also be set up that enable third party research to support the project implementer. In addition, application-oriented basic research should take place at the respective competent research institutions. Departmental research for the fulfilment of supervisory and licensing activities ("regulatory research"), on the other hand, has the function of enabling the respective authority to assess submitted documents – if necessary, also on the basis of its own diverse studies – and to create or maintain the necessary competence, also at the organisations providing technical support to the authorities. Moreover, supervisory and licensing authorities should point out gaps or deficits in the research and development programmes of other institutions and, if necessary, close these gaps or deficits by means of their own activities or commissioned ones. This research therefore has a character that is complementary to facility-related and basic research.

2. Consideration of existing results and research structures:
   Research on nuclear waste management in Germany is currently carried out by a large number of organisations and funded by various mechanisms. The documents of the BfE do not show how the BfE

plans to use or consider this research in its own work. Making reference to already existing results and research structures which might be used as a basis is largely omitted, nor is the question of the necessary size of future research capacity (at the BfE or other organisations) addressed.

3. Coordination of research:
   Against this background of the distribution of roles in nuclear waste management on the one hand and the wide range of research activities and funding mechanisms on the other, the research strategy mentions the instrument of interministerial early coordination, which has "so far" been used for coordination. In the future, the BfE will "strive to play a coordinating role", but its nature is not further explained. As stated in the BfE documents, "plurality and competition" (research strategy, Chapter 1) are essential for research that can meet the challenges of a science-based, self-questioning and learning site selection procedure. This applies beyond the research carried out or funded by the BfE. The ESK is of the view that a coordination of waste management research must take this requirement and the needs of the various actors in the waste management process into account (see 1.). It must therefore be ensured that operators and project implementer can design their own research and funding activities according to the needs of the facilities they operate or projects they run without the selection of topics being specified by the supervisory or licensing authority. Moreover, openness, breadth and diversity of research are necessary to meet the needs of a learning process, which is why the independence of basic research and research initiated by societal bodies must be ensured. Coordination of research activities therefore makes sense in terms of providing the necessary resources and budgets, promoting scientific exchange and avoiding duplication of work, but independence in drawing up the research programmes of the various actors is to be ensured.

4. Continuity regarding competence and staffing at the BfE and expert organisations:
   The ESK is of the view that the development and maintenance of technical competence in nuclear waste management will be one of the most important challenges in the coming decades. At present, the personnel capacities, which make up the existing technical competence, are too small compared to the upcoming challenges. Relevant research to the necessary extent and at the various locations described is a key element for meeting this challenge, see also the ESK Memorandum of 21.09.2017. It must be demanded from the actors in nuclear waste management that they plan their research and research funding in a way that meets this challenge and, in particular, ensures continuity and capacity with regard to technical competence and personnel resources. For a supervisory and licensing authority, this continuity and capacity is to be ensured both in-house and with the experts and expert organisations supporting it. The documents of the BfE do not show which research is to be carried out in-house and which by experts and which planning and financial planning measures are intended to be used to maintain and build up competence in the medium and long term.

The above explanations on the first and fourth strategic fields are explained in more detail below:

Ref. 1. (Alignment of research and development to the role of the BfE): In the view of the ESK, the BfE plays different roles in different areas:

- In areas in which the BfE acts as supervisory or licensing authority (plan approval, licensing or supervision pursuant to § 23d AtG, definition of exploration programmes and assessment criteria as well as recommendations for site selection pursuant to §§ 4(1), 15(1, 2, 4), 17(1, 2, 4), 19(1,2) StandAG), the BfE must be in a position to assess the applications or proposals of the project implementer or later operator in a qualified manner. This requires, on the one hand, the development, maintenance and further development of specific expertise and, on the other hand, the ability to assess, if required, documents of

the applicants, operators or project implementer on the basis of its own independent work (e.g. interpretation of geological data, performance of model calculations). The research or research funding of the BfE (so-called regulatory research) must meet these requirements. However, it is to be assumed that the applicants, operators or project implementer themselves carry out relevant research or research funding in these areas, which will naturally be more comprehensive and extensive than that of the BfE. Furthermore, there are other research funding programmes (e.g. of the BMWi and the BMBF) as well as research programmes at research centres, universities, the BGR, TSOs, universities/colleges and other research institutions). In the view of the ESK, the BfE should limit its own activities in the above-mentioned areas to regulatory research and its capacity in these areas should only be built up to the extent necessary for the activities of the BfE. Research should primarily be carried out in the research organisations and facilities already available for this purpose. These are in a far better position to carry out efficient and independent research than a supervisory and regulatory authority.

- In its function as the responsible body for public participation in the site selection procedure (§ 4(2) StandAG) and being responsible for the information platform pursuant to § 6 StandAG, the BfE is in a fundamentally different situation: it is not a matter of assessing the work, applications and proposals of others but of creating a scientific basis for own work. The respective challenges with regard to public participation are outlined in Section 6.1 of the research agenda.

In the view of the ESK, the research strategy and agenda of the BfE do not sufficiently measure up to this distinction with the explanations in Section 2.2 of the research agenda. For example, Sections 5.2 to 5.4, 5.6 and 5.9 of the research agenda make general statements on the need for research without making it clear by whom the research is to be carried out. Conversely, formulations in Sections 5.5, 5.7 and 5.8 (“assessment concepts and assessment methods”, “developing requirements”, “formulating requirements for the review ... and developing criteria ...”) indicate that the BfE plans research in order to develop specifications for the project implementer. Here a detailing as early as possible is required so that the project implementer can align its own work accordingly.

In addition, the ESK considers that the challenge of public participation, which is central to the BfE, should also be given greater weight in the research strategy and agenda than is currently the case with Section 6.1 of the research agenda.

In Section 6.4 of its research agenda, the BfE rightly points out that strategies must be developed to deal with insecurities, uncertainties and a lack of knowledge. However, strategies for dealing with expert dissent should also be considered.

Ref. 4. (Continuity regarding competence and staffing at the BfE and expert organisations):

The ESK sees the undisputed need for “plurality and competition” (short version of the research strategy) in a field of tension with the equally essential requirement of continuity in maintaining competence. In many countries, the maintenance of competence in the field of supervision and licensing is ensured by technical support organisations (TSOs) and continuous provision of resources for fulfilling their tasks. These organisations also have their own international research networks, for example within the framework of the SITEX project (www.sitexproject.eu), whose capacities and competence should be used. The ESK is of the view that the BfE should ensure such continuous provision of resources as an important pillar of its research funding in order to “support sustainable structures in the research environment” also in this way (short version of the research strategy).

Yours faithfully,

sgd. Michael Sailer
Chairman of the Nuclear Waste Management Commission