

Nordic radiation and nuclear co-operation in an international context.

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Bo Lindell lecture
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GEISLAVARNIR RÍKISINS
ICELANDIC RADIATION SAFETY AUTHORITY

The situation after WW 2

- The nuclear age had entered with a new and potentially unlimited source of energy for the future.
- The Nordic countries were all interested in peaceful uses of atomic energy.
- Studies in Sweden began in 1946 - 47.
- First Nordic reactor in Norway in 1951 – a major achievement.
- Even Iceland looked at production of heavy water by domestic energy sources.



The very beginning of a long journey.

- Sporadic contacts in the nuclear arena from 1947 and nordic nuclear meetings from 1949.
- Atmospheric bomb tests began in 1950.
- Contacts in radiation protection soon after.
- Increased international attention:
 - Eisenhower's Atoms for Peace speech in 1953.
 - The Geneva Conference on Peaceful Uses of Atomic Energy in 1955.
 - UNSCEAR established in 1956, with Sweden as a founding member.
 - IAEA established in 1957



The Nordic Council of Ministers ... NKA

- The Nordic Council of Ministers, NCM, was established in 1952, Finland joined in 1955.
- The Suez crisis in 1956 underscored Europe's dependence on imported oil.
- A permanent committee to follow planning and activities in the field of atomic energy and to promote the resulting possibilities for Nordic co-operation including industrial co-operation in the fields of reactors was established in 1957 through a resolution at NCM addressed to the Nordic governments.



NCM NKA

- This committee adopted later the acronym NKA Nordisk Kontaktorgan for Atomenergifrågor.
- Members of NKA were high ranking officials from the ministries for energy/industry and the Foreign ministries.
- At meetings they were accompanied by leading experts from the research centers and sometimes also from the industry.
- NKA was political and the officials in charge.
- Focus on international issues the first years



NKA .. Mutual assistance

- Questions on Reactor safety were raised in NKA already in 1959.
- Discussions on arrangements for mutual assistance in case of a nuclear accident.
- A nordic agreement on mutual assistance was signed in 1963 with IAEA involved. First international agreement of this kind – precursor to the IAEA Assistance Convention.
- Iceland adhered to the spirit of the agreement as stated in a letter in 1968.



NKA in Iceland i 1967 - Thingvellir

All the Nordic countries took part in NKA.

- Iikka Mäkipenti
- Knut Gussgard
- Erkki Laurila
- Gert Vigh
- Harry Brynielsson
- Jens Chr. Hauge
- Hans von Bülow
- Odd Gøthe



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and the Authorities ...

- Radioactive fallout in the Nordic countries – growing concern, nordic contacts and meetings from 1955 initiated by Rolf Sievert.
- Strong concentration of radionuclides in lichen was of concern.
- **Atomic bomb tests culminated in 1958.**
- Saltholmen late 1958 – drinking water (rain water) contaminated by radioactive fallout, big concern, several meetings and a joint Nordic statement (1st.)



The authorities – cont.

- The NCM recommends co-operation between the Radiation Protection Authorities late 1959.
- Regular meetings of experts with focus on radioactive fallout after 1959.
- A gentlemen's agreement on early warning.
 - Danmark-Sweden, Norway - Sweden
- After 1965 there was more focus on other areas – regular meetings between the directors and experts.
- Iceland participated from 1965.



Nordic Directors in Iceland 1965

- Bo Lindell
- Rolf Sievert
 - Last Nordic meeting
- Arne Nelson
- Juel Henningsen
- Per Grande
 - Picture by Olli Pakkola.



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The Nordic Society .

- Rolf Sievert took the initiative to establish the Nordic Society for Radiation Protection which was formed on 10 June 1964 and Sievert was elected as the 1st president.
- Sievert and Lindell were actively involved in the founding of IRPA. Sievert was on the IRPA provisional EC set up in november 1964 with Bo Lindell as his substitute.
- IRPA was founded 19 June 1965 and the Nordic Society became a member of IRPA at the end of 1965.



The Nordic Society cont.

- The first „big“ conference of the Nordic Society took place in Stockholm in February 1966 with 150 participants, 35 lectures and 2 panel discussions.
 - Asker Aakrog– Sr-90 in the Danish environment.
 - Olli Castren – Cs -137 in milk in Finland
 - Monica Gustafsson– Cs–137 in Swedish populations
 - Lennart Devell – internal contamination of personnel
 - Olli Ojala – GSD from x-ray examinations in Finland
 - Rune Walstam – radiation-induced cataracts in children due to medical procedures



IRPA.

- IRPA 's first Congress was held in Rome in September 1966 and Bo Lindell was elected to the first EC of IRPA.
- IRPA had now 15 AS and more than 5000 members from more than 55 countries.
- The proceedings from the Congress were compiled into two thick volumes.
- Since then IRPA has held International Congresses approximately every four years in all corners of the globe as well as sponsoring a large number of regional congresses i.e. Finland 2010.



NKA – cont.

- Economic growth in the Nordic region in late 1960 's raised demand for electricity.

Was nuclear power the way forward ?

- NCM felt the need in 1967 to intensify Nordic co-operation in the nuclear arena, to strengthen research institutes and provide opportunity for industry.
- More NKA related groups were established in 1970 i.e. „The Committee“ with focus on R&D and and the „Contact Group“. Franz Marcus was secretary general of NKA and the Committee and active in all groups.
- The structure of the NKA framework became gradually more and more complicated.



NKA .. opposition to nuclear power

- ...but the times they were a changing ...
- Organized opposition to nuclear power spread following the social unrest in Europe in 1968.
- „Limits to growth“ was published in 1968 and raised concern over modern technology, the environment and pollution.
- A Nordic contact group to exchange information about risks and environmental effects related to nuclear power was established in 1972 by the Committee.



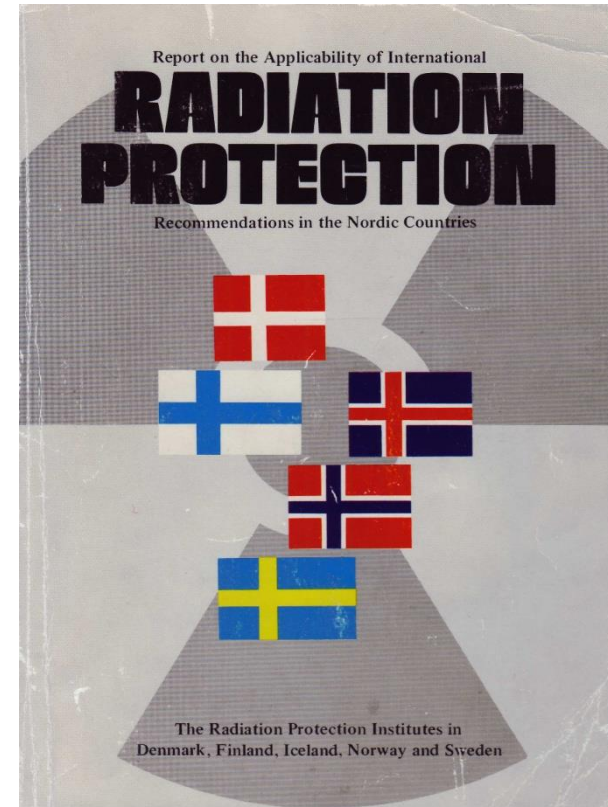
The Authorities cont.

- Co-operation between the Authorities progressed well and led to Nordic publications – the Flagbooks – dealing with international recommendations on radiation protection adapted to Nordic conditions.
- Work on the big Nordic Flagbook – the Nordic Basic Safety Standards – began in 1969 under leadership of Bo Lindell.
- Several working groups were involved.
- Impressive work that was concluded in 1976.



The big Nordic Flagbook.

- “ Nordic BSS ”
- A major contribution towards a common Nordic view on Radiation Protection.
- Written in english



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The Authorities ... – cont.

- The co-operation between the radiation protection authorities was expanded to include reactor safety questions.
- The first joint meeting of the radiation protection and the (emerging) reactor safety authorities took place in 1972.
- The first joint directors meeting took place in 1977 chaired by Bo Lindell and the Chiefs group (Chefs gruppen) was established:
 - annual meetings addressing radiation protection and reactor safety issues of common interest.



From NKA to NKS ..

- Energy crisis in late 1973, oil embargo – change in lifestyle, no private cars on sundays
- Impact on views on nuclear power.
 - Safety concerns balanced by fears about shortage of energy and dependence on energy supplies from abroad.
 - Nordic Ministers supported increased R&D on nuclear safety
- Public opinion still in fear of nuclear power
- Opposition against nuclear power addressed by NKA in 1974 – reactors, waste, transport ...



From NKA to NKS cont.

- Extended co-operation in nuclear safety was discussed in the NKA groups in 1975 leading to a report for the Ministers.
- The Ministers requested a concrete proposal for joint projects to enhance nuclear safety.
- An ad-hoc NKA group for nuclear safety, with the acronym NKS, developed a proposal.
- The proposal was presented to the Ministers in late 1976 by FM. A total of 35 projects at a cost of 3 M EUR over a period of 3 years.



From NKA to NKS ... cont.

- NKA assumed general responsibility, nominated steering groups, project leaders and host organizations. Complicated structure and the administration was time consuming.
- The Nordic Secretary (FM) co-ordinated the program and was the link between the project work and NKA (and the NCM Secretariat) who controlled the funding.
- The concept of at least equal funding (in kind) was introduced.



NKS 1st program.

- NKS research program began in **1977**, as a trial year with pilot projects. Focus on radioecology, radioactive waste and quality assurance. The program which finished in **1981** was regarded as a success.
- Seminars to disseminate results took place.
- The program was evaluated with focus on results obtained and lessons learned i.e. role of steering groups, minimum size of projects, limited funds go a long way. The evaluation report was widely distributed.



The Authorities and NKA/NKS...

- The Nordic co-operation was now in two parallel tracks.
- On one hand the practical voluntary cooperation between the authorities and on the other hand the political and research co-operation through NKA/NKS funded by NCM.
- The directors attended the NKA/NKS meetings but kept their distanceoutermost layer.
- The co-operation between the Authorities was very good with useful results for all involved.



Chefsmeeting at SIS in 1982.

- This was my first chefs-meeting.
- Other newcomers were Kaare Ulbak and Gunnar Saxeböl



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TMI

- Nuclear power was well established in both Sweden and Finland at the end of the 1970 's. Denmark kept the door open. Norway, Iceland felt no need for nuclear power any time soon.
- The TMI nuclear accident in March 1979 raised fears concerning nuclear safety and the opposition to nuclear power increased ..(there was no dose to members of the public).
- A wave of opposition in the Nordic countries was created. Barsebäck discussions



NKS, 2nd program

- NCM decided to fund a new research program.
- Planning was more difficult now involving Officials from both Energy/industry and Enviroment. The aftermath of TMI...
- Environmental implications of energy production were to be addressed by Environment Officials not Energy/Industry.
- Officials from the nordic ministries (energy and foreign affairs) were still in charge of NKA and appointed members of NKS.



NKS, 2nd program cont.

- TMI had a great impact on the 2nd NKS program **1981 – 1985** focusing on reactor safety, radioecology and radioactive waste.
- Funding, about 1 M EUR annually, from the Nordic Council gave rise to criticism from the vocal anti nuclear groups also within the NC.
- Same complicated administrative structure with long planning phase, pilot projects, steering groups etc.
- Summary reports were widely distributed and external evaluation was positive.



NKS, 3rd program

- Plans for the 3rd NKS research program **1985 – 1989** was met with severe critic from within parts of the Nordic Council and complications in obtaining funding from the Council.
- Administration now even more complicated with a coordinator for each program area in addition to steering groups and projectleaders
- 5 program areas and 35 projects:
 - radioactive waste; risk analysis and safety philosophy; release, dispersion and environmental consequences; materials; information technology



NKS, 3rd program cont.

- No radioecology - the ministerial officials in charge of the NKA/NKS said that „ enough measurements have been carried out „ ignoring the strong views of the research community and the safety authorities.
- Still there was about 1 M EUR annually ... and
- Iceland was now actively participating in the NKS program and I was a member of NKS.



NKS, 3rd program cont.

- Another generation... NKA/NKS an „old boys“ club meeting twice a year, in the country side for 2 – 3 days with excursions and 18 – 20 pages of minutes from each meeting. They seemed to have so much time..
- Franz Marcus was the Nordic secretary general of NKA/NKS – Very Executive –
- Sarcastic comments from some researchers:
 - NKS **aka** Nordisk **K**ulinarisk **S**elskap.
 - and
 - FM **aka** Kaiser Franz and Marcus Aurelius.



NKA/NKS

- The political winds in 1985 were clearly changing and dark clouds emerging – NKA was regarded by more and more in the Nordic Council as „a state within the state“ and as „a promotor of nuclear power“.
- A complicated non-transparent structure, and too many players: politicians, officials and different professionals fueled this unfortunate perception.

Then there was Chernobyl on 26 April 1986.



Chernobyl

- Monday 28. april - Gunnar Bengtsson, GD, at SSI:
„ Sigurdur, I need to go – there seems to be something serious happening at Forsmark „
- Many new actors became involved i.e. nordic ministers for environment, health, agriculture, social and most had very strong views.
- Chernobyl had an impact on the NKS research program; a proposal for radioecology projects and to use Chernobyl fallout for identification of critical pathways for radionuclides.



Nordic co-operation after Chernobyl

- A request for additional 1 M EUR for radioecology in early 1987 was not supported by the energy and environment officials and finally turned down by the Ministers.
- The authorities increased their co-operation and established new WG 's on EP&R and detection of airborne radioactivity.
- The co-operation between the Nordic authorities stood the test of Chernobyl but the situation for NKA/NKS within NCM became progressively more and more difficult.



The end of NKA ...the Annerberg group

- A WG on nuclear accidents and radioactive contamination was established by NCM in October 1986, the Annerberg group.
 - Requested by environment ministers after heated political debates in NCM.
 - WG to report to Officials-Environment not Energy. A clear vote of no confidence to them and NKA.
 - Antti Vuorinen and I were members of the group. Per Ivar Wethe was secretary.
 - The group was did a good job and managed to stayed focused on the non-political issues but the discussions on future funding were difficult.



The final report of the Annerberg group

- The final report (February 1988):
 - was positive towards the Nordic co-operation through NKA/NKS and the authorities which had been instrumental in establishing useful direct contacts after Chernobyl.
 - supported ongoing and future NKS research to include nuclear safety, emergency preparedness, radioecology and waste management.
- The Environment Ministers „simply“ forwarded the final report to the Energy Ministers



The end of NKA ...

- It was now clear that NKA would not survive as it did not at all fit into the structure of NCM and the political opposition was increasing with difficult debates at each NCM meetings.
- Lack of statutes for NKA became suddenly a problem. Statutes were developed and approved by the Energy ministers in 1987 – 30 year after the foundation of NKA.
- The Brundtland report „ Our Common future“ and sustainable development had now the full attention of NCM.



The end of NKA cont.

- In 1989 Denmark refused to accept funding of NKS projects at the proposed level of about 1 M EUR annually and requested a 50% cut ...
- Attempts to compromise did not succeed.
- The Ministers decided in June 1989 „to eliminate the Kontaktorgan from the budget of the Ministers“ and in November to abolish the statutes of the Kontaktorgan.
- This was the end of Kontaktorganet (NKA) as it had been for more than 30 years.



The end of NKA cont.

- Sweden withdrew from NKA in July 1990.
- NKA/NKS was very important for Nordic co-operation producing useful results but did not survive the political situation after Chernobyl.
- I remember well the difficult meetings (due to political constraints) in the final years of NKA.
- NKS activities would be continued by an voluntary agreement between the national authorities except for Finland.



The authorities after Chernobyl...

- Co-operation between the authorities was smooth and unconstrained by political influence while NKA was approaching the end.
- The authorities were praised for their handling of the impact of the Chernobyl accident and their useful co-operation.
- It was even considered if they could take over the NKS research program after NKA was terminated



NKS after NCM ...

- Interest to continue NKS work outside NCM.
- All countries involved with national funding. Funding from Co-sponsors was also sought.
- A new Consortium (Owners) was constituted in Copenhagen in December 1989.
 - Authorities in Denmark, Iceland, Norway and Sweden. Ministry of Trade and Industry in Finland
- A total of about 1 M EUR available annually.
- The complicated administrative structure was maintained: FM as executive secretary and reference groups replacing steering groups.



NKS, 4th program 1990 – 1994.

- The Consortial group appointed members of NKS. NKS appointed project leaders/co-ordinators (19) and reference group members (28) for the 4th program in January 1990.
- Program areas:
 - Emergency preparedness.
 - Waste and decommissioning.
 - Radioecology
 - Reactor Safety
- 15 final reports and 3 final seminars in 1994.

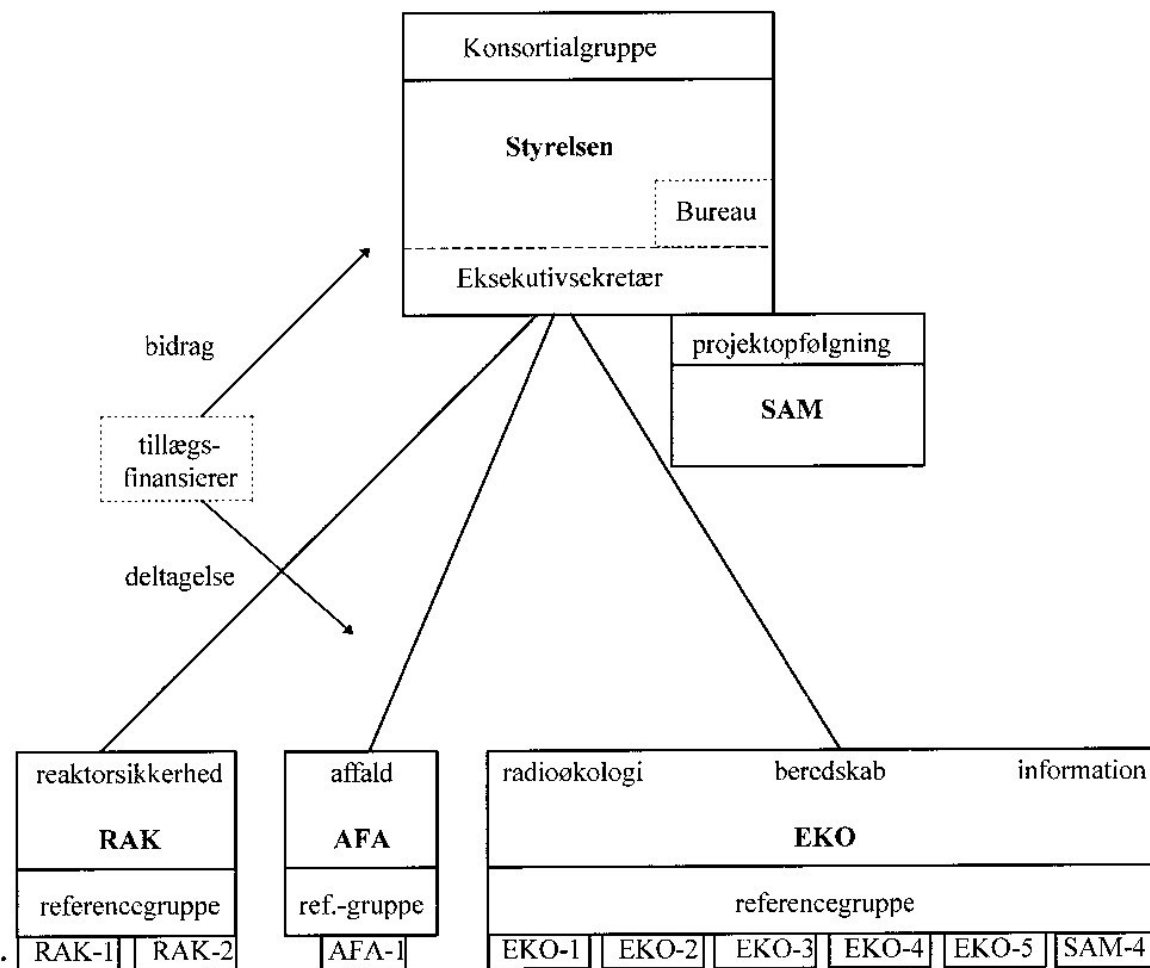


NKS – the times they were a changing...

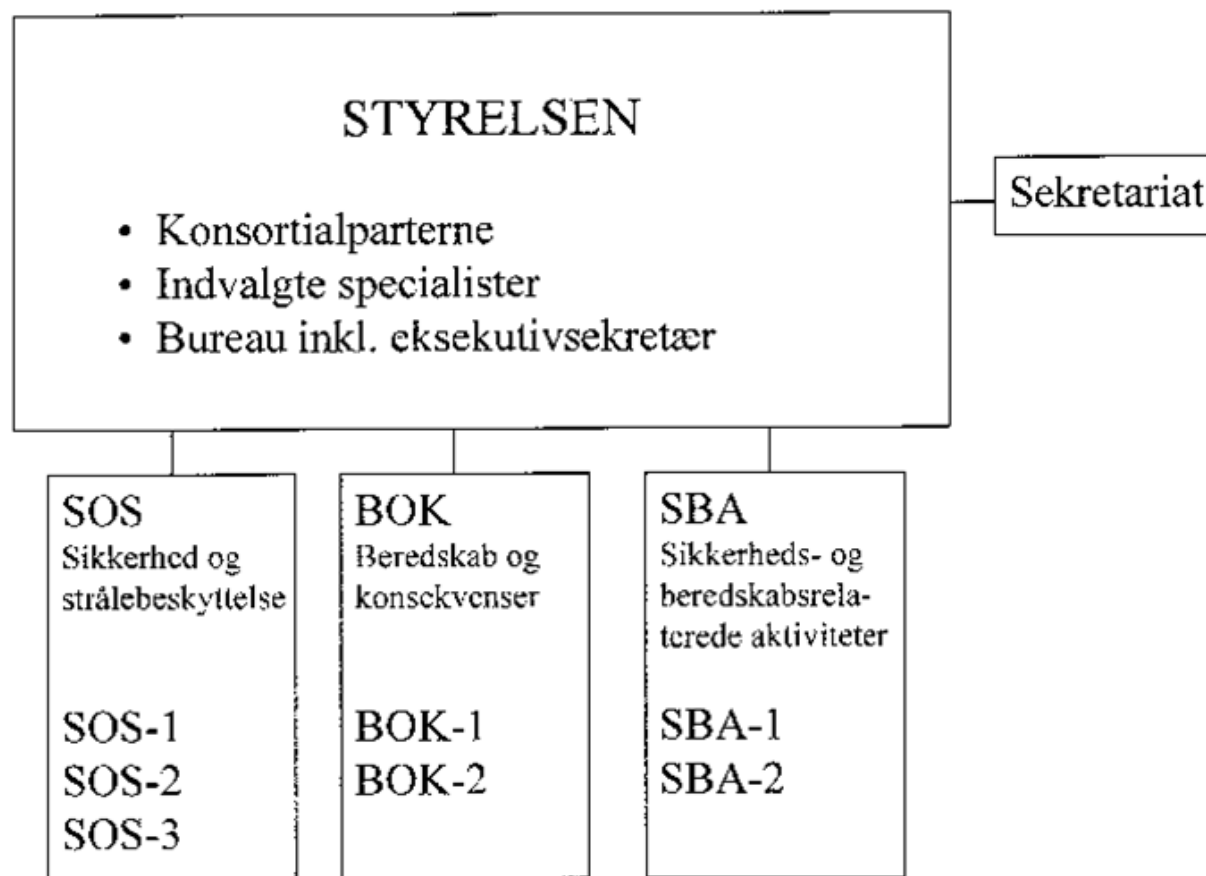
- FM retired in 1994 and Torkel Bennerstedt took over as „Nordic Secretary“ until 2006.
- Two very different personalities - both very competent and efficient.



NKS organization 1996, 5th program



NKS organization 2000, 6th program



NKS – changes in 2002

- The formal cyclical 4 year NKS programs continued until 2002.
- In 2002 a more dynamic, cost efficient and flexible project structure was introduced.
 - 2 program areas, R&B (Reactor Safety and Emergency Preparedness inc. Radiocology and Measurements), a PC for each area, no „groups“
 - Annual call for proposals, not a 4 year period
 - Formal evaluation and a formal decision process on funding in the NKS board and projects not automatically continued for more than 1 year.

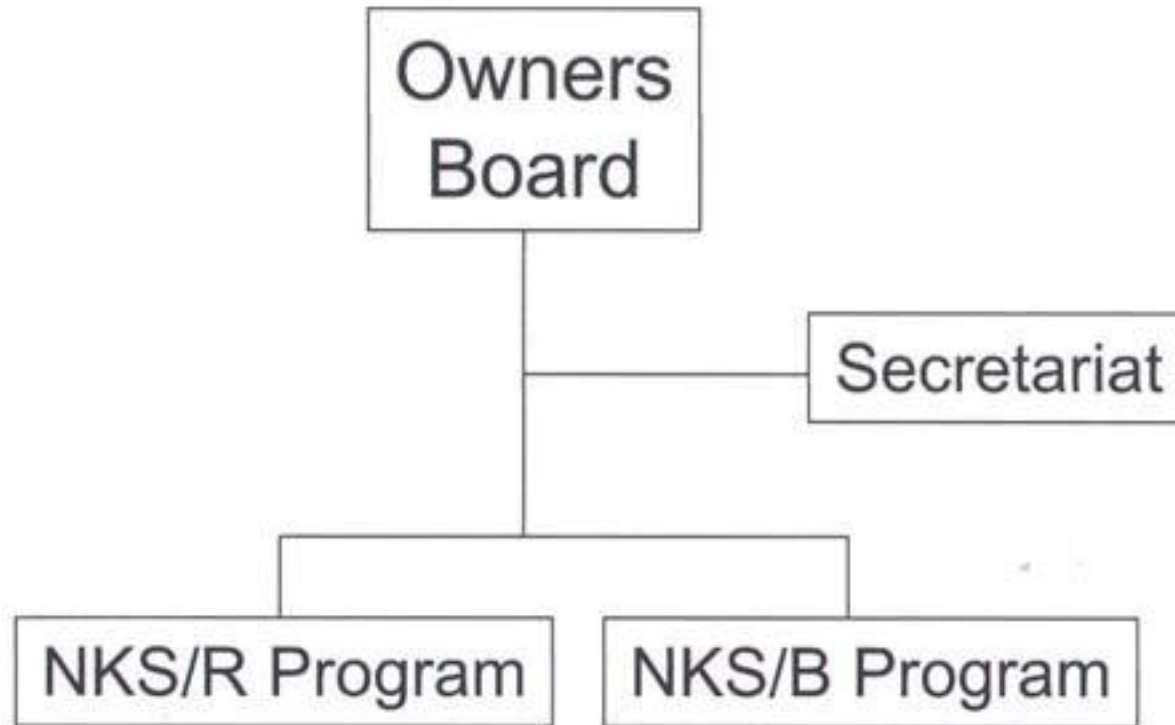


NKS since 2006

- NKS has adapted well to changing times.
- Administration further simplified in 2006 – optimized - with more funds available for research projects.
 - the secretary of the Board, the Bureau and the Nordic (executive) secretary were discontinued.
- Stable financing about 1 M EUR annually and at least equal in kind contribution.
- The next call for proposals is next month.
Look forward to many good project proposals, see www.nks.org.



NKS organization after 2006



Fukushima

- The Fukushima accident had an impact on the NKS research program and the co-operation between the authorities.
- A nuclear accident somewhere is a nuclear accident everywhere. Information overflow.
- System of radiation protection is robust and fit for purpose. Stood the test of Fukushima but ICRP MC TF identified several areas for improvement.
- How can we deal with a major nuclear accident in Europe ...



The authorities ...

- The co-operation between the authorities continues to be very useful. The directors meet at least once every year. There are several active WG's.
- Nordic statements and publications on issues of common interest i.e. the Nordic Guidelines and recommendations (Flagbook) in 2014:
 - **Protective Measures in Early and Intermediate Phases of a Nuclear or Radiological Emergency**
- With a new actor on the scene, **HERCA**, the co-operation is now more outward looking.



Who is this new actor HERCA ?

Despite common European Regulatory Framework, there is flexibility in transposing into national regulations which has led to differences in radiation protection practices throughout Europe

→ There is a need for a network/association to address regulatory radiation protection issues in Europe

- Recognition of the need for increased co-operation between Radiation Protection Authorities within Europe.
 - Need for a common understanding, mutual approach and harmonization at the practical level.
- **HERCA (Heads of the European Radiological protection Competent Authorities) was established in 2007 to meet this need.**



Objectives of HERCA

HERCA has the objective to contribute to a high level of radiological protection throughout Europe by:

- building and maintaining comprehensive European network of radiation safety regulators in Europe
- promoting exchange of experience and learning from each other's best practices
- discussing, and where appropriate, expressing its consensus opinion on significant radiological protection and regulatory issues
- developing a common approach to radiological protection issues;
- having an impact on the practice of radiological protection, within the States of HERCA members, through the voluntary implementation of outcomes from HERCA work.



HERCA Overview – Official nomination

Official nomination by Radiation Protection
Authorities (RPAs)

AT	:	Austria
BE	:	Belgium
BG	:	Bulgaria
HR	:	Croatia
CY	:	Cyprus
CZ	:	Czech Republic
DK	:	Denmark
EE	:	Estonia
FI	:	Finland
FR	:	France
DE	:	Germany
EL	:	Greece
HU	:	Hungary
IS	:	Iceland
IE	:	Ireland
IT	:	Italy
LV	:	Latvia
LT	:	Lithuania
LU	:	Luxembourg
MT	:	Malta
NL	:	Netherlands
NO	:	Norway
PL	:	Poland
PT	:	Portugal
RO	:	Romania
SK	:	Slovakia
SI	:	Slovenia
ES	:	Spain
SE	:	Sweden
CH	:	Switzerland
UK	:	United Kingdom

52 RPA from
**31 European
countries**
(incl. the 28
EU MS).



The authorities and NKS

- The authorities have a leading role within NKS and several of the directors are members of the owners group and the NKS board.
- Can the directors group take over as the owners/board of NKS ? Last discussed in 2003 but no consensus due to the situation in Finland - the contribution to NKS is from the Ministry not from STUK.
- Conclusion in 2003: in the near future the Directors Meetings and NKS will continue to be separate with no formal links.



The international co-operation ...

- Radiation and nuclear safety is a global issue.
- Through international co-operation a robust, system of radiological protection and global safety standards have been developed.
- Nordic views are important in the global context and international co-operation is important for the Nordic countries.
- Together the Nordic's are much more influential than each country alone and can continue to play a key role in the international arena.



Conclusions ...

- The Nordic nuclear and radiation co-operation for more than 60 years has:
 - been of great value for all the Nordic countries regardless of their views towards nuclear power.
 - contributed in a significant way to better radiation and nuclear safety in the Nordic countries as well as to a common Nordic view on radiation and nuclear safety issues.
 - stood the test of Chernobyl and Fukushima.
 - adapted well to changing national needs and available resources



Conclusions cont.

- The Nordic co-operation in radiation and nuclear safety for more than 60 years has in particular:
 - Adapted well to the changing political situation and new realities i.e. political views towards nuclear power and membership of Danmark, Finland and Sweden in EU.
- Common Nordic statements have proven their value.



Conclusions ... final

- The Nordic co-operation in radiation and nuclear safety
 - is still going strong after 60 years

and

- will continue to be of great importance in the future
- adapting well to societal and technological changes as it has in the past.



Nordic co-operation ..

Thank you very much
for your attention.

