NKS-R Framework
Call for Proposals 2013

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General aspects

NKS activities are sought and carried out under two broad research programmes. The NKS-R programme focuses on reactor safety and technology, whilst the NKS-B programme covers issues related to emergency preparedness, measurement techniques, radioecological assessments and the management of radioactive waste and discharges associated with the nuclear sector. New NKS activities are sought under annual call for proposals for each programme and decisions on funding are made by the NKS board. Where an activity proposal contains elements of interest to both the NKS-R and NKS-B programmes, the proposal may be treated as a 'cross-over' activity and treated accordingly as per the discretion of the NKS board. NKS activities only receive funding for 1 year at a time and will typically run from January to December. Where the overall scope of an activity is planned to be carried out over more than one year, additional funding must be sought through the annual call for proposals for each subsequent years work. Typically, a proposal for a NKS activity should include participation from at least three Nordic countries. The participation could be in either direct involvement or by using the end results. Where applicable, applicants should consider inviting those Nordic countries that may have an interest in participating in the planned activity. In the certain cases where interest is restricted, a bilateral cooperation may be approved.

Aims of the NKS programmes

The main aims of both the NKS-R and NKS-B programmes are:

- To maintain and strengthen Nordic competence in the areas of nuclear safety and research
- To develop close informal networks between scientists, workers and end users from the relevant Nordic authorities, organisations, industries and university departments that are concerned with the various aspects of nuclear safety and research.

Proposals submitted to annual call for proposals for both the NKS-R and NKS-B programmes should primarily address these main aims. Equally, the technical/scientific and pedagogic merits of each proposal will be considered in the evaluation process, as well as whether the proposal will produce distinct and measurable goals. In addition, it is important that a proposal demonstrates that the output from the activity will be of use to at least one relevant end user group. To ensure a consistently high level of Nordic competence and qualification in the areas of nuclear safety and research in the long run, the involvement of young scientists and workers in NKS activities is actively encouraged. The Nordic universities and technical institutes have an important role in this respect and the active participation of PhD and MSc students will be viewed positively by the NKS board. Proposals should also demonstrate (where applicable) how the planned work builds on results from previous NKS activities and/or national and international research programmes. In this connection, NKS activities can be designed as 'pilot' studies before seeking larger funding from national and international research programmes for continuation of the work funded by NKS.

Types of NKS activities and expected output

NKS activities can be knowledge seeking and competence building taking the form of research activities, test exercises and information collation/review exercises or aim to spread and distribute knowledge and results through seminars, workshops and educational/training courses. Whatever the form of the planned activity, a final report will be required at the end of the year's work which will then be published on the NKS website.

Research activities should be based on relevant novel investigations or the development of an area of research towards a Nordic perspective. Final reports for research projects should be produced in line with standards expected for scientific publications. Test exercises can take the form of measurement intercomparisons or activities that test competencies across the Nordic countries. Such activities should seek to address any problems highlighted from the exercise in the final report in order to increase knowledge and competencies where necessary. Information collation and review exercises should be designed to fill knowledge gaps or develop existing methodologies for use within Nordic countries. Final reports from such activities should in line with standards expected for research activities.

Seminars and workshops should aim to develop or build upon existing informal networks and should be preceded by preparation work by participants. Experts from Nordic and/or non-Nordic countries can be invited to address seminars and workshops to provide additional value to these activities. Final reports for such activities should take the form of conference proceedings, containing extended abstracts from each speaker as well as a final overview of any discussions and conclusions. Presentations (slide shows) from such activities can be hosted on the NKS website but should not be included in the final report. Educational and training courses can contain practical and/or theoretical elements and may include exchange visits between organisations and institutes. Such activities are particularly relevant where they are aimed at young scientists and workers. Final reports for educational and training course should contain all course material presented as well as feedback from the participants.

NKS-R Programme

Priority is given to activities in the area of operational reactor safety. Other operational or economical issues should be given lower priority. Ongoing national and international research (and cooperation with such programmes) will also be taken into account in assessing activities.

The nuclear industry and nuclear authorities have a number of current challenges that are of particular interest under the NKS-R programme. These include safety aspects of the modernisation of old plants, harmonisation of safety requirements and standards, power uprates, ageing issues, decommissioning and dismantling, waste disposal and new nuclear facilities. A new current topic is the Fukushima from which lessons can be learned also in a Nordic perspective.

Main research areas and content in the NKS-R Programme

The following main research areas are currently assessed to be of importance for the NKS-R Programme.

Reactor physics and thermal hydraulics

Examples of research areas:

- Core instability/oscillation phenomena in BWR fuel with higher burnup
- Reactor physics and dynamics
- Thermal hydraulics and CFD-calculations

- Integration of different models

Modernisation, introduction of new techniques and new requirements

Examples of research areas:

- Digital control room; new requirements
- Power uprates

Plant ageing

Examples of research areas:

- Thermal or mechanical fatigue
- Radiation damage on the reactor pressure vessel
- The ageing of the containment concrete
- NDT-technology and validation of methods
- RI-ISI, strategies and application of the method
- Ageing management programs and ageing mechanisms; overview of Nuclear Power Plants
- New materials, their properties and ageing

Severe accidents

Examples of research areas:

- Iodine and halogens chemical behaviour in severe accident conditions
- Molten corium and concrete interaction

Probabilistic methods

Examples of research areas:

- Application of PSA for safety evaluation
- Comprehensible presentation of PSA results on different levels
- Uncertainty assessment
- Requirements on PSA-studies depending on the application
- Verification of the defence-in-depth principle with PSA
- Nordic harmonisation of requirement on PSA-studies and applications
- Reference library for guides and rules
- Harmonisation of fundamental definitions and concepts within the safety area

Organisation, man and safety culture

Examples of research areas:

- Models and methods for safety reviews
- The safety culture influence on occurred events
- Measures in conjunction with event investigations and reviews
- Benchmarking within the nuclear industry and other safety critical areas
- Safety evaluation of organisational changes
- Safety culture and evaluation of organisations
- Safety aspects in the use of sub contractors in the nuclear industry
- Implementation of new techniques and new working methods
- Application of HR-methods (MTO) in nuclear power plants

Decommissioning and dismantling of nuclear facilities

Examples of research areas:

- Decommissioning and dismantling of research reactors
- Involvement of the Nordic stakeholders
- Legal requirements in the Nordic countries on decommissioning projects
- Experiences from decommissioning projects

Common seminars for the NKS R- and NKS-B Programmes

Examples of research areas:

- PSA, severe accidents and emergency preparedness
- Decommissioning of nuclear facilities and relaxation of surveillance
- Environmental consequence assessments

The list of research topics presented above is not complete. All proposals to new activities within the 8 main areas will be considered in the evaluation process. Additional priorities for each Call for Proposals may be announced at the discretion of the NKS board.

Abbreviations used

BWR	Boiling Water Reactor	NDT	Non-Destructive Testing
CFD	Computational Fluid Dynamics	PSA	Probabilistic safety assessment
HR	Human Reliability	RI-ISI	Risk-Informed In-Service Inspection
MTO	Människa, teknik, organisation		