

The Nordic Nuclear Safety Research (NKS) programme: Nordic cooperation on nuclear safety

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A brief history of Nordic cooperation on nuclear safety

The roots of the current Nordic Nuclear Safety Research (NKS) programme can be traced back to the recommendation by the Nordic Council in the late 1950s for the establishment of joint Nordic committees on the issues of nuclear research and radiation protection. One of these joint Nordic committees, the 'Kontaktorgan', paved the way over its 33 year existence for the future of Nordic cooperation in the field of nuclear safety, through the formation of Nordic groups on reactor safety, nuclear waste and environmental effects of nuclear power in the late 1960s and early 1970s. With an increased focus on developing nuclear power in the wake of the energy crisis on the 1970s, the NKS was established by the Nordic Council to further develop the previous strands of Nordic cooperation in nuclear safety. NKS started its first programme in 1977, funding a series of 4 year programmes over the next 24 years covering the areas of reactor safety, waste management, emergency preparedness and radioecology. Initially funded directly from the Nordic Council, ownership of NKS was transferred from the political level to the national competent authorities at the beginning of the 1990s. This organisational and funding model has continued to the present day with additional financial support from a number of co-sponsors in Finland, Norway and Sweden.

The owners and main financiers of NKS are:

- Danish Emergency Management Agency
- Finnish Ministry of Employment and the Economy
- Icelandic Radiation Safety Authority
- Norwegian Radiation Protection Authority
- Swedish Radiation Safety Authority

The current NKS programme

In 2000, the owners of NKS decided to review the overall structure and organisation of NKS and outline a new format to the programme. National reviews of NKS were held in each Nordic country leading to a reorganisation of NKS in 2002 and the formation of two parallel research programmes; NKS-R on reactor safety and NKS-B on emergency preparedness each coordinated by a programme manager who reports to the NKS board. By 2011, these research programmes had evolved to cover a range of related nuclear safety issues:

NKS-R programme

Reactor Safety
Decommissioning
Organisational issues

NKS-B programme

Radiological and nuclear emergency preparedness
Measurement strategy, technology and quality assurance

Radioecology and environmental assessments
Management of radioactive waste and discharges

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.

These aims are achieved through the financial support of 1 year activities under each of the NKS-R and NKS-B programmes. New NKS activities are sought under annual call for proposals for each programme and decisions on funding are made by the NKS board. Since 2002, NKS has provided financial support to a combined total of more than 100 activities under the NKS-R and NKS-B programmes. In 2011, the combined budget of NKS was 1.3 million € with 0.9 million € made available to support activities under the NKS-R and NKS-B programmes. In addition to the funding provided directly by NKS it should be noted that matching in-kind contributions are provided by organisations participating in NKS activities, without which it would not be possible for NKS activities to take place.

NKS activities can take the form of research and development projects, exercises or seminars and workshops to address relevant issues of common Nordic interest. To ensure the Nordic dimension of the work, a minimum of 2 (NKS-R) or 3 (NKS-B) of the 5 Nordic countries must be involved in a planned activity. Dissemination of NKS activity outputs through published reports and the establishment and maintenance of networks allows for the sharing of expertise and experience across the Nordic countries. The regular invitation of international experts to NKS seminars and workshops allows the Nordic nuclear community to keep abreast of developing international recommendations and research. Furthermore, by keeping vital informal networks in tune between the Nordic authorities, scientists and other stakeholders, the region's potential for fast, coordinated and targeted response to urgent issues is strengthened. The provision of common grounds for understanding in cross-border issues is an important facet of the informal networks created by NKS, maintaining trust in Nordic authorities and facilitating harmonization in responses and recommendations.

Through a flexible organisation NKS can rapidly adapt to emerging issues, new challenges and sudden events. This was reflected for instance in the inclusion under the NKS-B programme of the need for activities dealing with radiological terror threats nearly a decade ago, while in 2012, NKS will organise a seminar devoted to the lessons learned from the Fukushima accident. Ensuring knowledge and expertise for the future is a priority task, which NKS addresses by promoting the involvement of students and young scientists in all its activities. Experience has shown that new problems will emerge in relation to nuclear and radiological safety and it is already clear that technological improvements are needed for existing management tools. Through the NKS-R and NKS-B programmes, the opportunity exists for the next generation of Nordic nuclear safety workers to develop their careers, contact network and to meet the challenges that lie ahead.

Some recent examples of funded NKS-R and NKS-B activities

The understanding of human and organisational factors on nuclear safety

Through interviews the characteristics of the Nordic nuclear power safety culture has been investigated. The interviews have been tested against a theoretical model developed by the project. The ambition to increase the understanding of safety culture is of great interest for both regulatory bodies and power companies. (Project NKS-R MOSACA)

Increased knowledge of organic and inorganic iodine during severe accident conditions

Several experiments have been performed in order to document the formation of iodine oxides by radiolysis and the absorption of IO_x particles on different surfaces found in the reactor containment. The results will help to increase the resolution in computer modelling codes and provide a more accurate determination of the source term for severe accident scenarios. (Project NKS-R NROI and NKS-R AIAS)

Parameters for ingestion dose models for Nordic areas

Nordic specific data for a number of parameters used in the dose assessment ECOSYS model have been derived including typical diets, imported food products, animal feeding regimes, leaf area indices and relevant soil parameters. Default ECOSYS parameters produce ingestion doses in Nordic areas that can be under or over-estimated by orders of magnitude. (Project NKS-B PardNor)

Nordic workshop for users of gamma spectrometry

A workshop was held to address common problems in gamma spectrometry through lectures and practical exercises, allowing Nordic users to share their own experience in gamma spectrometry and to develop their analytical skills. Topics covered by the workshop included matrix and absorption corrections, true coincidence summing corrections, gamma spectrometry of natural radionuclides and uncertainties and detection limits. (Project NKS-B GammaWorkshops)

The evolution of Nordic co-operation on nuclear safety issues has been documented in the book "Half a Century of Nordic Nuclear Co-operation. An Insider's Recollection" by Franz R. Marcus, while a more recent overview of the NKS programme has been produced in the report "Nordic Nuclear Safety Research 1994-2008: From Standardized 4-Year Classics To Customized R&B" by Torkel N. O. Bennerstedt. These reviews are available for download free of charge, along with all NKS activity reports from the NKS website www.nks.org.