DRAFT

NKS(15)4
2015-05-06

Agenda for the board meeting in Copenhagen 12 June 2015

Place:
Park Inn by Radisson Copenhagen Airport, Engvej 171, DK-2300 København S

Time: 10:00 to 15:00

1 Opening

2 Practical remarks
- Meeting secretary.
- Information from chairman and host.

3 Approval of the agenda

4 Minutes of the last board meeting (Helsinki 13 January 2015)
- See draft minutes NKS(15)1 dated 2015-02-06.
- Review, discussion and decision.

5 Accounts 2014
- See distributed material: Financial Statements 2014, NKS(15)2 and Long-Form Audit Report, both dated 2015-04-01.
- Presentation by the auditor and the secretariat, discussion and decision.

6 Financial status for the current year
- See distributed material: Financial status report and financial programme specification, both dated 2015-05-29.
- Presentation, discussion.

7 News since last board meeting

- Report from the owners' group.
- News from the board members' organisations.
- Administrative news.

8 R-part: status

- See material from Karin Andgren: status report May 2015.
- Presentation by the programme manager.
- Discussion.

9 B-part: status

- See material from Kasper Andersson: status report May 2015.
- Presentation by the programme manager.
- Discussion.

10 NKS seminar on current trends in nuclear and radiological safety 2016

- Presentation by the programme managers.
- Discussion.

11 Information activities

- The website, NewsLetters, NewsFlashes etc.
- New pamphlet.
- Discussion.

12 Research activities in 2016

- Call for Proposals.
- Preliminary budget 2016.
- Funding 2016.
- Discussion, decision.

13 Other issues

- Waste activity based on request from the Nordic Council of Ministers.
- NSFS conference 2015.
- Any other business.

14 Next meeting

- Next meeting will be 12 January 2016 in Stockholm.

15 End of meeting

DRAFT
NKS(15)1
2015-02-06

Minutes of the board meeting in Helsinki 13 January 2015

Present: Sigurður M. Magnússon (Chair), Eva Simic, Jorma Aurela, Ole Harbitz, Steen Hoe, Finn Ugletveit, Nici Bergroth, Kaare Ulbak, Jens-Peter Lynov, Annelie Bergman, Olga German, Timo Vanttola, Atle Valseth, Raimo Mustonen, Karin Andgren, Kasper Andersson and Finn Physant (meeting secretary).
Apologies: Tarja Ikäheimonen.

1 Opening

The Chair opened the meeting and welcomed the participants. The Chair expressed many thanks to the hosts Jorma Aurela and the Ministry of Employment and the Economy. A special welcome was given to Raimo Mustonen, who in this meeting replaced Tarja Ikäheimonen.

2 Practical remarks

Practical remarks about the meeting were given by the Chair and the host. Finn Physant was appointed meeting secretary.

3 Approval of the agenda

The agenda was approved. The Chair and Jorma Aurela proposed as agenda item 14: Possible alignment of NKS research activities (B-part) with EURATOM research activities. Everyone agreed to this.

4 Minutes of last board meeting (Copenhagen, 10 June 2014)

The minutes were approved. Actions noted in the appendix of the minutes of the last board meeting will be noted in parenthesis in these minutes.

5 News since last board meeting

a. Report from the owners' group meeting
Jorma Aurela had reported from the meeting of the owners' group at the dinner the evening before the board meeting. There had been three issues on the agenda of the meeting.

1. The financial situation.
   The owners of NKS are not in a position to provide more funding for NKS in

2015. Therefore the funding of R&B-activities needs to be reduced to about 3,4 MDKK for each area in order to have a reserve of about 1 MDKK.

2. Chairmanship of NKS.
   There is an agreement that Sigurður Magnússon chairs the NKS to the end of 2016. The owners unanimously decided that he would continue as Chair of NKS from 2017 to the end of 2018.
3. Possible alignment of NKS research activities (B-part) with EURATOM research activities.
   Jorma Aurela proposed that NKS looks at the possibility to align NKS research activities (B-part) with EURATOM research activities. The owners agreed to address the proposal at the board meeting (see item 14 Other issues).

b. News from board members' organisations

The members informed each other about relevant news.

c. Administrative news

Finn Physant informed the board that the policy document "This is NKS" had been updated according to the decision from the last board meeting. Karin Andgren presented a proposal for harmonization of R-research areas in different texts: "This is NKS", new 2015 folder, "Covered topics", web site NKS-R texts and CfP material (action C). The board took note of this.

Finn Physant noted that the "NKS Administrative Handbook" is still valid and updated. The handbook will be updated if needed.

Finn Physant presented the revision of the "Handbook for NKS applicants and activity leaders" especially the section "Who can apply" (action C). The formulation "The activity should involve organisations from at least 3 Nordic countries" was not found to be sufficiently specific, the intention being that a **proposal** should involve **applicant partners** from at least 3 Nordic countries even though only two countries can be accepted for R-proposals in special circumstances i.e. only competance in two Nordic countries. Further, a request had been made independently by two applicants in connection with writing of proposals for CfP 2015 for more clarity on how to apply proposal templates for proposals for continuation of ongoing activities. It was concluded that the PC's will provide the board with a proposal for revision of the current texts "Handbook for NKS applicants and activity leaders" (with special attention to sections 1.1, 1.4 and 2.4 as pointed out by Finn Ugletveit), "Instructions for applicants" and other relevant CfP material. A proposal for these revisions will be distributed by the end of March 2015 with a deadline for comments of end of April 2015.

It was suggested by Kaare Ulbak, that proposals for continuation of ongoing activities should in the future be required to contain a detailed overview of progress by the time of the new proposal on milestones and deliverables stated in the contract of the ongoing activity. It was felt that this would enhance reviewers' overview of the potential usefulness of continuation of the activity, and it was agreed that the PC's would address this in the design of proposal forms for CfP 2016 as well as in guidance texts for the call.

6 Financial status

Finn Physant presented the distributed material: Financial status report and financial programme specification, both dated 15 December 2014 and both including the wording "Contracts signed, but not paid" (action B). At this date the reserve was estimated to approximately 1,27 MDKK. Solely due to the last month's development in exchange rates

the reserve must now be calculated approximately 0,41 MDKK lower. – The board took note of the financial situation.

7 Agreements

The following four agreements were prepared for the board's decision:
-R-part programme manager 2015 with Vattenfall
-B-part programme manager 2015 with DTU Nutech
-secretariat until 30 June 2016 with FRIT and
-auditing for the accounts of 2014 with Dansk Revision.
All these agreements were approved.

8 R-part: status and new activities

The PC-R presented the status of the ongoing activities. The work under NKS-R is progressing according to plan. All activities initiated in 2013 have been finally reported and there are no unfinished activities from earlier years. Twelve final reports for four NKS-R activities have been published since the last board meeting. Two seminars have been carried out since the last board meeting and two seminars will be carried out in January 2015.
The PC-R presented the evaluation results and funding recommendation for CfP 2015 - a total of 16 proposals were received. After some discussion, the board agreed to fund the following activities in 2015 (all amounts in kDKK):

LESUN	600
PLANS	400
MODIG	300
L3PSA	340
ADdGROUND	500
DECOSE	460
ATR	300
COPSAR	500

The total budget for these 8 activities is 3400 kDKK.

9 B-part: status and new activities

The PC-B presented a status report for ongoing activities. The activities are progressing well. All activities started before 2014 are finalized. Of the twelve 2014 activities, 7 have been finalized, while 5 are expected to be finalized shortly. In addition to the final reports received from completed activities, a report has been received and published on the NKS website on a new voxel phantom available from NKS phantom library. This extra report describes a (for NKS cost-free) further development related to the 2011 NKS-B activity PIANOLIB. Three NKS-B seminars have been carried out in 2014.
The PC-B presented the evaluation results and funding recommendation for CfP 2015 – a total of 13 (of them 6 continued) proposals were received. After some discussion the board agreed to fund the following activities in 2015 (all amounts in kDKK):

FAUNA	345
NORCON	544
STANDMETHOD	317
EFMARE	408
GAMFAC	417

RAPID-TECH	317
NORCOP-COAST	145
IDEA	181
CONCORE	363
NUFORNOR	363

The total budget for these 10 activities will be 3400 kDKK.

Ole Harbitz suggested that a statement regarding max duration of projects and maximum yearly and total funding, which could be expected for a NKS activity should be included in the instructions for applicants. This should apply to both the R and B areas. The PC's will propose such a statement at the next board meeting.

10 Budget for 2015

Finn Physant presented the distributed budget proposal of 2 January 2015. – Only one revision had been made – the contribution from Fennovoima had been raised to 7,750 EUR according to the confirmation from Nici Bergroth. - All contributions were noted to and confirmed by the owners' and co-financiers' representatives. - Olga German confirmed that the contribution from Forsmark is raised with 3% compared to 2014 (to 13,150 EUR), whereas the contribution from Ringhals will be the same as in 2014 – namely 12,000 EUR. Olga German will soon inform Finn Physant about this year's contribution from OKG (a 3% raise to 12,450 EUR is now expected). - The budget approved by the board is attached in appendix A.
Finn Ugletveit asked for a more readable presentation of the figures concerning the reserve. This new presentation is included in appendix A.
It was discussed, which size the reserve should have. It was decided to take up this question during the June meeting with the auditor's participation.

11 Information activities

Finn Physant informed the board about the status of the new website, which was opened in May 2012, NewsLetters etc. The new website is still considered to be a good everyday working tool. User statistics have now been obtained for more than two years and were presented. There is a clear tendency that electronic news and special events (meetings, seminars etc.) attract more website users. Three NewsFlashes and one NewsLetter have been distributed since the last board meeting including news on the last board meeting, CfP 2015, new reports, upcoming seminars etc. There is a list of approximately 480 e-mail adresses, to which the electronic letters are sent. A new and updated version of the pamphlet "Nordic Nuclear Safety Research" will be published 2015.

12 NKS seminar on current trends in nuclear and radiological safety 2016

A program committee for the NKS seminar 12th-13th January 2016 has been formed. The members are: Patrick Isaksson (SSM), Eldri Holo (NRPA), Ulla Ehrnsten (VTT) and Kresten Breddam (SST).The PC-R presented the outcome of the first program committee meeting. Working title of the seminar is: " Nuclear risk assessment and preparedness: the Nordic view", sub-title: "Lessons learned from Fukushima and how do we proceed". The idea is to include six to seven sessions with different themes/topics. There could be key note speaker(s) for each session + international aspect (e.g. experiences from Fukushima) + presentation of relevant NKS activity(ies). Target group: NKS objective is networking for

the Nordic countries. The target group is both young and more senior professionals, both RnB side and both industry and academia. (I.e. the target group is broad, with focus on Nordic networking). Suggested venue is Finlandshuset in Stockholm.
The seminar outline was discussed by the board. The board emphasized the importance of clear objectives and it was decided that the PCs will present a set of objectives for the seminar at the board meeting in June. Reasons may include:
- Show NKS activities
- Plant new ideas for future activities
- Bring together people interested in the NKS-R and the NKS-B programme

Jorma Aurela expressed a wish for more "selling" topic titles. The board agreed to this and the PCs will present updated topic titles at the next board meeting.
The seminar title is suggested to be updated and include a forward focus. What are the challenges that lay ahead?
It is important to keep a balance between NKS-R related topics and NKS-B related topics and where possible address cross overs. Topics should be chosen in such a way that the programme catches the interest of most of the audience most of the time.
The topic named "stress tests" should be more focused on sharing information on improvements at the Nordic NPPs due to Fukushima.
Other ideas from the board for interesting presentations at the seminar include:

- Are authorities and industry spending too much resources on peer reviews?
- Safety of NPP's in Northeast Europe. Challenges ahead.
- Fukushima status – today . Why is it so important to continue work on L3PSA and so on. International comprehensive Fukushima report(s) can be presented.

Suggestions of NKS-R projects that can be presented during the session on "Defense-in-depth" are: DeCOSE (steam explosion), ADdGROUND and MODIG
The board wanted an expansion on the safety culture topic.
Can NORCON be finalized before the NKS seminar? The interest will probably be high for this report.
Relevant introductory and summarizing presentations should be held. An idea for an introductory presentation is new builds in the Nordic and near-Nordic region. A summarizing presentation could be on challenges taken up at different IAEA conf/reports or in ICRP work.
The key-note speakers should be highly ranked.
The PCs will organize additional program committee meeting(s) and present an updated and more detailed seminar program at the June board meeting (action F).

13 Request from the Nordic Council of Ministers

The PC-B presented the current status on the request from the Nordic Council of Ministers (NCM) for commissioned project work to identify possible needs for further Nordic collaboration on radioactive waste issues (explicitly excluding wastes from the nuclear industry and emergencies). At the NKS Board meeting in January 2014, it was decided to convey the proposal for consideration of the directors of the Nordic radiation safety authorities. These recommended at their next meeting in August 2014 that the work be undertaken by NKS. Specialists representing the authorities in each Nordic country will thus meet in Copenhagen in the Spring of 2015, and provide an overview of the national situations and discuss whether there are needs for further collaboration. If needs are identified, proposals for new collaboration plans on specific sub-topics will be outlined. On

the background of the results of the meeting, a short recommendation report will be written, including the national accounts as an appendix. Shortly after the Board meeting in January 2015, a contract between NKS and NCM has been signed. NCM will pay NKS 100,000 DKK for the work, which will be used to cover expenses for national experts and direct meeting costs. The directors of the Nordic radiation safety authorities will identify national participants at their earliest convenience, where this has not already been done. A date for the meeting in Copenhagen will be proposed in the near future.

14 Other issues

Possible alignment of NKS research activities (B part) with EURATOM research activities:
Jorma Aurela had proposed at the owners meeting that NKS looks at the possibility to align NKS research activities (B part) with EURATOM research activities and the owners had agreed to address the proposal at the board meeting under agenda item 14 Other issues. Raimo Mustonen introduced the topic and Jorma Aurela provided further information. The proposal was met with an open mind from the board members and it was agreed to set up a small working group to explore the feasibility and practicality of such an alignment. Members of the working group are: the NKS Chair, the PC´s, Per Strand and Sisko Saloma (to be confirmed by Jorma/Raimo). The Chair requested that Sisko be the secretary of the working group and that her first task would be to develop further the ideas outlined by Raimo and Jorma and submit to the other members of the working group ASAP.

15 Next meeting

Next meeting will be in Copenhagen 12 June 2015.

16 End of meeting

Many thanks for a good meeting were expressed by the chairman – especially to the host Jorma Aurela. Special sincere thanks were given to Finn Ugletveit and Kaare Ulbak, who both are retiring, for their cooperation and valuable contributions to the NKS.

Sigurður M. Magnússon
Chairman

Finn Physant
Meeting secretary

Appendices:
A: Budget decision for 2015
B: Actions from the board meeting

Appendix A - NKS budget decision for 2015 - 13 January 2015

Budgets	**Budget for 2015**	**Budget for 2015**	**Budget for 2014**
	EUR	**DKK**	**DKK**
R-part			
Activities	456.768	3.400.000	3.750.000
Fee PC	65.828	490.000	480.000
Travels PC	6.717	50.000	50.000
Coordination	6.717	50.000	50.000
Young scientists' travel	6.717	50.000	50.000
R total	**542.748**	**4.040.000**	**4.380.000**
B-part			
Activities	470.203	3.500.000	4.500.000
Fee PC	65.828	490.000	480.000
Travels PC	6.717	50.000	50.000
Coordination	6.717	50.000	50.000
Young scientists' travel	6.717	50.000	50.000
B total	**556.182**	**4.140.000**	**5.130.000**
Seminar 2016			
Seminar 2016	13.434	100.000	0
Seminar 2016 total	**13.434**	**100.000**	**0**
Translation project			
Translation project	0	0	149.206
Translation total	**0**	**0**	**149.206**
Common			
Common various according to specification	33.586	250.000	250.000
Common total	**33.586**	**250.000**	**250.000**
Others			
Fee Secretariat	86.652	645.000	630.000
Fee Chairman incl. travels	61.798	460.000	450.000
Travels Secretariat	1.343	10.000	10.000
Others total	**149.793**	**1.115.000**	**1.090.000**
TOTAL	**1.295.744**	**9.645.000**	**10.999.206**
Expected incomes according to app. 1	**1.163.897**	**8.663.585**	**8.856.884**
Surplus	**-131.847**	**-981.415**	**-2.142.322**

Any deficits to be covered by the reserve available for the board, which according to the financial status report of 15 December 2014 is ca.:	1.270.000,00
Proposed budget for 2015	-981.414,70
Present reserve and surplus	288.585,30
Funding reserved for use in 2014, but not used, will amount to ca.:	300.000,00
Loss due to the development in exchange rates 2014-2015 ca.:	-410.000,00
Old reservations from before 2012, not used, amount to ca.:	900.000,00
Total reserve end of January 2015: ca. DKK:	**1.078.585,30**
Total reserve end of January 2015: ca. EUR:	**144.901,03**

Specification of ”Common" for 2015

	2015 EUR	2015 DKK	2014 DKK
Common			
Reports, materials etc.	3.694	27.500	28.750
Postage, fees	1.008	7.500	7.500
Equipment	2.015	15.000	15.000
Internet	12.091	90.000	90.000
Auditing, consulting	8.061	60.000	58.750
Information material	4.030	30.000	30.000
Various expenses	2.687	20.000	20.000
Common total	**33.586**	**250.000**	**250.000**

Appendix 1 for budget decision for 2015

Pledge for funding in 2015 - Incomes

	Proposal for 2015 EUR	Proposal for 2015 DKK	Actual for 2014 DKK
SSM	480.209	3.574.480	3.801.980
TEM	340.000	2.530.824	2.536.502
BRS	57.400	427.263	428.221
GR	24.000	178.646	179.047
NRPA	141.004	1.049.580	1.128.885
Total EUR / DKK	**1.042.613**	**7.760.793**	**8.074.635**

SSM contribution SEK	4.550.000
NRPA contribution NOK	1.275.000

	EUR	DKK	DKK
Fortum	25.250	187.951	182.777
TVO	25.250	187.951	182.777
Fennovoima	7.750	57.688	55.952
IFE	12.000	89.323	85.793
Forsmark	13.150	97.883	95.268
Ringhals	12.000	89.323	89.524
OKG	12.450	92.673	90.158
NCM	13.434	100.000	0
Total EUR / DKK	**121.284**	**902.792**	**782.249**
Complete EUR / DKK	**1.163.897**	**8.663.585**	**8.856.884**

Exchange rates 2014/15:

NKS 2015:	
DKK	100,0000
EUR	7,4436
NOK	0,8232
SEK	0,7856
NKS 2014:	
SEK 2014	0,8356
EUR 2014	7,4603
NOK 2014	0,8854

Appendix B

Actions from the board meeting
(if nothing else is mentioned to be taken by the coordination group):

A. Ref. item 5: the PC's will provide the board with a proposal for revision of the current texts "Handbook for NKS applicants and activity leaders" (with special attention to sections 1.1, 1.4 and 2.4 as pointed out by Finn Ugletveit), "Instructions for applicants" and other relevant CfP material. A proposal for these revisions will be distributed by the end of March 2015 with a deadline for comments of end of April 2015.
B. Ref. item 5: the PC's would address this (activity continuation) in the design of proposal forms for CfP 2016 as well as in guidance texts for the call.
C. Ole Harbitz suggested that a statement regarding max duration and funding, which could be expected for a NKS activity should be included in the instructions for applicants. The PC's will propose such a statement at the next board meeting.
D. Ref. item 10: It was discussed, which size the reserve should have. It was decided to take up this question during the June meeting with the auditor's participation.
E. Ref. item 11: A new and updated version of the pamphlet "Nordic Nuclear Safety Research" will be published 2015.
F. Ref. item 12: The PCs will organize additional program committee meeting(s) and present an updated set of objectives and a more detailed draft seminar program at the June board meeting.
G. Ref. item 13: The directors of the Nordic radiation safety authorities will identify national participants at their earliest convenience, where this has not already been done. A date for the meeting in Copenhagen will be proposed in the near future.
H. Ref. item 14: The Chair requested that Sisko be the secretary of the working group and that her first task would be to develop further the ideas outlined by Raimo and Jorma and submit to the other members of the working group ASAP.

The Secretariat

2015-04-01
NKS(15)2

Financial statements

for

The Nordic Nuclear Safety Research Programme
NKS Secretariat

2014

1. april 2015
Finn Physant
FRIT

Statement by Management

The NKS Secretariat and Group of Owners have discussed and approved the annual report of The Nordic Nuclear Safety Research Programme (in the following referred to as 'NKS') for the financial year 1 January 2014 - 31 December 2014.

In our opinion, the financial statements provide a true and accurate picture of the organisation's assets, liabilities and equity, financial position as at 31 December 2014 and the results of the organisation's activities for the financial year 1 January 2014 - 31 December 2014.

In our opinion, the management's review includes a fair review of the matters dealt with in the management review.

We recommend the financial statement for approval by the Group of Owners.

Roskilde, 1 April 2015

NKS Secretariat:

Finn Physant

Copenhagen, 12 June 2015

Group of Owners:

Sigurður M. Magnússon
Chairman

Steen Cordt Hoe

Jorma Aurela

Ole Harbitz

Eva Simic

Independent Auditors' Report

To the group of owners of NKS

Report on the Financial Statements

We have audited the financial statements of NKS for the financial year 1 January to 31 December 2014, which comprises accounting policies, income statement, balance sheet and notes, including Financial Programme Specifikation. The financial statements are presented in accordance with the agreements and the accounting policies, which is decided by the Management, and which is described at page 5.

Management's responsibility for the financial statements

The Management is responsible for the preparation of financial statements that give a true and fair view in accordance with the agreements and the accounting policies, which is decided by the Management. The Management is also responsible for such internal control as the Management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In addition, Management is responsible for the transactions covered by the financial statements are consistant with the contribution, laws and other regulations, agreements and generally accepted practices.

Auditor's responsibility and basis of opinion

Our responsibility is to express an opinion on the financial statements based on our audit. We conducted our audit in accordance with International Standards on Auditing and additional requirements under Danish Audit regulation as well as the public accepted auditing standards. This requires that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatements of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to NKS's preparation of financial statements that give a true and fair view. In order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of NKS's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by the Management, as well as the overall presentation of the financial statements.

The audit also involves an evaluation whether there are established procedures and internal controls that support the transactions, covered by the financial statements, which are consistant with the contribution, laws and other regulations, agreements and the accounting policies, which is decided by the Management.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

The audit has not resulted in any qualification.

Independent Auditors' Report

Opinion

In our opinion, the financial statements give a true and fair view of NKS's financial position at 31 December 2014 and of the results of NKS's operations for the financial year 1 January to 31 December 2014 in accordance with the agreements and the accounting policies, which are decided by the Management.

It is also our opinion that there are established procedures and internal controls that supports that the transactions are subject to the financial statements are consistent with the contributions, laws and other regulations, agreements and the accounting policies, which is decided by the Management.

Statement on the management's review

We have read the Management's review. We have not performed any further procedures in addition to the audit of the financial statements. On this basis, it is our opinion that the information provided in the Management's review is consistent with the financial statements.

Roskilde, 1 April 2015

Dansk Revision Roskilde
Godkendt revisionsaktieselskab

Palle Sundstrøm
Partner, State-Authorised Public Accountant

Statement by Management

2014 has been characterised by planned work/operation of the R (Reactor)-part and the B (Emergency Preparedness)-part.

A new programme manager for the R-part has been appointed.

In the course of 2014, the currency market for the Norwegian and Swedish currency has developed in a negative direction in comparison with the Danish currency and the EURO. The total foreign exchange loss at the end of the year is at DKK 438,752 / EUR 58,943 / 7,4436.

The financial statements are presented in DKK, but the amounts are also stated in EUR in a separate column.

The financial statements show a loss of DKK 1,233,162 / EUR 165,667, which is consistent with decisions taken by the Board.

Subsequently, the equity as at 31 December 2014 constitutes DKK 7,980,680 / EUR 1,072,153.

In assessing the year's loss and equity as at 31 December 2014, consideration must be made of the contracts for the R and B parts of DKK 6,756,198 / EUR 907,652, where invoices have not yet been received or where the work has not yet been completed.

It may also be indicated that NKS in accordance with programme managers' statements has received external funding of around DKK 13,85 mio. / EUR 1,86 mio. in the form of un-charged contributions. The external funding is the work performed in connection with the implementation of activities for which invoices will not be sent.

Unused activity, coordination and travel funds for programmes for the year 2013 are returned to the reserve as are unused common programme costs for a total of DKK 912,568 / EUR 112,598.

Sigurður M. Magnússon
Chairman

Accounting policies

The financial statements are presented in accordance with the agreements and the accounting policies, which is decided by the Management.

The financial statements are presented in accordance with the same accounting policies as last year.

Recognition and measurement
The association uses the ”open post”-principle, which means, that all expenses, which is paid in the period 1/2-2014 - 31/1-2015, are included in the financial statements.

Conversion of foreign currencies
Transactions in foreign currencies are in the course of the year translated to the exchange rate at the beginning of the financial year. Giro and bank accounts, receivables and payables in foreign currencies, are translated at the exchange rates at the balance sheet date.

Realised and unrealised exchange differencies are recognised in the income statement as financial income or financial expences.

The income statement

Revenue recognitions
Income include grants for the financial year from the owners and the additional funding.

Expenses
Expenses include paid expenses for the financial year’s approved projects for respectively the R- and the B-part, including common program expenses and travels, activity supports and fees. The association is not taxable for VAT and therefore the expenses of the association are recognized including VAT.

Interest income
Interest income include interest income.

Income taxes
The association is not liable to pay tax.

Balance sheet

Cash and cash equivalents
Cash and cash equivalents include bankdeposit in giro and bank accounts in Denmark, Finland, Norway and Sweden.

Received prepayments
Received prepayments are measured at the exchange rates at the balance sheet date.

Income statement 2014

				Rate
Grants and interest income				**7,4436**
Beredskabsstyrelsen DK	DKK	428.221,22	EUR	57.528,78
Arbets- och näringsministeriet FI	DKK	2.536.502,00	EUR	340.762,80
Geislavarnir ríkisins IS	DKK	179.047,20	EUR	24.053,84
Statens strålevern NO	DKK	1.128.885,00	EUR	151.658,47
Strålsäkerhetsmyndigheten SE	DKK	3.801.980,00	EUR	510.771,67
Additional funding	DKK	782.249,76	EUR	105.090,25
Interest income	DKK	46.234,43	EUR	6.211,30
Total grants and interest income	**DKK**	**8.903.119,61**	**EUR**	**1.196.077,11**
Expenses				
R-Part	DKK	4.021.309,89		540.237,24
B-Part	DKK	4.284.730,62	EUR	575.626,12
Activity support	DKK	149.206,00	EUR	20.044,87
Fees	DKK	1.072.500,00	EUR	144.083,51
Common program expenses	DKK	166.737,48	EUR	22.400,11
Travels	DKK	3.145,95	EUR	422,64
Exchange adjustments	DKK	438.651,72	EUR	58.930,05
Total expenses for the NKS programme	**DKK**	**10.136.281,66**	EUR	**1.361.744,54**
Income - Expenses	**DKK**	**-1.233.162,05**	**EUR**	**-165.667,43**

Balance sheet 2014

Assets:				**Rate**
				7,4436
Giro and bank accounts converted to DKK, Note 1				
DK/IS-giro 918-9297	DKK	763.777,97	EUR	102.608,68
FI-giro 800015-70837915	DKK	1.493.221,07	EUR	200.604,69
NO-giro 7874.07.06976	DKK	1.171.683,86	EUR	157.408,22
SE-giro 6 64 63-1	DKK	6.212.349,34	EUR	834.589,36
Giro and bank accounts total	DKK	9.641.032,24	EUR	1.295.210,95
Total Assets	**DKK**	**9.641.032,24**	**EUR**	**1.295.210,95**

Liabilities:				
Equity:				
Retained from previous years	DKK	9.213.842,29	EUR	1.237.820,72
Result of this year	DKK	-1.233.162,05	EUR	-165.667,43
Total equity	**DKK**	**7.980.680,24**	**EUR**	**1.072.153,29**
Statement for new financial year, Note 2	DKK	1.660.352,00	EUR	223.057,66
Total Liabilities	**DKK**	**9.641.032,24**	**EUR**	**1.295.210,95**

Notes

Note 1: Giro and bank accounts:

		Currency	DKK	EUR
DK/IS-giro 918-9297:				
Holding 31.01.2015	DKK	763.777,97	763.777,97	102.608,68
FI-giro 800015-70837915				
Holding 31.01.2015	EUR	200.604,69	1.493.221,07	200.604,69
NO-giro 7874.07.06976				
Holding 31.01.2015	NOK	96.852,86	79.729,27	10.711,12
Giro deposits 31.01.2015	NOK	1.326.475,45	1.091.954,59	146.697,11
SE-giro 6 64 63-1:				
Holding 31.01.2015	SEK	7.907.776,65	6.212.349,34	834.589,36
Total			**9.641.032,24**	**1.295.210,96**

Kurser pr. 31.12.2014

EUR	744,36
NOK	82,32
SEK	78,56

Note 2: Payment regarding the new financial year from <u>Strålsäkerhetsmyndigheten, SE</u> and <u>additional funding from IFE, NO</u>:

Owner contribution for 2015 - Paid 29.12.2014
Additional funding for 2015 - Paid 30.01.2015

Notes

Financial programme specification
31 January 2015

	DKK							EUR	7,4436	
Total	Budget from 2013	Returned 2013	Budget 2014	Total budget 2014	Payments made	Contracts signed, but not paid	Rest budget	Payments made	Contracts signed, but not paid	Rest budget
R-Part	2.376.420	-250.688	4.381.000	6.506.732	4.021.311	2.385.286	100.135	540.237	320.448	13.452
B-Part	4.168.177	-501.057	5.130.000	8.797.120	4.284.731	4.370.912	141.477	575.626	587.204	19.007
Activity support	88.951	-88.951	149.206	149.206	149.206	0	0	20.045	0	0
Fees	6.900	-6.900	1.080.000	1.080.000	1.072.500	0	7.500	144.084	0	1.008
Common programme exp.	61.728	-61.728	250.000	250.000	166.738	0	83.262	22.400	0	11.186
Travels	3.244	-3.244	10.000	10.000	3.146	0	6.854	423	0	921
I alt	6.705.420	-912.568	11.000.206	16.793.058	9.697.632	6.756.198	339.228	1.302.815	907.652	45.573
	F_1	F_2	F_3	F	G	H_1	H_2	G	H_1	H_2

$F_1 + F_2 + F3 = F$
$F - G = H = H_1 + H_2$

Notes

Detailed financial programme specification - 31 January 2015

	DKK							EUR	7,4436	
Specifikation:	Budget from 2013	Returned 2013	Budget 2014	Total budget 2014	Payments made	Contracts signed, but not paid	Rest budget	Payments made	Contracts signed, but not paid	Rest budget
R-Part: Common program.	175.857	-175.857	580.000	580.000	279.214	240.000	60.786	37.511	32.242	8.166
Activities	2.125.732	0	3.751.000	5.876.732	3.731.446	2.145.286	0	501.296	288.205	0
Travel young scientists	74.831	-74.831	50.000	50.000	10.651	0	39.349	1.431	0	5.286
B-Part: Common program.	664.485	-194.485	580.000	1.050.000	710.000	240.000	100.000	95.384	32.242	13.434
Preparedness	1.525.995	-138.629	1.800.000	3.187.366	1.610.043	1.577.323	0	216.299	211.903	0
Measurement	1.075.754	-110.000	1.800.000	2.765.754	927.878	1.837.876	0	124.654	246.907	0
Radioecology	724.000	0	900.000	1.624.000	1.028.287	595.713	0	138.144	80.030	0
Waste	120.000	0	0	120.000	0	120.000	0	0	16.121	0
Travel young scientists	57.943	-57.943	50.000	50.000	8.523	0	41.477	1.145	0	5.572
Fukushima	88.951	-88.951	0	0	0	0	0	0	0	0
Translation project	0	0	149.206	149.206	149.206	0	0	20.045	0	0
Fee Secretariat	6.900	-6.900	630.000	630.000	622.500	0	7.500	83.629	0	1.008
Fee Chairman incl. travels	0	0	450.000	450.000	450.000	0	0	60.455	0	0
Reports etc.	17.292	-17.292	28.750	28.750	12.735	0	16.015	1.711	0	2.152
Postage etc.	-1.750	1.750	7.500	7.500	7.356	0	144	988	0	19
Equipment	15.000	-15.000	15.000	15.000	599	0	14.401	80	0	1.935

Notes

Detailed financial programme specification - 31 January 2015

	DKK							EUR	7,4436	
Specifikation:	Budget from 2013	Returned 2013	Budget 2014	Total budget 2014	Payments made	Contracts signed, but not paid	Rest budget	Payments made	Contracts signed, but not paid	Rest budget
Internet	18.672	-18.672	90.000	90.000	59.534	0	30.466	7.998	0	4.093
Auditing	0	0	58.750	58.750	58.750	0	0	7.893	0	0
Information material	-259	259	30.000	30.000	20.598	0	9.402	2.767	0	1.263
Various	12.773	-12.773	20.000	20.000	7.166	0	12.834	963	0	1.724
Travels Secretariat	3.244	-3.244	10.000	10.000	3.146	0	6.854	423	0	921
Diff.	0	0	0	0	-2	0	2	0	0	0
Total	6.705.420	-912.568	11.000.206	16.793.058	9.697.630	6.756.198	339.230	1.302.814	907.652	45.573
	F_1	F_2	F_3	F	G	H_1	H_2	G	H_1	H_2

$F_1 + F_2 + F3 = F$

$F - G = H = H_1 + H_2$

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The Nordic Nuclear Safety Research Programme (NKS)

Long-form audit report of 1 April 2015 regarding Financial Statements for 2014

Long-form audit report of 1 April 2015 regarding Financial Statements for 2014

Contents

Long-form audit report of 1 April 2015 regarding Financial Statements for 2014

1 Audit of the financial statements

1.1 Introduction

As the appointed auditors for The Nordic Nuclear Safety Research Programme (NKS), we have audited the financial statements for the financial year 1 January 2014 - 31 December 2014 prepared by the NKS Secretariat.

The financial statements show the following results, assets and equity:

DKK / EUR	Current year	Last year
Result for the year	-1,233,162 / -165,667	435,341 / 58,354
Equity	7,980,680 / 1,072,153	9,213,842 / 1,235,050

1.2 Conclusion on the executed audit - auditor's report

The audit performed has not given rise to significant remarks to the financial statements.

If the financial statements are carried in the existing form and if further, significant information does not appear during management's processing, we will provide the financial statements for 2014 with an unmodified audit opinion.

The audit has not included the management's review, but we have read through the management's review. This has not given rise to remarks. On this background, it is our opinion that the information in the management's review is in accordance with the financial statements.

1.3 Scope and execution of the audit

The purpose, planning and execution of the audit, the auditor's responsibility and reporting as well as the board's responsibility have remained unchanged, which is why we refer to our letter of engagement dated 30 March 2011.

As preparation for the audit of the financial statements for 2014, we have discussed the expectations to the financial development for 2014 with the Secretariat, including risks related to the association's activities. We have, furthermore, discussed risks connected to the presentation of accounts and the initiatives the board has initiated for the management hereof.

On this background, we have prepared our auditing strategy with a view to targeting our work at significant and areas of risk. We have identified the following items and areas to which, according to our opinion, special risks of significant errors and insufficiencies in the financial statements are associated:

- Grants
- Project expenses
- Giro and bank accounts
- Equity

On other areas, the risk of error in the financial statements is assessed as normal and the execution of the audit has therefore had a lesser scope.

The audit was executed with a view to verifying whether the information and amount specifications in the financial statements are correct. Analyses, review and assessment of administrative procedures, internal control systems and control procedures have been performed as well as a review and assessment of bookkeeping items and documentation for this.

The audit has also included an assessment of whether the prepared financial statements fulfil the auditing regulations of legislation and articles of association. In this regard, we have assessed the selected accounting policy, the board's accounting opinion as well as, moreover, the information submitted by the board.

Furthermore, the audit has been planned and executed in accordance with the international auditing standards as well as generally accepted government auditing standards and, in addition to the financial audit, it also includes a review and assessment of whether due financial considerations have been taken with the administration of the funds covered by the accounts.

During the execution of the financial audit, we have checked whether the accounts are without significant errors and insufficiencies. We have also checked the financial statements' agreement with the underlying bookkeeping records as well as the financial statements' concordance with laws and regulations as well as with commenced agreements and the accounting policies, which is decided by the Management.

The performance audit has been executed as an integrated and parallel part of the financial audit and, among other things, has included random reviews of agreements and contracts, reports, analyses of expense and income items as well as an analysis of budget deviations.

The audit has been executed in connection with the preparation of the financial statements.

2 The executed audit

2.1 Administration

Similar to last year, The NKS Secretariat is managed by FRIT ApS.

Agreement has been entered into on an extension of the agreement until 30 June 2016.

It must be noted that the Board has chosen to extend the agreement with Chairman of the Board, , Sigurður M. Magnússon, up to and including 2018.

2.2 Attestation procedures

We have performed a follow-up on NKS Secretariat's procedures and internal controls regarding attestation procedures and have found reason to state the following:

Long-form audit report of 1 April 2015 regarding Financial Statements for 2014

Project expenses

We checked on a sample basis whether the supporting documentation is duly approved by the programme manager or by chairman, Sigurður M. Magnússon. This review has not given rise to any comments.

In addition, we have established that the Secretariat regularly sends programme status to the programme managers. The programme status is forwarded approximately every second month and at the latest on 31 January 2015. The programme status includes, for example, a ledger card for project expenses so that the programme manager can see the individual payments on the project for the current year.

Secretariat expenses

Remuneration for the Secretariat is controlled as per agreement and to the minutes of the board meeting. We checked on a sample basis whether the invoices has been approved by Sigurður M. Magnússon. This review has not given rise to remarks.

2.3 Authorisation to sign

The accounts manager, Finn Physant, owner of FRIT ApS, and chairman, Sigurður M. Magnússon, have authority to make withdrawals on NKS' giro and bank accounts jointly or individually together with Claus Rubin, who is a consultant for FRIT ApS.

Our assessment is that the above terms and conditions for authorisation to sign, in consideration of the few staff members, is appropriately organised.

2.4 Use of IT

In connection with our audit, we have performed a general review and assessment of the association's administrative use of IT, including of system, data and operation security.

Our assessment is that the association is dependent on IT in the daily business processes. However, the association's use of IT is not assessed as being a risk.

2.5 Non-corrected misstatements

Pursuant to the international auditing standards, we must account for non-corrected misstatements that are not insignificant, to the association's senior management.

We can inform, that we have asked the NKS Secretariat to make one single correction to the draft for the financial statements. The correction was related to an exchange rate adjustment at DKK 100.

So all amount errors and insufficiencies in the financial statements are corrected in cooperation with the NKS Secretariat.

2.6 Discussions with management on fraud

During the audit we have enquired the Secretariat about the risk of fraud and the Secretariat has informed us that according to their assessment, there is no particular risk that the financial statements can contain significant erroneous information as a result of fraud.

The Secretariat has, furthermore, reported that they do not have knowledge of fraud or investigations in progress for assumed fraud.

During our audit we have not established conditions that could indicate or arouse suspicion of fraud of significance to the information in the financial statements.

3 Comments to the audit and financial statements 2014

For the individual items in the income statement and balance sheet we can supplement the presented financial statements for the year 2014 with the following:

3.1 Additional financiers

The additional financiers stated in the income statement may be analysed as follows in DKK:

	2014	2013	2012
Fortum Power and Heat Oy, Finland	182,777	175,319	167,270
TVO, Finland / Teollisuuden Voima Oyj, TVO	182,777	175,319	167,270
Fennovoima Oy, Finland	55,952	52,223	52,039
Forsmarks Kraftgrupp AB, Sweden	95,268	95,269	92,184
Kärnkraftsäkerhet och utbildning (KSU), Sweden	0	90,868	87,909
OKG Aktiebolag, Sweden	90,158	86,690	83,857
Ringhals AB, Sweden	89,524	89,525	87,909
IFE, Norway	85,794	85,795	81,776
Total additional financiers	782,250	851,008	820,214

The additional financiers are in accordance with the supporting documentation.

We have found that Kärnkraftsäkerhet och utbilning (KSU), Sweden from the year 2014 has stopped as additional financier.

3.2 Exchange rate adjustments

The exchange rate adjustments are mainly the result of foreign currency amounts being registered at the rate on 31 December 2013 throughout 2014. This gives deviations between the utilised rate and the actual rate.

We can report that the principle used does not affect the overall results, but just the allocation of the individual items in the income statement.

Long-form audit report of 1 April 2015 regarding Financial Statements for 2014

3.3 Budget balances brought forward from one year to the next

In the financial survey for 2014, budget figures for all expenses are specified. In addition, an amount transferred from 2013 of, in total, DKK 5,792,852 - cf. the accounts pages 10 to 11, first two columns.

We draw attention to the fact that the remaining budget for joint programme expenses and joint trips, similar to previously, have not been transferred from 2013 to 2014 and are thus transferred to NKS' equity (reserve).

It is furthermore noted that the coordination and travel expenses as well as activity expenses granted to the programme managers for the year 2014 that are not used/allocated similar to previous year will be transferred to equity. Thus, only the allocated activity expenses for R Part and B Part will be transferred from the one year to the next.

4 Performance audit

In accordance with generally accepted government auditing standards, we checked, for a number of selected areas, whether NKS has established business processes to ensure appropriate management of allocated funds. We performed our audit procedures to obtain limited assurance as to whether the management is conducted in a financially appropriate manner and whether the performance numbers disclosed are documented and adequate to cover NKS' operations in 2014.

According to our information, the grants (except for the grants contributed by Fortum Power and Heat Oy and TVO) are not earmarked for specific projects but for NKS' programmes as such. Based on this information, our audit was conducted on the basis of NKS' activities as a whole. During our audit, we checked that the grants from Fortum Power and Heat Oy and TVO have been employed as intended.

During our audit, we established that expenses incurred relate to individual projects and that the supporting documentation is duly approved. We noted that the programme and Secretariat budgets are kept. Finally, we checked on a sample basis whether reports have been prepared for completed projects.

As part of the performance audit, we must check whether the individual projects could be carried out in a more economical manner / efficiency. During our audit, no matters have come to our attention that cause us to believe that this is the case. However, we must state that our lack of technical expertise within nuclear safety means that we do not have the possibility to comment on this.

4.1 Management of funds

We have previously recommended the placement of available funds in another way than in bank/giro accounts in order to achieve greater rate of return.

The year's interest income is calculated at TDKK 46, which is a reduction of TDKK 34 compared to 2013. This is due to a reduction in the interest rate percentage and in the length of the period of commitment. On the date of the presentation of accounts, the rate of return on available cash accounts is the following:

Danske Bank, DK	0% p.a. on the entire deposit
DnB NOR, NO	Between 0.0% - 2.0% p.a. depending on the size of the deposit
Nordea, SE	Between 0.0% - 1.0% p.a. depending on the size of the deposit
Danske Bank, FI	Between 0.0% - 0.3% p.a. depending on the size of the deposit

4.2 Agreement between bookkeeping records and financial statements

We noted that there is agreement between the performed bookkeeping and the prepared financial statements for the year 2014.

Similar to previous years, all deposits and payments in January 2015 have been included in the accounts as if they were settled before 31 December 2014. This utilised accounting policy does not affect the accounting result. Only the size of the cash available, receivables and debt are affected.

5 Statutory information, etc.

We have ascertained that on all essential areas, the association complies with the Danish Bookkeeping Act, including regulations on the storage of accounting records.

It is our opinion that the requirements of legislation on bookkeeping and storage of accounting records have been complied with. We have furthermore agreed that our archive material will be stored for 10 years after the expiry of the relevant financial year.

6 Economic crime

In accordance with the Danish Act on Approved Auditors and Audit Firms, we are obliged to check whether any management member has committed significant economic crime and under certain circumstances we must report our findings to legislative and enforcing authorities (primarily the Serious Economic Crime Squad).

During our audit we have not come across conditions or indications that any management member have committed economic crimes.

7 Other tasks

In this financial year we have provided the following other services to NKS:

- Assistance with the preparation of the financial statements

A fee for the audit of the financial statements has been agreed on, including assistance with the preparation of the financial statements, participation in accounting meetings and in board meetings as well as the translation to English of the accounts and long-form audit report, in the amount of DKK 48,000 excl. VAT. The amount has not been allocated as debt in the presented accounts.

Long-form audit report of 1 April 2015 regarding Financial Statements for 2014

8 Statements in connection with the audit

8.1 The managements representation letter

As part of the audit of the financial statements, we have obtained confirmation from management of the financial statements' completeness, including that they contain all information on mortgages, guarantees, related parties, court cases, events after the balance sheet date as well as other complex auditable areas.

Management has further declared that all errors that have been presented to management are rectified in the financial statements. We have ascertained that the rectifications are included.

8.2 Auditor's statement

In compliance with the law regarding the approved auditors and audit firms, we state that:

- We comply with the statutory requirements for independence, and
- during the audit carried out, we have received all the information we have requested.

Roskilde, 1 April 2015

Dansk Revision Roskilde
Godkendt revisionsaktieselskab

Palle Sundstrøm
Partner, state-authorised Public Accountant

Presented at the board meeting on 12 June 2015

Sigurður M. Magnússon
Chairman

Steen Cordt Hoe

Jorma Aurela

Ole Harbitz

Eva Simic

Financial status - 29 May 2015

Incomes

DKK

Expected incomes this year	8.663.585	A = B + C
Received until now	8.272.512	B
Additional payments	391.073	C
Cash balance	11.391.584	D
Available funds	11.782.657	E = C + D

Budget and expenses

DKK

Total budget incl. transfer from earlier years	15.506.444	F = G + H
Paid until now	4.858.862	G
Rest budget incl. contracts signed, but not paid	10.647.582	H

Available

DKK

Reserve available for the board	1.135.075	I = E - H

Financial programme specification - 29 May 2015

	DKK							EURO	7,4436	
Total	Budget from 14	Returned 14	Budget 15	Total budget 15	Payments made	Contracts signed, but not paid	Rest budget	Payments made	Contracts signed, but not paid	Rest budget
R-Part	2.485.421	-136.385	4.041.000	6.390.036	2.334.348	3.905.688	150.000	313.605	524.704	20.152
B-Part	4.512.489	-1.001.081	4.140.000	7.651.408	1.644.000	5.857.408	150.000	220.861	786.905	20.152
2016 seminar	0	0	100.000	100.000	0	0	100.000	0	0	13.434
Fees	7.500	-7.500	1.105.000	1.105.000	775.000	330.000	0	104.116	44.333	0
Common programme exp.	83.262	-83.262	250.000	250.000	102.393	0	147.607	13.756	0	19.830
Travels	6.854	-6.854	10.000	10.000	969	0	9.031	130	0	1.213
I alt	7.095.526	-1.235.082	9.646.000	15.506.444	4.856.710	10.093.096	556.638	652.468	1.355.943	74.781
	F_1	F_2	F_3	F	G	H_1	H_2	G	H_1	H_2

$F_1 + F_2 + F3 = F$

$F - G = H = H_1 + H_2$

Detailed financial programme specification - 29 May 2015

	DKK							EURO	7,4436	
Specifikation:	Budget from 14	Returned 14	Budget 15	Total budget 15	Payments made	Contracts signed, but not paid	Rest budget	Payments made	Contracts signed, but not paid	Rest budget
R-Part: Common program.	300.786	-60.786	590.000	830.000	485.000	245.000	100.000	65.157	32.914	13.434
Activities	2.145.286	-36.250	3.401.000	5.510.036	1.849.348	3.660.688	0	248.448	491.790	0
Travel young scientists	39.349	-39.349	50.000	50.000	0	0	50.000	0	0	6.717
B-Part: Common program.	340.000	-100.000	590.000	830.000	485.000	245.000	100.000	65.157	32.914	13.434
Preparedness	1.577.323	-250.000	1.215.000	2.542.323	488.700	2.053.623	0	65.654	275.891	0
Measurement	1.837.876	-489.604	1.777.000	3.125.272	520.300	2.604.972	0	69.899	349.961	0
Radioecology	595.813	0	408.000	1.003.813	150.000	853.813	0	20.152	114.704	0
Waste	120.000	-120.000	100.000	100.000	0	100.000	0	0	13.434	0
Travel young scientists	41.477	-41.477	50.000	50.000	0	0	50.000	0	0	6.717
2016 seminar	0	0	100.000	100.000	0	0	100.000	0	0	13.434
Fee Secretariat	7.500	-7.500	645.000	645.000	315.000	330.000	0	42.318	44.333	0
Fee Chairman incl. travels	0	0	460.000	460.000	460.000	0	0	61.798	0	0
Reports etc.	16.015	-16.015	27.500	27.500	8.594	0	18.906	1.155	0	2.540
Postage etc.	144	-144	7.500	7.500	1.844	0	5.656	248	0	760
Equipment	14.401	-14.401	15.000	15.000	0	0	15.000	0	0	2.015
Internet	30.466	-30.466	90.000	90.000	27.200	0	62.800	3.654	0	8.437
Auditing	0	0	60.000	60.000	50.000	0	10.000	6.717	0	1.343
Information material	9.402	-9.402	30.000	30.000	0	0	30.000	0	0	4.030
Various	12.834	-12.834	20.000	20.000	14.755	0	5.245	1.982	0	705
Travels Secretariat	6.854	-6.854	10.000	10.000	969	0	9.031	130	0	1.213
Diff.	0	0	0	0	0	0	0	0	0	0
Total	7.095.526	-1.235.082	9.646.000	15.506.444	4.856.710	10.093.096	556.638	652.468	1.355.943	74.779
	F_1	F_2	F_3	F	G	H_1	H_2	G	H_1	H_2

$F_1 + F_2 + F3 = F$ $F - G = H = H_1 + H_2$

nks

nordic nuclear safety research

DENMARK FINLAND ICELAND NORWAY SWEDEN

A common Nordic view

Nordic problems need Nordic solutions. NKS aims to facilitate a common Nordic view on nuclear safety and radiation protection including emergency preparedness. This requires common understanding of rules, practice and measures, which may vary between countries, as well as with time. The work builds on a foundation of over sixty years of Nordic collaboration on related issues. Non-Nordic participation may be allowed under certain circumstances.

Securing Nordic competence and knowledge building

Through collaborative NKS activities, Nordic competence and capabilities are maintained and strengthened, and solutions to Nordic problems are disseminated through a sustained informal network. NKS publications are available cost-free on the internet. A special effort is made to engage young scientists and students, to ensure knowledge and expertise for the future.

Strengthening response capacities

By maintaining vital informal networks between Nordic authorities, nuclear power companies, scientists and other stakeholders, the region's potential for a fast, coordinated and targeted response to urgent issues is strengthened. Thereby, problems can be tackled quicker, more efficiently and consistently and at lower cost than if they needed to be addressed on a national scale.

Addressing current societal questions

NKS keeps an open eye to societal changes and events that might influence requirements and perception of nuclear safety, radiation protection and emergency preparedness in the Nordic countries. For instance the Fukushima accident prompted the arrangement of an NKS joint reactor safety and emergency preparedness seminar on lessons learned and future implications for Nordic society.

NKS activities

These can take the form of research activities, test exercises or information collation/review exercises. Alternatively they can aim to harmonize approaches to common problems or spread and distribute knowledge and results through seminars, workshops and educational/training courses. Common to all NKS activities is that the results should be beneficial and made available to concerned end users in all Nordic countries. Aspects of nuclear safety, radiation protection and emergency preparedness may be combined in one activity.

Research areas

Areas of interest covered by NKS activities fall under two main programmes, NKS-R and NKS-B, which cover the following specified research areas.

NKS-R programme:

- Reactor safety
- Nuclear power plant life management and extension
- Decommissioning and handling of generated waste
- Organisational issues

NKS-B programme:

- Emergency preparedness
- Measurement strategy, technology and quality assurance
- Radioecological assessments
- Wastes and discharges

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Nordic nuclear safety research

Some recent examples of NKS activities

Addressing off-site consequence criteria using Level 3 PSA

The Level 3 Probabilistic Safety Analysis (Level 3 PSA) activity is seeking to deepen Nordic understanding about the merits and limitations of probabilistic off-site consequence analysis for nuclear facilities. Risk metrics including health, environmental and economic effects have been studied in the first year of the activity. The aim is to produce a guidance document for Level 3 PSA (NKS-R L3PSA).

Modelling as a tool to augment ground motion data in regions of diffuse seismicity

After the Fukushima accident, seismic safety of nuclear power plants and other nuclear installations has become an increasingly important topic also in regions with low seismic activity, including the Nordic nuclear sites. The aim of the proposed project is to refresh existing and to build new capabilities in earthquake source modelling for stable continental regions, specifically the Fennoscandian shield (NKS-R ADdGROUND).

Nordic Nuclear Accident Consequence Analysis

The focus is on a pan-Nordic assessment of the dispersal and transport of contamination after a nuclear power plant accident in the Nordic region as well as the assessment of the long term consequences to man, environment and society. Each participant country conducts the full suite of assessments likely to be employed after a serious accident (NKS-B NORCON).

Standardization of radioanalytical methods for determination of important radionuclides

The activity aims to establish a close collaboration among research institutions, authorities and nuclear industries in Nordic countries to identify new measurement demands in the nuclear industry, and to validate, standardize and where needed develop new analytical methods for determination of important radionuclides for routine laboratory analysis (NKS-B STANDMETHOD).

How to apply

Nordic companies, authorities, organizations and researchers can submit proposals for NKS activities under the NKS-R and NKS-B programmes. Usually at least three of the five Nordic countries should participate in an activity. Activities submitted under annual calls for proposals are assessed according to criteria important to the objectives of NKS, with final funding decisions made by the NKS board.

Do you have suggestions for a nuclear safety or radiation protection related activity? Contact us via www.nks.org

Financing of NKS activities

NKS is mainly financed by Nordic authorities, with additional contributions from Nordic organizations that have an interest in nuclear safety. The budget for NKS in 2014 was about 9 million Danish kroner (€ 1.2 million). In addition to the funding sought from NKS, participating organizations are asked to provide a similar amount of in-kind contributions. This may take the form of working hours, travel expenses or laboratory resources. Without these in-kind contributions it would not be possible to carry out NKS activities.

Main financiers

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

Co-financiers

- Fennovoima Oy, Finland
- Fortum Power and Heat Ltd, Finland
- TVO, Finland
- Institute for Energy Technology (IFE), Norway
- Forsmark Kraftgrupp AB, Sweden
- OKG AB, Sweden
- Ringhals AB, Sweden

The NKS website

On the NKS website (www.nks.org) information is available on funding opportunities, travel support for young scientists, current activities and upcoming seminars. Presentations from seminars held are available for download as are reports from all completed NKS activities. It is also possible to discover more information on NKS and the history of Nordic co-operation in nuclear safety. You can also reach the NKS website using the QR code.

How to apply for NKS funding

NKS email list

NKS sends out newsflashes and newsletters throughout the year providing information on call for proposals, upcoming seminars and published reports. If you wish to join the NKS email list please sign up at www.nks.org or scan the QR code.

NKS Mobile Reports

All NKS reports from all completed activities can be reached conveniently also with your mobile devices at mobile.nks.org or simply by scanning the QR code.

Contact

If you wish to learn more about NKS and NKS activities visit our website or contact the NKS secretariat.

nks@nks.org

Telephone +45 4677 4041

NKS Secretariat

P.O. Box 49

DK-4000 Roskilde, Denmark

Karin Andgren, NKS-R programme manager

Kasper Grann Andersson, NKS-B programme manager

Sigurður M Magnússon, NKS chairman

Finn Physant, NKS secretariat

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Nordic nuclear safety research

Underground research facility for final nuclear waste storage, Onkalo, Finland
Photo: Posiva Oy

This is NKS

Nordic Cooperation Forum

NKS (Nordic Nuclear Safety Research) is a forum for Nordic cooperation and competence in nuclear safety, including emergency preparedness, serving as an umbrella for Nordic initiatives and interests. It runs joint activities of interest to financing organisations and other end users producing seminars, exercises, scientific articles, technical reports and other types of reference material. The work is financed and supported by Nordic authorities, companies and other organisations. The results which should be practical and directly applicable are used by participating organisations in their decision making processes and information activities.

The Nordic Approach

The Nordic region comprises five countries, i.e., Denmark (including the Faroe Islands and Greenland), Finland, Iceland, Norway and Sweden. Building on the foundation of a common cultural and historical heritage and a long tradition of collaboration, NKS aims to facilitate a common Nordic view on nuclear and radiation safety. A common understanding of rules, practice and measures, and national differences in this context, is an essential requirement. Through collaborative efforts problems may be tackled quicker, more efficiently, more consistently, and at a lower cost.

Why Nordic Cooperation on Nuclear and Radiological issues?

One reason to maintain this collaboration between the Nordic countries is the common challenges in relation to nuclear installations. While nuclear power plants are in operation in Finland and Sweden, research reactors have been operated in Denmark, Finland, Norway and Sweden. Clearly, exchange of operational expertise and new ideas can be beneficial. Some of the Nordic research reactors have been closed down and the experience gained in subsequent decommissioning may be useful in connection with the planned decommissioning of Swedish nuclear power reactors. Also knowledge exchange between Sweden's nuclear fuel production plant and other Nordic nuclear installations may be beneficial. The Fukushima accident highlighted the need for an effective operational emergency preparedness for accidents at nuclear installations. By continuously improving detection, response and decision aiding tools while maintaining an informal collaborative network between relevant stakeholders in the Nordic countries, the capacity and capability to respond optimally to an emergency is enhanced. Experience has shown that nuclear and radiological challenges to society are far from static, and the response systems require continuous development. Radiological issues need to be addressed coherently and effectively in the Nordic countries, and some of these are on the NKS agenda. They range from exposure to naturally occurring radioactive material in the environment to the threat of malicious use of radioactive material. In addition to the NKS cooperation there is an extensive co-operation between the Nordic radiation safety authorities regarding general radiation safety issues.

Nordic and International Benefits

NKS with its program for nuclear safety including emergency preparedness is of common benefit for all five Nordic countries. The hallmark of NKS is a spirit of sharing – all results are available free of charge on the NKS web site (www.nks.org), not only to the NKS family but also worldwide providing an international benefit of the NKS work. When quoting NKS material, a reference to the source will be appreciated.

Two Program Areas

NKS activities are divided into two program areas:
NKS-R: Reactor safety; Nuclear power plant life management and extension; Decommissioning and handling of generated waste; Organisational issues.
NKS-B: Nuclear and radiological emergency preparedness; Measurement strategy, technology and quality assurance; Radioecology and environmental assessments; Management of radioactive waste and discharges.

Owners and Financiers of NKS

The owners and main financiers are:
Danish Emergency Management Agency (DEMA, Denmark)
Ministry of Employment and the Economy (TEM, Finland)
Icelandic Radiation Safety Authority (GR, Iceland)
Norwegian Radiation Protection Authority (NRPA, Norway)
Swedish Radiation Safety Authority (SSM, Sweden)

The co-financiers are:
Fennovoima Oy (Finland)
Fortum Power and Heat Ltd. (Finland)
TVO (Finland)
Institute for Energy Technology (IFE, Norway)
Forsmark Kraftgrupp AB (Sweden)
OKG AB (Sweden)
Ringhals AB (Sweden)

Financial Contribution

In 2014 the contributions of the owners and additional financiers were about 9 million Danish crowns (1.2 million euros). To this should be added contributions in kind by participating organizations, worth approximately the same amount, without which this program would not be possible.

Nordic nuclear safety research

NKS(15)3
2015-05-25

HANDBOOK FOR NKS APPLICANTS AND ACTIVITY LEADERS

May 2015

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1 INFORMATION FOR APPLICANTS

1.1 Subscribe to NKS News

Ensure that you will not miss any important information (regarding e.g. call for proposals) by subscribing to NKS News at: www.nks.org.

1.2 Who can apply?

Organisations such as universities, research centres, institutes and companies in the Nordic countries can apply for NKS funding for research activities. The activity budget should distribute the NKS funding between participant organisations from at least 3 Nordic countries (in some special cases, involvement of only 2 Nordic countries has been accepted in the NKS-R programme). Non-Nordic participation in NKS activities is possible, but NKS funding of Non-Nordic organisations is not possible. The activity leader must come from a Nordic country (i.e. work for a Nordic organisation).

1.3 What kind of work would be funded?

NKS funds work related to nuclear safety, including emergency preparedness, radioecology, measurement strategies and waste management, considered to be of importance to the Nordic community. The work should be of interest to the owners and financing organisations of NKS. The results must be of relevance, e.g., practical and directly applicable. The work can be in the form of scientific research, including experimental work, or joint activities producing seminars, workshops, courses, exercises, scientific articles, technical reports and other type of reference material. Examples of research topics can be found in the framework documents for NKS-R (http://www.nks.org/en/nksr/call_for_proposals/nks-r_framework_2015.htm) and NKS-B http://www.nks.org/en/nksb/call_for_proposals/nks-b_framework_2014.htm.

1.4 Requirements for NKS activities

The following requirements shall fulfil the following requirements:

- Demonstrated compatibility with the current framework program
- NKS funded participation of organisations in at least three Nordic countries in all major activities (occasionally, two countries may be acceptable)
- Results of NKS activities are publicly available for free

1.5 Criteria for NKS activities

The entire NKS program as well as the various activities is evaluated against the following criteria:

1. *Added Nordic value*
   Will the proposed activity lead to an increase in Nordic competence and/or building of informal networks within a relevant NKS-R framework area and how will this be achieved?
2. *Technical and/or scientific standard*
   How does the proposed activity demonstrate a suitable technical and/or scientific standard?
3. *Distinct and measurable goals*

What will the proposed activity deliver as a result of the proposed work programme in the year for which funding is applied for? It is important to ensure that it is clear to the evaluators what the proposed activity will set out to achieve.

4. *Relevance to NKS end-users*
   Is the proposed activity relevant to NKS end-users and which NKS end-users is the proposed activity targeting? It will strengthen the proposal if the interest of relevant end users is clearly demonstrated and not only assumed.
5. *Participation of young scientists*
   Will the proposed activity involve young scientists in the proposed work programme and if so, how? In this context, those studying at degree, masters, PhD level and those in their first 2 years of postdoctoral work would be considered as 'young scientists'
6. *Links to other national/international programmes*
   Does the proposed activity have a link to ongoing or past research programmes or activities? In particular, it should be clear where a proposed activity builds upon previously funded NKS activities.

1.6 What do I have to do in return for the money

The activity partners are expected to report the work carried out each year. The most common type of output is a scientific report at the end of the year. A report with clear results is requested even if the activity continues the next year. Other forms of reporting can be for example presentations and proceedings from a seminar. All material produced must be available for publishing on the NKS webpage, where they are free to be downloaded by anyone.

1.7 How is the money paid?

The NKS funding is granted for one year at a time. Generally, an activity will not receive more than 600 kDKK per year from NKS. The first 50% of the contribution is paid when an activity is started and the rest 50% when the final results of one year's work are available. The first part of the funding can be invoiced when a contract has been made between NKS and the activity leader.

1.8 Working language

The main working language in NKS is English. Applications for NKS funding as well as final reports and other material should be submitted in English. However, each working group determines its own language for meetings.

1.9 How do I apply 1 – the need for Nordic partners and how to find them

It is up to the applicants themselves to find collaboration partners in the Nordic countries. The programme managers can help with getting into contact with Nordic organisations. NKS seminars are good places for networking. More information on ongoing research and all the published reports are available on the NKS website.

1.10 How do I apply 2a – the practicalities of applying

NKS funding is announced in the annual Call for Proposals. It is usually organised in September - October. All the necessary information, material and instructions are distributed on the NKS website. The Call for Proposals is also announced in the NKS electronic newsletter. The applicant is requested to fill in an application form. A voluntary annexe with further details about the proposal

may also be handed in. Detailed instructions on how to fill in the application form will be available when the Call for Proposal opens. The applicant is encouraged to read these instructions carefully.

1.11 How do I apply 2b - budgets

The applicants are expected to demonstrate that at least half of the necessary funding of the activity in question will be supplied by the participating organisations. In other words, the participants are expected to put in the same amount of money in the project as they are applying from NKS. These contributions may be work hours, travel expenses, etc. and should be clearly specified in the proposal form.

Please note that all funding by NKS includes possible VAT

1.12 What happens next

Proposals received before deadline are evaluated against the requirements by the NKS programme managers. Projects fulfilling these requirements are then evaluated against the criteria in section 1.5by the NKS board members. The board members have the right to use the help of external experts in the evaluation process if needed. Each proposal will be given marks based on how well the proposal fulfils the NKS criteria. Based on the evaluation results and the available budget, the programme managers make a suggestion for the next year's NKS-R and NKS-B programme. The suggestions are discussed at the January board meeting and the final decision of successful applicants is made by the board. The programme managers inform the applicants of the outcome as soon as possible after the board meeting.

1.13 Useful links for applicants

NKS webpage
Information about NKS
Owners and supporting financiers of NKS
The NKS-B programme
The NKS-R programme
Information about the Call for Proposals, NKS-B programme
Information about the Call for Proposals, NKS-R programme
NKS Seminars
NKS Reports
Travel support for young scientists: NKS-B, NKS-R

2 INFORMATION FOR ACTIVITY LEADERS

2.1 Contract

The Activity Leader will shortly after the Board's grant decision receive a contract template from the manager of the relevant NKS Programme, which is to be filled in with information on the activity deliverables or stages of work to be done, *always* including the submission of a final activity report (normally by the end of the funding year). In the contract template, the Activity Leader must also include a budget for each of the various activity partners, in line with the Board's decision. The contract is valid when signed by an authorised representative of the Activity Leader's organisation and by the Programme Manager. The NKS Programme Manager will have provided the contract template with a reference number (format: AFT/{R or B}({year}) {serial number}). This reference number is the identifier of the activity, and must be stated in all official management documents concerning the project (contracts, invoices, etc.). Contracts are generally for one year's work, and further continuation of activities is subject to submission and approval of a new proposal.

2.2 Invoices

When the contract is duly signed by both parties, the Activity Leader should inform the participants that they can invoice NKS for 50 % of their total contractual amount. When the work has been completed and the final report of the activity has been approved by the Programme Manager, the Activity Leader should inform the participants that NKS can be invoiced for the remaining 50 % of the amount. All invoices are to be addressed to the NKS Secretariat, but mailed to the relevant Programme Manager (NKS-R or NKS-B).

2.3 Activity progress reporting and communication

If deviations are foreseen from the agreed activity work schedule, the Activity Leader must immediately notify the Programme Manager so that any problems may be solved and contingency plans implemented if necessary. On request, the Activity Leader is also obliged to inform the Programme Manager of the state of progress at various stages of the activity.

2.4 Progress documentation if applying for continued funding

If participants in an activity wish to apply for funding for continuation of the activity, they need to document significant progress with the ongoing work (e.g., in relation to declared milestones and deliverables) in connection with the application for continuation.

2.5 Advertisement of dissemination activities

Events like seminars, workshops, courses and exercises connected to NKS activities need to be advertised timely and efficiently to be successful. NKS Programme Managers can help Activity Leaders in advertising these, e.g., through NewsFlashes sent to subscriber lists and posted on the NKS internet site http://www.nks.org/en/news/subscribe_to_our_newsletter/. It is however the responsibility of the Activity Leader and partners to plan and execute all aspects of the activities. Seminars should generally be open and not held exclusively for a closed circle of participants.

2.6 Travel support for dissemination activities

NKS particularly encourages participation of young scientists in NKS events to maintain a high level of competence in the longer perspective, and can offer travel support for this purpose

(http://www.nks.org/en/nksr/travel_assistance/). All other costs for NKS in connection with NKS activities are to be covered by the amount approved in the contract.

2.7 Final reporting of the activity

All NKS activities, regardless of their nature, must produce a final report that should be in the standardised NKS report format (see template/instructions: report template). **Please note**, that where an activity is anticipated to continue for more than one year, a final report is expected to be delivered after each year of the activity as funding cannot be guaranteed for continuing activities. Note that Activity Leaders must also supply a filled-in bibliographic datasheet (http://www.nks.org/en/this_is_nks/administration/) together with the final report.

Final reports from research activities or exercises aimed at filling knowledge gaps or developing methodologies should be in line with standards expected for scientific publications. Final reports from exercise activities in the form of intercomparisons or proficiency tests should seek to address any discrepancies or problems highlighted by the exercise, to increase knowledge and competencies where necessary. Final reports from seminar or workshop activities should contain extended abstracts from each presenter as well as a final overview of any discussions and conclusions. Presentation slides should not be presented in final reports. Final reports for educational and training courses should contain all course documents presented as well as feedback from participants. The conclusion of any NKS activity (and thus the final payment) is subject to the approval of the final report by the Programme Manager. In addition to the final report, activity participants are urged to disseminate activity results (with due credit to NKS) in scientific journal articles as well as at conferences, seminars and workshops. The Programme Manager in charge of the activity should be notified of any dissemination efforts.

The final report can be a paper and electronic report, or only an electronic one, but in both cases the report will be formally registered at the NKS and through the international library network. Printing costs of modest paper reports can be covered centrally by NKS (there is no need to use the activity funding for this), but printing of more sophisticated reports (e.g. thick reports using colour figures) may need to be included in the budget of the activity. Information about possible printing costs can be obtained from the NKS Secretariat.

2.8 Internet hosting of NKS activity material

All final reports of NKS activities are hosted on the NKS internet site (http://www.nks.org/en/nks_reports/). In connection with NKS events like seminars and workshops it is encouraged that the Activity Leader seeks the permission of the participants to publish presentations (slides) on the NKS internet site (http://www.nks.org/en/seminars/presentations/presentations.htm). Also information on other available software (e.g., as downloads) or hardware generated by NKS activities can be hosted on the NKS internet site (http://www.nks.org/en/nksb/supporting_material/). For further information contact the relevant Programme Manager.

Instructions how to fill in a proposal form

Proposals for NKS-R activities, which are to receive NKS funding in 2016, have to be submitted on a *Proposal form*, which can be found at the NKS web site. If you have any questions or problems filling in the form please contact the Programme Manager, Karin Andgren.

Language

Please note that the preferred language to be used in the proposal form and supplementary description is English.

New or continued activity

There are two different proposal forms, one for application for new activities and one for application for continuation of current activities. Please fill in the appropriate one of these.

Summary information about the proposed activity

Please note that information in this section may be made public if the activity is accepted. Suggest an acronym for your activity (not too long) and please use the same acronym if it is a continuation of an ongoing activity. Fill in the start date and end date of your proposed activity. Duration of an activity should typically not exceed 3 years. A drop-down form field is used to select one of the following categories:

1. Thermal hydraulics
2. Severe accidents
3. Reactor physics
4. Risk analysis
5. Organisation and safety culture
6. Decommissioning
7. Plant life management and extension

Please consult the *Framework* document for NKS-R which can be found on the NKS web site for further information on the individual categories.

Please provide a short summary of the proposed activity. If the proposal is for a continued activity, a short summary is also needed of the results achieved so far, including information on the current progress on milestones and deliverables stated in the contract for the current activity period (see section on milestones and deliverables below). It is strongly recommended to add more detailed information in a separate file (please refer to the section 'Supplementary description' below). *NOTE: Activities planned to extend over more than 1 year should be scheduled and conducted in such a way that distinct and discrete deliverables are produced in each year.*

The requested funding for 2016 should be given in thousand DKK, with decimal point (.) as a separator for decimals. If continuation of the activity is assumed in 2017 (and possibly later), please state the expected requested funding in thousand DKK for subsequent years. Generally, an activity will not receive more than 600 kDKK per year from NKS. **Please note**, NKS will only award funding for **1 year at a time** and additional funding for continuation of an activity must be applied for on a separate basis through subsequent NKS-R Call for Proposals.

Relevance of proposed activity to NKS criteria

It must be clearly demonstrated by the applicant why NKS should support the proposed activity in accordance with the NKS-R framework and by addressing the NKS criteria stated in chapter 1.5 in Handbook for NKS applicants and activity leaders.

Co-ordination of activity

One co-ordinator must be responsible for ensuring that the proposed work is carried out as described and on time.

Other organisations involved

Other organisations that are involved in the work (especially those who will receive part of the funding) must also be listed.

Assumed distribution of NKS funding amongst participants

'Participants' are here defined as organisations that would receive funding from NKS according to the proposal form. Please give the assumed distribution of NKS funding amongst the participants. This may be revised before the order for work is finalised. Note; please ensure that the proposal contains a realistic budget for the work proposed. Note, in order to be eligible for funding from NKS, a proposed activity should include participants from a minimum of 2 (preferably 3) Nordic countries. Non-Nordic participation in NKS activities is possible, but NKS funding of non-Nordic participants is not possible.

Assumed distribution of own contribution funding amongst participants

Please give the assumed distribution of own contribution funding amongst participants. It is important that participants realize that the NKS requires that value of own contributions to the work must be at least equal to the funding received from NKS. Own contribution funding can include both in-kind contributions (e.g. in work time) and other external funding sources.

Milestones, deliverables

It is very important to define clearly *what* is to be done and *when*. An activity must define an appropriate number of milestones / deliverables that progress can be measured against at different stages. The NKS-R programme manager will contact the activity leader during the duration of the activity for updates on progress, and current progress needs to be reported and contextualized in connection with proposals for continuation of the work. The last deliverable is normally the final report, which will be published by the NKS Secretariat as a formal NKS report.

Submission of proposal

The filled out Proposal form must be sent from the official e-mail address of the co-ordinator of the activity (this procedure replaces having to send in a signed form). Please contact the Programme Manager in advance if you have problems with this arrangement. Date of sending the proposal by e-mail will be taken as the date of submission.

Supplementary description

A free format supplementary description of the proposed activity can be sent as a separate document. Please, keep this supplementary description to a **maximum of 4 pages**. Applicants may provide internet links in their supplementary description to additional sources of information that may support their application, but please bear in mind that evaluators may not have the means or the time to access large quantities of supporting electronic information.

The supplementary description should be used in order to give more details concerning the proposed activity and may for example include some scientific and/or technical background information, a more in depth discussion of the research approach to be employed as well as more detailed aspects of the planned budget and use of funds. If the proposed activity is a continuation of an ongoing funded activity, it is strongly recommended to include a brief description of any results and/or milestones that have been achieved, in order to demonstrate the progress made.

Proposal must be sent by e-mail
to karin.andgren@vattenfall.com
no later than
?day, xxth of October 2015

1. Summary information about the proposed continued activity

Name of the activity		Proposed acronym[1]
Start date	**End date**	**Continued activity**
		Continued activity
Proposed research area		
Thermal Hydraulics		
Short summary of the results from the activity in 2015		
Short summary of the proposed continuation of the activity		
List of participating organisations (including the co-ordinating one)		
Requested funding from the NKS in 2016. If continuation of activity is assumed beyond 2016, please estimate requested funding in later years.		
In 2016: (in 1000 DKK)	Expected requested funding in later years (if applicable):	

1: If this activity is a continuation of a previously funded NKS-R activity, please use the same acronym as before (a list of acronyms of ongoing activities can be found on the NKS-R web site)

Please note that the above information may be made public on the NKS web site **if** the proposal is accepted by the NKS Board

2. Relevance of proposed activity to NKS criteria

Summarise how the proposed activity will maintain and build up competence and informal Nordic networks
Summarise the proposed activity's technical and scientific merits
Summarise what the proposed activity will deliver in the form of distinct and measureable goals during 2016
Summarize who are the potential end users and how it has been ensured that the proposed activity is relevant for them
Summarise the participation of 'young scientists' in the proposed work (Degree, masters, PhD, post doctoral level)
Interfaces to other relevant projects (past or present NKS activities, national research programs, EU programs, etc.)

3. Co-ordination of activity

Institution or company	
Activity co-ordinator	
Postal address	
E-mail	
Telephone (international format)	**Fax (international format)**

4. Other organisations involved

Institution or company	Contact person	E-mail
Institution or company	Contact person	E-mail
Institution or company	Contact person	E-mail
Institution or company	Contact person	E-mail
Institution or company	Contact person	E-mail
Institution or company	Contact person	E-mail

5. Assumed distribution of NKS funding amongst participants (in 1000 DKK)[1]

	2016	2017 -
Total	0 k DKK	0 k DKK

6. Assumed distribution of own contributions amongst participants (in 1000 DKK)[1]

	2016	2017 -
Total	0 k DKK	0 k DKK

7. Milestones, deliverables

	Date

[1] Use decimal point (.) as a separator for decimals in all tables

Final report	

8. Submission of proposal

This form must be sent by e-mail no later than xxth October 2015 from the official e-mail address of the activity co-ordinator (as given on this form) to karin.andgren@vattenfall.com.

Please use the *acronym* as a file name and add the number "1"

The date of sending will be regarded as the date of submission.

Is supplementary description (maximum 4 pages) included?

No (please click on drop-down form field at left to select "Yes" if needed)

Name of file: (please use the acronym and add the number "2")

Please note that a confirmation of the reception of the proposal will be sent by the programme manager.

Proposal must be sent by e-mail
to karin.andgren@vattenfall.com
no later than
?day, xx[th] of October 2015

1. Summary information about the proposed new activity

Name of the activity		Proposed acronym[1]
Start date	**End date**	**New activity**
		New activity
Proposed research area		
Thermal Hydraulics		
Short summary of the activity		
List of participating organisations (including the co-ordinating one)		
Requested funding from the NKS in 2016. If continuation of activity is assumed beyond 2016, please estimate requested funding in later years.		
In 2016: (in 1000 DKK) Expected requested funding in later years (if applicable):		

1: If this activity is a continuation of a previously funded NKS-R activity, please use the same acronym as before (a list of acronyms of ongoing activities can be found on the NKS-R web site)

Please note that the above information may be made public on the NKS web site **if** the proposal is accepted by the NKS Board

2. Relevance of proposed activity to NKS criteria

Summarise how the proposed activity will maintain and build up competence and informal Nordic networks
Summarise the proposed activity's technical and scientific merits
Summarise what the proposed activity will deliver in the form of distinct and measureable goals during 2016
Summarize who are the potential end users and how it has been ensured that the proposed activity is relevant for them
Summarise the participation of 'young scientists' in the proposed work (Degree, masters, PhD, post doctoral level)
Interfaces to other relevant projects (past or present NKS activities, national research programs, EU programs, etc.)

3. Co-ordination of activity

Institution or company	
Activity co-ordinator	
Postal address	
E-mail	
Telephone (international format)	**Fax (international format)**

4. Other organisations involved

Institution or company	Contact person	E-mail
Institution or company	Contact person	E-mail
Institution or company	Contact person	E-mail
Institution or company	Contact person	E-mail
Institution or company	Contact person	E-mail
Institution or company	Contact person	E-mail

5. Assumed distribution of NKS funding amongst participants (in 1000 DKK)[1]

	2016	2017 -
Total	0 k DKK	0 k DKK

6. Assumed distribution of own contributions amongst participants (in 1000 DKK)[1]

	2016	2017 -
Total	0 k DKK	0 k DKK

7. Milestones, deliverables

	Date

[1] Use decimal point (.) as a separator for decimals in all tables

Final report	

8. Submission of proposal

This form must be sent by e-mail no later than xxth October 2015 from the official e-mail address of the activity co-ordinator (as given on this form) to karin.andgren@vattenfall.com.

Please use the *acronym* as a file name and add the number "1"

The date of sending will be regarded as the date of submission.

Is supplementary description (maximum 4 pages) included?

No (please click on drop-down form field at left to select "Yes" if needed)
Name of file: (please use the acronym and add the number "2")

Please note that a confirmation of the reception of the proposal will be sent by the programme manager.

Nordic nuclear safety research

NKS-R STATUS REPORT

Karin Andgren
NKS-R Programme Manager
May 2015

Table of contents

Status summary

This report provides a short overview of the current status of the NKS-R programme. Since the last NKS Board meeting in January, final reports for six of the NKS-R activities started in 2014 have been published on the NKS website. Contracts have been agreed and signed for seven out of eight activities started in 2015. All activities initiated earlier than 2014 have been finally reported.

1.1 Seminars

Five NKS-R activities will have seminars or workshops: MODIG seminar with stake holders (October), ADdGROUND workshops (May and November), L3PSA final seminar (January), LESUN dissemination seminar with stakeholders (October) and two workshops within the PLANS activity (May and November).

1.2 Young scientist travel support

No requests have been received.

1.3 Published reports

The following reports have been published within the NKS reports series since the last board meeting in January:

NKS-328	February 2015	Human performance tools in nuclear power plant maintenance activities - Final report of HUMAX project	HUMAX
NKS-329	February 2015	Nordic Nuclear Forum for Generation IV Reactors 2014	Nordic-Gen4
NKS-330	February 2015	Guidelines for reliability analysis of digital systems in PSA context — Final report	DIGREL
NKS-332	March 2015	Measuring Procedure Competence. Final Report from the NKS-R(14)112/13	ProCom
NKS-333	April 2015	PIV Measurements of DCC-06 and DCC-07 PPOOLEX Experiments	ENPOOL
NKS-334	April 2015	PPOOLEX Experiments with a Sparger	ENPOOL
NKS-337	April 2015	Addressing off-site consequence criteria using Level 3 PSA	L3PSA
NKS-338	May 2015	CFD and FEM modeling of blowdown of gas into pressure suppression pool	ENPOOL

The reports listed above are all final reports for work done in 2014 within the respective activities. Most of the activities result in one joint final report. However, participants in some of the activities prefer to submit separate final reports. In addition, some of the activities are divided into sub-activities which provide separate reports.

2 Activities initiated in 2014

Nine activities were initiated in 2014. Seven of the activities were continuing activities and two were new. Four final reports are still missing. An overview of the status of 2014 NKS-R activities is presented in table 1.

Table 1. NKS-R 2014 activities

Activity	Description	First invoice	Report	Second invoice	Report number
ATR	Impact of Aerosols on the Transport of Ruthenium in the primary circuit of nuclear power plant.	x	-	-	
DECOSE	Debris coolability and steam explosion	x	-	-	
DIGREL	Guidelines for reliability analysis of digital systems in PSA context	x	1/2	-	NKS-330
DPSA	Deterministic-probabilistic safety analysis methodology	x	-	-	
ENPOOL	Experimental and numerical studies on suppression pool issues	x	3/4	-	NKS-333 NKS-334 NKS-338
HUMAX	Maximizing human performance in maintenance	x	x	2/3	NKS-328
L3PSA	Addressing off-site consequence criteria using Level 3 PSA	x	x	1/4	NKS-337
Nordic-Gen4	Nordic nuclear forum for generation IV reactors	x	x	x	NKS-329
ProCom	Measuring procedure competence	x	x	x	NKS-332

3 Activities initiated in 2015

Eight activities were started in 2014. Three of these are continuing activities and five are new. Contracts have been signed for seven of the activities. The contracts from KTH for DECOSE and their part of the work within COPSAR are still missing. The reason being mainly because of the delay with signing the main APRI-9 project contract. Hopefully, both contracts will be signed in the beginning of June. In this chapter short descriptions are given for the activities. For more detailed status reports see attachments.

3.1 ADdGROUND

Modelling as a tool to augment ground motion data in regions of diffuse seismicity

After the Fukushima accident, seismic safety of nuclear power plants and other nuclear installations has become an increasingly important topic also in regions with low seismic activity, including the Nordic nuclear sites. The technical aim of the ADdGROUND activity is to refresh existing and to build new capabilities in earthquake source modelling for ground motion simulations in the context of stable continental regions, specifically the Fennoscandian shield. The scarcity of empirical observations of near-field ground motions from large

magnitude earthquakes in Fennoscandia has been an impediment for deeper understanding of the possible earthquake loading scenarios on nuclear installations, even if the empirical data has been exhaustively analyzed. With recent advances in computational methods, the opportunity exists for numerical models to give realistic estimates of earthquake loads. In addition to the technical outcome, this project also aims to establish and maintain a network of experts focused on diffuse seismicity areas of the Nordic Countries and further enhance the cooperation between VTT and Uppsala University in the area of earthquake source modelling.

Activity leader: Ludovic Fülöp, VTT

NKS-R funding: 500 kDKK

Milestones:
1) Potential calibration cases for modelling identified. Data collected by end of July
2) Input variable ranges for selected modelling cases ready by December
3) Final report expected by year end

Status
The main progress item in the project is the realization of an initial workshop which contributed towards Milestone #1. The workshop “Potential of numerical methods to supplement empirical earthquake observations” was organized on 8th of May 2015 with six presentations focusing on the topic at hand. The consortium agreed on which data should be collected for calibration. Planning of the data collection is ongoing, and the project is on schedule.

3.2 ATR

Impact of Aerosols on the Transport of Ruthenium in the primary circuit of nuclear power plant
Previous experiments have shown that the fraction of gaseous ruthenium transported through the primary circuit of an experimental setup at VTT was higher than what would be expected in thermodynamic equilibrium calculations. Focus of the ATR project is to study the impact of aerosols on the transport of ruthenium in the containment air of a BWR. Some of the most radiotoxic elements that may be released from the fuel into the containment’s atmosphere during a severe accident are iodine and ruthenium. The proposed work for 2015 is a continuation of previous experiments (ATR project in 2014) on the release and transport of ruthenium in the model of primary circuit. This work will create a clear added value by combining the national efforts and specialisations at VTT and at Chalmers. In this study, details of the impact of nitrogen oxide compound NO_2 with various concentrations on the transport of ruthenium in primary circuit conditions will be examined. Another aim is to examine the CsI-Ru system and to find out the reason for the observed extremely high transport of gaseous Ru. In addition to the analysis of gaseous and aerosol ruthenium mass fractions, the speciation of the reaction products will also be determined with several analysis techniques.

Activity leader: Ari Auvinen, VTT

NKS-R funding: 300 kDKK

Milestones:
1) Experiments/tests done at VTT during the summer
2) Analysis of samples during summer/autumn
3) Experiments/tests done at Chalmers during the autumn
4) Finalization of data by the year end

Status
Publication is under preparation based on the results from last year experiments. Submission for review is expected in June and the NKS report for 2014 is expected by end of May.

3.3 COPSAR

Containment Pressure Suppression Systems Analysis for Boiling Water Reactors
BWR containment is a complex system that includes many elements which affect each other's operation. There is a number of safety important scenarios, where containment pressure suppression function operation can be affected by (i) stratification and mixing phenomena, (ii) interactions with emergency core cooling system (ECCS), spray, residual heat removal (RHR) system, filtered containment venting system (FCVS), and (iii) overall water distribution between containment compartments. Year 2015 is the first year of the proposed four year project. The main aim is to design a spray test facility, start development work of spray calculation models and run pre-test simulations. In addition, behaviour of safety relief valve spargers and RHR nozzles will be studied both experimentally in the PPOOLEX facility and computationally with the help of GOTHIC code.

Activity leader: Markku Puustinen, LUT

NKS-R funding: 500 kDKK

Deliverables of VTT:
1) Improved condensation model for vapour on spray droplets
2) CFD calculation of the single spray nozzle experiment performed at LUT
3) CFD model for the PPOOLEX facility with spray systems and pre-calculation of experiments
4) Reports on the single spray nozzle calculations and PPOOLEX pre-test calculations

Deliverables of KTH:
1) Contribution to selection of the design of the spray injection systems for the drywell and wetwell of the PPOOLEX facility
2) Pre-test analysis for selection of operational regimes and test procedures
3) Post-test analysis and validation with GOTHIC code on spray
4) Post-test analysis and validation of EHS/EMS on spargers and RHR nozzles

Deliverables of LUT:
1) Experiments with a SRV sparger and RHR nozzles
2) Designing spray injection systems for the PPOOLEX facility
3) Designing spray injection systems for the PPOOLEX facility
4) Delivery of relevant experiment data to the simulation partners

Status
There activity is progressing according to plan.

3.4 DECOSE

Debris coolability and steam explosion
Uncertainties in assessment of (i) debris bed properties and coolability, (ii) steam explosion impact in BWRs will be reduced by experimental and analytical studies. The experimental part of the project will investigate key physical phenomena of the debris bed formation and coolability. Experimental data will be validated using simulation tools, leading to more reliable predictions of the debris bed coolability in case of an accident with a severe core damage. An analytical approach will be utilized to improve the prediction of coolability and to assess the uncertainties in modelling of steam explosion impact.

Activity leader: Pavel Kudinov, Kungliga Tekniska Högskolan

NKS-R funding: 460 kDKK

Deliverables:
1) Experimental data on debris bed properties and coolability from experimental facilities at KTH and at VTT
2) Developed and validated codes (DECOSIM, MEWA, CFD code) for analysis of the debris bed coolability in severe accident.
3) Analysis of steam explosion and debris bed coolability scenarios in Nordic BWRs.

Status
There are no major deviations between plans and results except for:
- Additional experiments with the COOLOCE facility at VTT will not be performed due to the reduction of funding in SAFIR2018. Instead the focus will be on analytical activities and application of the validated codes to prototypic plant conditions.

3.5 L3PSA

Addressing off-site consequence criteria using level 3 PSA
The aim is to deepen the Nordic understanding about the merits and limitations of probabilistic off-site consequence analysis for nuclear facilities. The project began in 2013, and is in its last year of a planned three years. Through this study the group is furthering Nordic understanding of the potential for Level 3 PSA to determine the influences and impacts of off-site consequences, the effectiveness of off-site emergency response, and the potential contributions of improved upstream Level 1 and Level 2 PSAs. Level 3 PSA provides a tool to assess the risks to society posed by a nuclear plant, and could be integral in making decisions related to the off-site risks of nuclear facilities.

Activity leader: Andrew Wallin-Caldwell, LRT

NKS-R funding: 300 kDKK

Tasks and milestones:
1) Industry and Literature Survey (Status: Completed)
2) Appropriate Risk Metrics (Status: Completed)

3) Regulation, guides and standards (Status: Continuation of IAEA & ANS/ASME work.)
4) Development of a Guidance document (Status: Activity started in 2014 and to be completed in 2015)
5) Pilot Application including tools for dispersion and consequence analysis (Status: Activity started in 2014 and to be completed in 2015)
6) Final report of appropriate risk metrics and regulation, guides and standards

Status
Last year's progress on the Pilot projects was modest as compared with the project plan developed in 2013. This slight deviation in the progress of the pilot project is only slight and will not compromise the overall project plan. The working group has better distributed project responsibilities in order to complete the project according to the proposed schedule.

3.6 LESUN

Learning from Successes in Nuclear Power Plant Operation to Enhance Organisational Resilience
The purpose of the LESUN project is to improve nuclear safety by enhancing organisational learning from successful actions and decisions. The specific goal is to develop an Operating Experience method for capturing, analysing and communicating lessons learned based on successes.

Activity leader: Ann-Britt Skjerve, IFE

NKS-R funding: 600 kDKK

Tasks

No.	Activities	Duration (planned)	Status
1	Literature review	January-August 2015	On-going, almost completed.
2	Data collection: Empirical studies in two Nordic NPPs	March-October 2014	Preparations on-going.
3	Data analysis (dep. on data collection period)	March-November 2014	
4	Dissemination seminar	December 2015	
5	Intermediate report	December 2015	

Status
The project progresses according to plan. Pia Oedewald will resign from her position at VTT before the summer vacation, Marja Liinasuo and Hanna Koskinen, will instead join the project team.

3.7 MODIG

Modelling of Digital I&C
MODIG is an international collaboration project focussing on risk analysis methods and application for modern nuclear power plants with digital automation systems. The objective is to get a consensus approach for a reliability analysis of a plant design with digital I&C, improved integration of probabilistic and deterministic approaches in the licensing of digital

I&C, improved failure data collection including software failure probability quantification, and practical application of probabilistic risk analysis (PRA) to compare design alternatives.

Activity leader: Jan-Erik Holmberg, RiskPilot

NKS-R funding: 300 kDKK

Tasks

1) Development of a method for the analysis of spurious actuations for PSA
2) Clarification of the role of PSA when assessing defence-in-depth, diversity and complexity in design
3) Software reliability: Further explore additional field data (AREVA, Siemens), test of the developed method on real implementation, assessment of the software complexity, improvement of the CCF treatment.
4) Initiation of WGRISK task on failure data collection
5) Seminar together with the SAFIR project SAUNA on September 30 in Espoo
6) Final report is expected to be submitted by year end

Status

3.8 PLANS

Planning Safety Demonstration
Better understanding of selected relevant challenges associated with DI&C safety demonstration and how they can be effectively addressed in the early stages of development projects which benefits all concerned stakeholders on a general level. Refined guidance for DI&C safety demonstration planning on selected topics offering better work routine, harmonized practises and cost savings for stakeholders and thus an expected competitive edge for Nordic end user organizations. An established network of Nordic nuclear safety experts working on DI&C safety demonstration offering a forum of competence and knowledge exchange and strengthening the position of Nordic countries in the world's nuclear community..

Activity leader: Vikash Katta, IFE

NKS-R funding: 400 kDKK

Tasks

1) Extending the approach described in the safety demonstration plan guide (described in Elforsk report 13:86) by investigating further the following areas and devise detailed guidance on them:
    a. Explore reasoning models in order to support an explicit and clear reasoning structure for safety argumentation.
    b. Refine guidance on the first three SSAs, namely Project Scope, Safety Classification and Categorisation, and Requirements.
    c. Develop illustrative examples for the framework based on case studies when possible.
2) Establishing a Nordic technical group of experts on nuclear DI&C safety demonstration. The project group will be extended with experts representing regulators,

utilities, suppliers, consultancy firms and research organisations related to nuclear safety in Nordic countries.

Status
An industrial expert workshop was held on May 12th. There are no major deviation to the original plan.

4 Overview of all NKS-R activities 2010-2014

It is seen from the table below that all activities started in 2013 and earlier have been finalised. An activity is considered to be started at the January board meeting, and ended when the final report has been delivered.

Activity	NKS number	Started	Ended
Decom-sem	NKS_R_2010_83	01/2010	12/2010
DIGREL	NKS_R_2010_86	01/2010	12/2010
IACIP	NKS_R_2008_61	01/2010	12/2010
INCOSE	NKS_R_2009_75	01/2010	05/2011
MOSACA10	NKS_R_2008_69	01/2010	01/2011
NROI	NKS_R_2008_70	01/2010	04/2011
POOL VTT	NKS_R_2007_58	01/2010	05/2011
POOL KTH	NKS_R_2007_58	01/2010	06/2011
POOL LUT	NKS_R_2007_58	01/2010	03/2011
AIAS	NKS_R_2011_98	01/2011	12/2012
DIGREL	NKS_R_2010_86	01/2011	01/2012
ENPOOL	NKS_R_2011_90	01/2011	03/2012
ENPOOL	NKS_R_2011_90	01/2011	05/2012
ENPOOL	NKS_R_2011_90	01/2011	05/2012
MoReMO	NKS_R_2011_95	01/2011	02/2012
NOMAGE4	NKS_R_2008_63	01/2011	11/2011
POOLFIRE	NKS_R_2011_96	01/2011	02/2012
SADE	NKS_R_2011_97	01/2011	03/2012
RASTEP	NKS_R_2010_87	06/2011	09/2012
AIAS	NKS_R_2011_98	01/2012	06/2013
DECOSE	NKS_R_2012_100	01/2012	07/2013
DIGREL	NKS_R_2010_86	01/2012	02/2013
ENPOOL VTT	NKS_R_2011_90	01/2012	04/2013
ENPOOL LUT	NKS_R_2011_90	01/2012	03/2013
ENPOOL KTH	NKS_R_2011_90	01/2012	05/2013
MoReMO	NKS_R_2011_95	01/2012	03/2013

Nordic-Gen4	NKS_R_2012_103	01/2012	11/2012
POOLFIRE	NKS_R_2011_96	01/2012	02/2013
RASTEP	NKS_R_2010_87	01/2012	10/2013
SADE	NKS_R_2011_97	01/2012	03/2013
Decom-sem	NKS_R_2013_106	01/2013	02/2014
DECOSE	NKS_R_2012_100	01/2013	10/2014
DIGREL	NKS_R_2010_86	01/2013	03/2014
DPSA	NKS_R_2013_107	01/2013	07/2014
ENPOOL	NKS_R_2011_90	01/2013	10/2014
Exam HRA	NKS_R_2013_110	01/2013	03/2014
HUMAX	NKS_R_2013_108	01/2013	02/2014
L3PSA	NKS_R_2013_109	01/2013	03/2014
POOLFIRE	NKS_R_2011_96	01/2013	12/2014
SADE	NKS_R_2011_97	01/2013	02/2014
ATR	NKS_R_2014_111	01/2014	unfinished
DECOSE	NKS_R_2012_100	01/2014	unfinished
DIGREL	NKS_R_2010_86	01/2014	02/2015
DPSA	NKS_R_2013_107	01/2014	unfinished
ENPOOL	NKS_R_2011_90	01/2014	unfinished
HUMAX	NKS_R_2013_108	01/2014	02/2015
L3PSA	NKS_R_2013_109	01/2014	04/2015
Nordic-Gen4	NKS_R_2012_103	01/2014	02/2015
ProCom	NKS_R_2014_112	01/2014	03/2015

Attachments

A1. Status report ADdGROUND

Progress to NKS of the project

Modelling as a tool to augment ground motion data in regions of diffuse seismicity (ADdGROUND)

Activity leader: Ludovic Fülöp (VTT), May 20th, 2015

Introduction/Scope

After the Fukushima accident, seismic safety of nuclear power plants and other nuclear installations has become an increasingly important topic also in regions with low seismic activity, including the Nordic nuclear sites.

The technical aim of the proposed project is to refresh existing and to build new capabilities in earthquake source modelling for ground motion simulations in the context of stable continental regions, specifically the Fennoscandian shield. The scarcity of empirical observations of near-field ground motions from large magnitude earthquakes in Fenniscandia has been an impediment for deeper understanding of the possible earthquake loading scenarios on nuclear installations, even if the empirical data has been exhaustively analyzed. With recent advances in computational methods, the opportunity exists for numerical models to give realistic estimates of earthquake loads. In addition to the technical outcome, this project also aims to establish and maintain a network of experts focused on diffuse seismicity areas of the Nordic Countries and further enhance the cooperation between VTT and Uppsala University in the area of earthquake source modelling. A longer term aim would be to extend the cooperation to the Baltic countries. The project outcomes will support STUK and SSM, providing background information for the safety assessments of nuclear plants, but are also significant for nuclear repositories.

Foreseen milestones and deliverables

	Date
D.1. Workshop – Potential of numerical methods to supplement empirical earthquake observations (min 3 speakers)	03.2015
M.1. Potential calibration cases for modelling identified. Data collected.	07.2015
D.2. Workshop – Sensitivity of modelling effects of earthquakes in areas of diffuse seismicity (min 3 speakers)	11.2015
M.2. Input variable ranges for selected modelling cases.	12.2015
D.4. Journal paper submitted	07.2016
Final report	12.2015

Some presentation material is public, and some is becoming public once the underlying publications are accepted. We are in the process of clarifying the status of presentations. The workshop had 15 participants:

The consortium agreed to collect data for three levels of earthquake as calibration cases for the future modelling tasks:

- Data from one recent Canadian event (M_w>5) which was well measured for strong earthquakes (VTT and Uppsala University)
- Data from a low magnitude Swedish earthquake measured as close (<20km) to epicentre (Uppsala University)
- Continue with the Kouvola data analysis (M_L 2.6)
- Use some micro earthquake data measured in POSIVA's array (ÅF-Consult)

Planning of the data collection is ongoing, and the project is on schedule.

Publicity for AdDGROUND

Intensive PR activity was also carried out to publicise the events. The press releases of the Workshop in Finnish and English were republished by several media outlets, contributing to the visibility of the activity and of the research project/program:

Ei Fukushimaa Fennoskandiaan" -projekti käyntiin, suomalaiset mukana (07/05-15 14:43);

http://www.talouselama.fi/uutiset/ei+fukushimaa+fennoskandiaan+projekti+kayntiin+suomalaiset+mukana/a2305150

Seismic Safety of Nuclear Power Plants Will Improve (07/05-15 16:16);

https://informedinfrastructure.com/14640/seismic-safety-of-nuclear-power-plants-will-improve/

Nordic earthquake experts convene in Espoo (08/05-15 13:01)

http://www.paneuropeannetworks.com/environment/nordic-earthquake-experts-convene-in-espoo/

Seismic safety of nuclear power plants will improve (10 May 2015)

http://www.cnegypt.com/2015/05/seismic-safety-of-nuclear-power-plants.html

Vakaiden manneralueiden maaniäristyksiä mallinnetaan (10.5.2015) Kaleva + liitteet (E-edition, PDF)

A2. Status report ATR

PROJECT STATUS REPORT 1 (2)

Project name: **Impact of Aerosols on the Transport of Ruthenium in the primary circuit of nucear power plant**

Project short name: ATR-2015 Project number: 237799

Author / logger: Ari Auvinen Date: 29.5.2015

1 Project assignment realisation

Description of the work done during the work period (1.1.2015 – 31.5.2015):

Six out of nine experiments planned for year 2015 on the transport of Ru have been conducted at VTT (table 1.). The carrier gas in the experiments is air. Reference experiments on the chemistry of pure RuO_2 and CsI were conducted at first. In the second phase, the effect of nitrogen oxides (N_2O, NO_2) and nitric acid (HNO_3) on the ruthenium transport was studied by varying their gas phase concentrations and residence time together with Ru oxides in the RCS model. Thus their impact on the equilibrium of Ru species transported to the outlet of the RCS model can be found out.

Table 1. Experimental matrix for transport of Ruthenium in air-ingress scenario.

Exp.	T (K)	precursor	additive precursor conc.	comments	humidity
1	1300	RuO_2	atomizer without particles	Reference exp.; use of inner tube	humid
2	1500	RuO_2	atomizer without particles	Reference exp.; use of inner tube	humid
3	1700	RuO_2	atomizer without particles	Reference exp.; use of inner tube	humid
4	1300	RuO_2+ $NO_2/N_2O/HNO_3$	HNO_3 through atomizer	Use of inner tube	humid
5	1500	RuO_2+ $NO_2/N_2O/HNO_3$	HNO_3 through atomizer	Use of inner tube	humid
6	1700	RuO_2+ $NO_2/N_2O/HNO_3$	HNO_3 through atomizer	Use of inner tube	humid
7	1300	RuO_2+CsI	4 wt.% of CsI solution		humid
8	1500	RuO_2+CsI	4 wt.% of CsI solution		humid
9	1700	RuO_2+CsI	4 wt.% of CsI solution		humid

Deviations from set objectives:

There is no deviations to the project plan.

2 Results produced during the performance period

The results of year 2014 activities were presented in ERMSAR 2015 conference on Severe Accident Research 24th-26th April, International OECD/NEA-NUGENIA/SARNET Workshop on the "Progress in Iodine Behaviour for NPP Accident Analysis and Management" 30th March – 1st April and OECD-NUGENIA/SARNET Source Term workshop 1st – 2nd April.

The results have attracted considerable interest and IRSN have announced their plan to duplicate tests carried out with NO_2 gas in their OECD STEM2 programme. Therefore, writing a publication of the test results as soon as possible is considered to be of high priority.

3 Scheduling situation

The third phase of experiments will start on Wednesday the 3rd of June. In the third phase, the chemistry of CsI-Ru system will be investigated. In the experiments caesium iodide, caesium and

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iodine will be fed separately to the flow of Ru oxides. As an outcome the reason for increased transport of gaseous ruthenium will be explained and the related chemical reactions will be proposed.

These experiments and the following analyses of samples will give a more detailed view on the processes leading to the transport of ruthenium through the reactor coolant system and a better understanding on the chemical composition of containment atmosphere during a severe accident. The last phase of experiments will be completed by June 25th and the activity will be reported on schedule.

The report for year 2014 activities will be delivered on week 23 to NKS and a publication manuscript describing the results will be send for a review.

A3. Status report COPSAR

STATUS of COPSAR-NKS ACTIVITIES, May 20th, 2015

Work at LUT, Markku Puustinen, Jani Laine, Antti Räsänen, Lauri Pyy and Joonas Telkkä

Deliverable 1: Experiments with a SRV sparger and RHR nozzles
Specifications for the SPA-T1 test were agreed with KTH on the basis of earlier tests and GOTHIC simulations and the test was carried out on 12th of May. Test matrix for single phase liquid tests, where the PIV system could be utilized for the definition of flow fields around the sparger head, is being developed with KTH. Design of a RHR nozzle to be installed for mixing efficiency tests is under development. Expected submit date of the report is October 15th, 2015.

Deliverable 2: Designing spray injection systems for the PPOOLEX facility
Information on different spray systems in power plants is being gathered.

Deliverable 3: Single spray nozzle experiments in a separate test facility
Droplet size measurements of a single spray nozzle with the help of the shadowgraphy application of the PIV system are being done. The aim is to develop a measurement environment for defining kye characteristics of a spray nozzle design which will be later installed to the PPOOLEX facility. Expected submit date of the report is November 30th, 2015.

Deliverable 4: Delivery of relevant experiment data to the simulation partners.
Measurement data and video clips of SPA-T1 were delivered to KTH.

Work at VTT, Timo Pättikangas and Risto Huhtanen

Deliverable 1: Improved condensation model for vapour on spray droplets
The submodel developed earlier for the evaporation and condensation model for spray droplets is transferred to new version of ANSYS Fluent. Implementation of the modifications needed for using the submodel with the Euler-Euler two-phase solver have been started. The possibilities to use the model with the Euler-Euler two-phase solver will be tested.

Deliverable 2: CFD calculation of the single spray nozzle experiment performed at LUT
Modelling of single spray nozzle experiments has been started. First CFD model for the experimental configuration has been constructed. The first experiments do not include condensation or evaporation. Test calculations for the spray nozzle have been performed by using available information on the properties of the nozzle.

Deliverable 3: CFD model for the PPOOLEX facility with spray systems and pre-calculation of experiments
Modelling of the PPOOLEX facility will be started in August.

Deliverable 4: Reports on the single spray nozzle calculations and PPOOLEX pre-test calculations

Reporting will be started in November.

Work at Royal Institute of Technology (KTH), Ignacio Gallego-Marcos, Lukasz Filich, Walter Villanueva and Pavel Kudinov

Deliverable 1: Contribution to selection of the design of the spray injection systems for the drywell and wetwell of the PPOOLEX facility
Information on spray nozzle models, nozzle diameters, droplet diameters, droplet distributions, mass flow rates, and jet expansion angles that have been obtained from literature. Discussion on the selection of the design will be carried with LUT.

Deliverable 2: Pre-test analysis for selection of operational regimes and test procedures
No progress.

Deliverable 3: Post-test analysis and validation with GOTHIC code on spray
No progress.

Deliverable 4: Post-test analysis and validation of EHS/EMS on spargers and RHR nozzles
Post-test analysis and preliminary validation of EHS/EMS on spargers against the recent PPOOLEX SPA-T3 and SPA-T4 tests have been carried out. Further development of the EMS model for spargers is ongoing as well as the validation of the EHS/EMS models against the remaining SPA tests. Expected submission date of the report is June 30, 2015.

A4. Status report DECOSE

STATUS REPORT OF DECOSE-NKS PROJECT IN 2014
May 20, 2015

Work at Royal Institute of Technology (KTH), Division of Nuclear Power Safety
DECOSE-NKS and APRI-9

Pavel Kudinov, Sergey Yakush, Simone Basso, Dmitry Grishchenko, Alexander Konovalenko, Sachin Thakre, Weimin Ma, Aram Karbojian.

1. Joint analytical activity on debris bed coolability which will include: code–to–code comparison, development of recommendations and best practice guidelines for simulations, defining reference cases for coolability analysis in plant accident conditions, post-test analysis and code validation against COOLOCE data and pre-test analysis to determine conditions for the future COOLOCE experiments (Tasks 7).

A workshop has been organized at KTH in January to discuss and plan project activities. Validation of the DECOSIM code against existing COOLOCE data with different configurations of debris bed is ongoing. Code performance (convergence, time step limitations) has been improved significantly. DECOSIM simulations of debris bed coolability were carried out for the experimental conditions of COOLOCE-10, 11, and 12 test series performed by VTT. It was known that simulations give lower dryout power than that for top flooding, while in COOLOCE-11 experiments the dryout power was higher (better coolability). Therefore, a number of simulations were performed in order to study sensitivity of dryout power to conditions in the top part of the bed. The heat-releasing volume was of height 0.23 m, top 0.04 m were filled with passive porous material. Simulations carried out for system pressure 2 bar, heating power 30 kW (correspond to experimental power).

Simulations show that dryout conditions are very sensitive to particle diameter and porosity of the bed. Generally, reasonable agreement between simulations and experiments was achieved. However, for the side-only flooding, results were shown to be very sensitive to conditions in the top (unheated) layer. Therefore, special attention must be paid in the experimental procedures to decrease the uncertainty in how tight is the contact between the impermeable top lid and particulate debris bed underneath it, in order to make quantitative comparisons and validation possible.

DECOSIM numerical simulations of debris bed coolability were carried out for a wider range of debris bed configurations, including conical, cylindrical, Gaussian, and mound-shaped beds. The function describing the dependence of dryout heat flux on the width-to-height ratio was found for each shape. A unified shape function describing all configurations within 10% accuracy was proposed, and an analytical expression for it was found. As a result, a surrogate model for 2D debris bed coolability is developed applicable to wide range of debris bed shapes, properties, and system conditions.

Definition of the reference cases for coolability analysis in plant accident conditions is ongoing. Code–to–code comparison for the selected cases and development of recommendations and best practice guidelines for simulations is planned. A set of surrogate models for computationally efficient prediction of the onset of debris bed dryout and post-dryout debris bed coolability have been developed.

2. Investigation of particulate debris spreading, PDS-C tests and pre-test analysis to determine COOLOCE test conditions and procedure, PDS-P (pool) tests on particulate debris spreading in a pool (Task 4).

Experiments in PDS-C (Particulate Debris Spreading – Closures) facility with different types of particles (stainless steel cylinders, spheres, their mixtures, gravel, and zirconia-silica beads) have been carried out. A scaling approach has been developed and validated against experimental database for characterizing empirical closures for the particulate debris flux in non-dimensional variables. A model for prediction of particulate debris spreading based on the proposed scaling approach has been developed. The sensitivity

guidelines for future needs will then be collected to common report. The remaining tasks related to the validation and development of the simulation models and codes will be carried out. VTT is participating to the joint analytical activity on debris bed coolability including code–to–code comparisons, development of recommendations and best practice guidelines for simulations, defining reference cases for coolability analysis in plant accident conditions and code validation against experiments (Task 7).

2. Steam explosion analysis using the MC3D code to analyze steam explosion in a BWR containment (Task 8).
The expertise in MC3D use has been broadened by simulating an experiment performed with partially metallic melt, i.e. TROI-TS5. Also the sensitivity of the simulation results to selected input parameters has been evaluated. During this work a script to automate the simulation process was developed.

A literature survey of the state-of-the-art on steam explosions is being prepared for the Master´s Thesis theoretical part. Selected reactor application cases will be analysed with MC3D examining also the sensitivity of the results to key input parameters. Especially the effect of vessel breach mode will be analysed.

Status of all tasks from previous years

Task 1. Investigation of the effect of the bed geometry and particle size on coolability in 2D debris bed
Synthesis of the COOLOCE experiments performed 2011-2014 is being prepared to combine the results from all six debris shape variations: conical, truncated cone, cylindrical with top flooding, cylindrical with lateral flooding, cylindrical with an agglomerate simulant and cone on a cylindrical base. The geometries which allow multi-dimensional flooding generally have greater dryout power compared to geometries in which the water infiltration into the debris bed is limited by closed walls. On the other hand, it is emphasised that the coolability is strongly dependent on the height of the debris bed and, according to the experiments and the simulations; the effect of the bed height is often greater than the effect of the flooding mode.

Task 2. Investigation of the effect of debris agglomeration on coolability
The effect of agglomerate was studied in the COOLOCE-11 experiments performed in 2013. When comparing the results to previous experiments it was found out that the bed with both top and lateral flooding had the best coolability: the measured dryout heat flux (DHF) was 50-70% greater than the DHF of the test bed with top flooding only. Also, the test bed with the agglomerate simulant had better coolability than the top-flooded test bed, with 10-40% greater DHF. These results are also discussed in the synthesis performed in the frame of Task 1.

Task 3. Investigation of the effect of initial pool subcooling on coolability
The effect of initially subcooled water pool was analysed in the COOLOCE-9 experiments. The experiments suggest that the subcooling may increase dryout heat flux and increase coolability. A synthesis of the results is included in the 2014 report.

Task 4. Investigation of particulate debris spreading
No planned activities due to reductions in funding for SAFIR2018.

Task 5. Investigation of the effect of the heaters' geometry on the DHF
The effect of heater´s geometry will be assessed performing experiments in the POMECO-HT facility with the same ceramic beads as used in the COOLOCE experiments. Preparations for sending the debris bed material to KTH have been made.

analysis of the model has been carried out. The model has been used to quantify the uncertainty in the efficacy of the particulate debris spreading. The model has been applied for selected prototypic sever accident scenarios where efficacy of particulate debris bed spreading has been assessed.

A new sets of tests (~64 tests) has been carried out on upgraded PDS-P facility. The debris spreading driven by large turbulent flows in the pool has been investigated. The post-test analysis of the experimental data suggests that gas injection rate in the pool, pool dimensions and particle properties have strong influence on debris bed formation. A correlation for particle spreading efficiency, relating the tangent of particle spreading angle to two non-dimensional parameters based on the ration of characteristic particle sedimentation velocity to superficial gas velocity, as well as pool aspect ratio, was proposed and validated against PDS-P experimental data. Further experimental work is required in order to develop a database on particle spreading in the pool with wide ranges of pool configuration, particle properties and debris release conditions. The results of PDS-P tests are important for validation of the codes capable to predict complex multi-phase phenomena in severe accident conditions.

3. Investigation of the effect of the particle size on the DHF in POMECO-HT and POMECO-FL (Task 1d).
It is planned to arrange delivery from VTT of the small particle beads used in COOLOCE facility to clarify the effect of the particle size and morphology on the DHF.

4. DEFOR-A series of tests with corium simulant material on debris bed formation (Task 2).
New DEFOR-A tests are under discussion and planning.

5. Application of MC3D and TEXAS-V to analysis of steam explosion in a BWR containment (Task 8).
The steam explosion calculations in the flooded drywell of Nordic BWR have been carried out using MC3D and TEXAS-V codes. The sensitivity studies to the scenario and modeling parameters are ongoing. Morris diagrams were used to characterize sensitivity of the explosion impulse to the input parameters for TEXAS code. The database of TEXAS solution is under further development. New surrogate models for approximation of TEXAS-V output are proposed and implemented. Two approaches are used: (i) training of the Artificial Neural Networks and (ii) implementation of other advanced interpolation algorithms. The surrogate model will be used to perform extensive statistical analysis of steam explosion loads in a Nordic BWR containment.

6. Reporting of the POMECO-FL, POMECO-HT and PDS experiments and code development results.
Reporting for 2014 has been started.

Work at VTT Technical Research Centre of Finland Ltd DECOSE-NKS and SAFIR2018:

Eveliina Takasuo, Anna Nieminen, Magnus Strandberg

Status of Task for 2015

1. Post-test analysis of the COOLOCE experiments conducted thus far.
A comprehensive assessment of the effect of the debris bed geometry on coolability is ongoing for the six debris bed geometries that have been addressed in the experiments in 2012-2014. Several reference cases will be analysed and compared. VTT will provide the final results in September. Clearly-defined

Task 6. Development of advanced instrumentation
No planned activities due to reductions in funding for SAFIR2018.

Task 7. Joint analytical activity on debris bed coolability
Best practice guidelines for the reliable assessment of debris bed coolability based on the experiences using two-phase flow simulation codes are under development.

Task 8. Analysis of steam explosion in a Nordic BWR containment
MC3D and TEXAS have been applied to analysis of steam explosion in Nordic BWR conditions. Result are summarised in the reports.

Overall Project Summary

Comparison between plans and results with explanation of any deviations:
There are no major deviations between plans and results except for:

- Additional experiments with COOLOCE facility at VTT (Task 2, Task 3, and Task 4) will not be performed due to the reduction of funding in SAFIR2018. Instead the focus will be on analytical activities and application of the validated codes to prototypic plant conditions.

Expected submit date of the final report

- Expected date for submitting the reports for 2014 is mid of June 2015.

Any issues you would like the board to know

- Project contract signing by KTH has been delayed. Partially due to the delay with signing the APRI contract – which provides the main source of co-funding for the NKS-DECOSE project.

A5. Status report L3PSA

Memo

NPSAG / NKS-R L3PSA - Addressing off-site consequence criteria using Level 3 PSA: Spring 2015 status report

To:	NPSAG / NKS-R	**Cc:**	
From:	Level 3 PSA working group	**Date:**	22 May 2015
Project no:	211975		

1 Summary

Purpose of Project

Level 3 PSA provides a tool to assess the risks to society posed by a nuclear plant, and could be integral in making objective decisions related to the off-site risks of nuclear facilities. This study intends on furthering Nordic understanding of the potential of Level 3 PSA to determine the influences and impacts of off-site consequences, the effectiveness of off-site emergency response, and the potential contributions of improved upstream Level 1 and Level 2 PSAs.

Progress of the activity

The first year activities, completed during 2013, included an industrial survey, an investigation of appropriate risk metrics, and participation in the development of guidelines and standards. The next phase of the project will primarily focus on the pilot project and the guidance document.

The pilot project is split amongst a Finnish Project, and a Swedish Project. The Finnish project has been underway since 2013, while the Swedish project is starting in earnest during the second year of the project (2014). A significant amount of the work completed during the first year of the project was pilot project scoping and planning. This includes outlining the project goals, required inputs, definition of the steps required for performing such a study and the reports that will be produced.

Since January, significant progress has been made in formally defining the Scope of Analysis. The Scope of Analysis report has been mostly completed, and the working group is currently performing the Study concurrently with the development of the Methodology Specification. These reports will be further developed through the end of the year and completed in the first quarter of 2016.

The guidance document work is also ongoing. A proposal for a draft outline has been developed by the working group.

A comparison between plans and results with explanation of any deviations

Last year's progress on the Pilot projects was modest as compared with the project plan developed in 2013. This slight deviation in the progress of the pilot project is only slight and will not compromise the overall project plan. The working group has better distributed project responsibilities in order to complete the project according to the proposed schedule.

Expected submission date for Phase III of project

The third and final seminar will be held in January 2016. The second year report will be completed immediately following that meeting (approximately beginning of March 2016), incorporating the findings from the seminar.

Issues the board should know

Vattenfall AB has been added to the working group in this, the final year of the project. Vattenfall's experience with dispersion and consequence calculations as well as their involvement with the parallel NKS project NORCON has been very beneficial to the project.

2 Progress of activity

In general, the work has progressed very well, and has fulfilled all planned deliverables to date. The progress of the Pilot project is, however, a little behind the schedule developed for the Pilot project at the beginning of 2014. This is due to delays in deciding where the input data would be derived from.

This issue was discussed in the autumn of last year with stakeholders and plans for how the project could proceed. With the input source and input specification report discussed within the group the project will be able to continue. In order to maintain the overall project schedule project responsibilities have been better divided amongst the working group members.

Work on the Guidance document will begin with a Kick-off meeting June 1st 2015 in Uppsala. During this meeting stakeholder involvement, development logistics, and document scope will be discussed.

3 Project funding

3.1 Project timeline, distribution and deliverables

Table 1. List of project deliverables.

Deliverable	Date
Detailed project plan	May 2013 (complete)
Reference group meeting	May. 2013 (complete)
Project seminar 1	Jan. 2014 (complete)
First year report	Jan. 2014 (complete)
Major Sub-report Survey of Level 3 PSA Industrial Purpose/Application Status of Task 1 - Risk Metrics (complete) Status of Task 2 - Regulation & Standards (ongoing) Status of Pilot Application (SAFIR/PRADA – VTT)	
Project seminar 2	Jan. 2015 (complete)
Second year report	Jan. 2015 (complete)
Major Sub-sections Level 3 PSA Regulation, Guides and Standards Report Status of Pilot Application (33%)	
Final report (Following year 3)	Jan. 2016
Major Sub-report Level 3 PSA Guidance document Input from previous tasks including pilot application Including: 1. Recommendations for Level 1 and 2 PSA 2. Methodology guidance	

4 First year activities (2013)

The first year activities are fully described in Reference [1].

5 Second year activities (2014)

The second year activities are fully described in Reference [2].

The pilot project was the primary focus of the 2014 activities within the project.

The tools and methods used for performing the analysis have been limited to those that are available and the working group has experience using.

The activities within the pilot project have been focused on working to characterize and collect input data, and development of the Scope of analysis.

Additionally, work has also continued in support of the IAEA's development of a TECDOC for Level 3 PSA. This work is expected to continue over the next few years.

5.1 Swedish pilot project organization

Three reports are being developed to document the work completed in the pilot project:

- Level 3 PSA Pilot Study input specification
  - Based on LENA requirements / assumptions what inputs are need
  - what formats are required
  - What limitations have been found
  - What additional information could be (could have been) useful.
  - Complete before Summer semester
- Scope of analysis
  - Satisfy as many of the goals we prescribed in the previous meeting with the resources available
  - Countermeasures
  - Results
  - Uncertainties
  - Complete by year end
  - Start concurrently with Input specification
- Methodology specification
  - Describe LENA
  - Complete by year end
- Application and result interpretation specification
  - Complete during 2015

5.2 Regulations, guides, and standards

Progress on the Level 3 PSA standard has been modest over the past year. The Standard writing committee began work on the standard in 2004, and progress has been somewhat un-even over the past several years. The standard has had periods of significant progress, and periods of somewhat slow development. Judging based on the current status of the Level 3 PSA standard, the related Level 2 PSA standard, and the relatively modest progress of each during the past year, the completion of the ANS/ASME guidance on Level 2 and Level 3 PSA will take several more years.

The IAEA work will continue the next several years. The IAEA TECDOC is in the very early stages of development, and several more Consultant Meetings will be required to continue and eventually complete it. The IAEA has also discussed the possibility of additional regional workshops, but it is possible that there will be no additional regional workshops.

6 Comparison between planned and actual progress

Last year’s progress on the Pilot projects was modest as compared with the project plan developed in 2013. This slight deviation in the progress of the pilot project is only slight and will not compromise the overall project plan. The working group has better distributed project responsibilities in order to complete the project according to the proposed schedule.

7 Expected date for final report

The third and final year seminar will be held in the first quarter of 2016. The second year report will be completed immediately following that meeting, incorporating the findings from the seminar.

8 Other issues for information to NKS/NPSAG

Vattenfall AB has been added to the working group in this, the final year of the project. Vattenfall's experience with dispersion and consequence calculations as well as their involvement with the parallel NKS project NORCON has been very beneficial to the project.

9 References

[1] "Addressing off-site consequence criteria using Level 3 PSA — Phase 1 Status Report", NKS-R, NKS-303, March, 2014.

[2] "Addressing off-site consequence criteria using Level 3 PSA — Phase 2 Status Report", NKS-R, NKS-337, April, 2015

A6. Status report LESUN

Project: Learning from Successes in Nuclear Power Plant Operation to Enhance Organisational Resilience (LESUN).

The purpose of the LESUN project is to improve nuclear safety by enhancing organisational learning from successful actions and decisions. The specific goal is to develop an Operating Experience method for capturing, analysing and communicating lessons learned based on successes.

Overall, the project is progressing according to plan.

Project Group in 2015: Pia Oedewald (VTT) *(until 31/05/2015),* Kaupo Viitanen (VTT), Marja Liinasuo (VTT) *(from 15/04/2015)*, Hanna Koskinen (VTT) *(from 15/05/2015)*, Christer Axelsson (RAB), Rossella Bisio (IFE) and Ann Britt Skjerve (IFE, co-ordinator).

Milestones:

No.	Activities	Duration (planned)	Status
1	Literature review	January-August 2015	On-going, almost completed.
2	Data collection: Empirical studies in two Nordic NPPs	March-October 2014	Preparations on-going.
3	Data analysis (dep. on data collection period)	March-November 2014	
4	Dissemination seminar	December 2015	
5	Intermediate report	December 2015	

Overall status:

Overall, the project progresses according to plan. The literature review is close to being completed, and preparations for data collections are ongoing. It is expected that the main part of the data collection will be completed in June in Finland (Loviisa) and in June and August in Sweden (Ringhals). Project coordination is carried out using regular video-meetings. On May 26-27, the project team will meet in Halden for a lunch-to-lunch workshop to complete the preparation for the empirical work.

There will be changes to the LESUN project team before the summer vacation. By the end of May, Pia Oedewald will unfortunately no longer be a part of the LESUN project, as she resigns from her position at VTT. To compensate for this, two experienced researchers from VTT, Marja Liinasuo and Hanna Koskinen, join the project team during April and May.

Status on the individual activities:

Ad 1) Literature review
A literature review has been carried out focused at understanding the characteristics of successes, with a special focus on successes in an operational domain. The outcome of the

review has been documented in a 13-pages draft document. It will be reported as an integrated part of the intermediate report.

Ad 2) Data collection: Empirical studies in two Nordic NPPs
A method for addressing successful performance in NPP operations is currently being developed. The method is intended to support both data collection and data analysis. It is based on the assumption that to derive lessons learned from success in an operational setting, analyses need to be multi-levelled and reflect perspectives of the various stakeholders. Further, that lessons learned from successes should not be used to cement a particular task performance approach, but rather to build global insights in the operational environment, which assist stakeholders in successfully adapting their performance during task performance. The main part of data collection at Loviisa and Ringhals is expected to be performed in June and August.

Expected submit date of the Intermediate/final report:
We expect to submit the *final report* 31, December 2015.

A7. Status report MODIG

AFT/NKS-R(15)116/9
MODIG — Modelling of DIGital I&C
Status May 2015/Jan-Erik Holmberg, Risk Pilot AB

Task	Status
#1. Development of a method for the analysis of spurious actuations for PSA	Detailed working plan for 2015 prepared. Progress 10%
#2. Clarification of the role of PSA when assessing defence-in-depth, diversity and complexity in design.	Literature collected, and a general description of the defence-in-depth principle prepared. Progress 40%
#3. Software reliability: Further explore additional field data (AREVA, Siemens), test of the developed method on real implementation, assessment of the software complexity, improvement of the CCF treatment.	One working meeting held. Detailed working plan for 2015 prepared. Preliminary agreement with AREVA for collaboration. Progress 20%
#4. Initiation of WGRISK task on failure data collection	Proposal submitted to WGRISK in March 2015. As a feedback, WGRISK asked to merge this proposal with another proposal on taxonomy for diversity assessment of digital I&C. Progress 50%
#5 Plan for 2016–18	Preliminary road maps prepared for each task 1–4 Progress 5%
#6. Interim seminar 2015	Tentative plan is to hold it together with the SAFIR project SAUNA on September 30, 2015 in Espoo Progress 5%
#7. Interim report 2015	Table of contents prepared. Expected submit date of the report December 31, 2015. Progress 5%

No deviation to the original plan
Overall progress 20%

A8. Status report PLANS

Status report *PLANS, Planning Safety Demonstration, NKS_R_2015_117*

The status report is sent to the following programme manager of NKS-R: Karin Andgren

Reported by: Vikash Katta, Institute for Energy Technology, Norway (Project manager)

Date: 18/05/2015

Status of activities and milestones

As per the project plan, the main activity at the early stages of the project is to organise a workshop to kick-off the project. The objective of such a workshop is to agree upon the scope of the work and define a research roadmap. With a small deviation (as explained in the next section) from the original plans, we have performed the following activities:

A **project kick-off meeting** with project partners was organised on March 23rd, 2015 at SSM, Stockholm. The project partners discussed on how to achieve the activities planned for 2015. In particular, discussions were held on how to further develop a safety demonstration plan guide. In addition, the partners discussed and agreed upon organising an industry expert workshop. The main intention of organising the expert workshop was to engage utilities and vendors as early as possible in the project so that the results developed in the project addresses some of their challenges.

An **industry expert workshop** on "Safety demonstration and planning in Nordic NPP digital I&C projects" was organised by the project. The workshop was hosted by SSM at their premises in Stockholm on 12/05/2015. The workshop had participants (I&C experts) from STUK, TVO, Fortum, OKG, Ringhals, ÅF, ELE Engineering AB in addition to experts from IFE, SSM, Solvina and VTT.

The workshop focused on the challenges and possible solutions to safety demonstration. The participants discussed how safety demonstration planning at the early stages of the project can address several of the challenges related to safety demonstration. One of the main conclusions of the workshop is that there is a lack of awareness on importance of safety demonstration in the industry especially at the management level. One of the concrete suggestions from the experts to the PLANS project is the project should help the community to bridge the knowledge gap that exists in the personnel from several departments, including management, involved in digital I&C projects. PLANS project intends to address this with developing a guide for safety demonstration planning and to show how safety demonstration plan fits into the overall system engineering process.

The project also had an early start with setting up a **Nordic consortium** for NPP digital I&C experts (promised as a result of PLANS project) by inviting the participants of the industry expert workshop to join the consortium.

Deviation and explanation

There has been one small deviation with respect to arranging the workshop for kicking-off the project. However, this will not have any effect on the expected results of the project. We have conducted the kick-off meeting on March 23rd at the SSM premises and not in conjunction with the 3rd Scandinavian conference on system & software safety (as planned in the proposal). As per the original plan, we intended to invite some of the experts attending the conference to our meeting. Instead, we have decided to organise an industrial expert workshop on May 12th, 2015 and to invite NPP I&C experts to this workshop.

Status of deliverables

1. An internal report on the summary of the industry expert workshop will be finalised by the end of May. This can be made available to NKS, if desired.
2. A final report of the project is expected to be submitted by December 3rd, 2015.
3. A revised version of the safety demonstration plan guide will be made available in November.
4. A website (http://nordicnsec.ife.no) for Nordic nuclear safety experts consortium on safety demonstration of digital I&C systems has been setup.

Issues

None

NKS-R Status

June 2015

Karin Andgren
NKS-R Programme Manager

Board meeting,
Copenhagen, 12 June 2015

Summary

Overall the work in NKS-R is progressing according to plan

- Since last NKS-R status report
  - *8 final reports published on website*
- Delayed activities (from before 2014)
  - *None*
- Activities commencing in 2014
  - *5,5 (of 9) completed, final reports missing for ATR, DECOSE, DPSA and ENPOOL (KTH)*
- Activities commencing in 2015
  - *8 contracts out of 10 signed (contracts from KTH missing), work on schedule*
  - *Fortum & TVO support agreement drafts has been sent*

Final reports published in NKS website (since last Board Meeting):

- DIGREL
- ENPOOL (LUT and VTT)
- HUMAX
- L3PSA
- Nordic-Gen4
- ProCom

2014 activities

Final reports still missing (3/9)

- Activities continuing in 2015:
  - ATR
  - DECOSE
- Activities ended in 2014:
  - DPSA

ATR

Activity leader - Christian Ekberg, Chalmers (2014), Ari Auvinen, VTT (2015)

•Publication is under preparation based on the results from last year experiments. Submission for review is expected in June and the NKS report is also expected in June.

•Overall the tests were very successful. Results were presented at ERMSAR meeting as well as in OECD-NUGENIA workshop in iodine chemistry. IRSN already picked up some of these tests carried out with NO2 and is preparing to duplicate them in their OECD STEM2 program.

•Budget for 2014: 300 kDKK 2015: 300 kDKK

DECOSE (cont. in 2015) & DPSA (ended)

Activity leader – Pavel Kudinov, KTH

- Final report for DPSA and DECOSE expected in June.
- Budget for DECOSE in 2014: 500 kDKK
- Budget for DPSA in 2014: 400 kDKK

- Signed contracts from KTH for 2015 (DECOSE and COPSAR) are still missing. Main reason being the delay with signing the APRI-9 project contract.

NKS-R Seminars 2015

ADdGROUND: Workshop #1 – Potential of numerical methods to supplement empirical earthquake observations. 8th of May 2015
Workshop #2 – Sensitivity of modelling effects of earthquakes in areas of diffuse seismicity. November 2015
L3PSA: Final seminar (third year) January 2016
LESUN: Dissemination seminar with stakeholders. December 2015
MODIG: Seminar with stakeholders. October 2015
PLANS: Workshop #1 to collect input from a selected set of I&C experts and to ask them to join a consortium. 12th of May 2015
Workshop #2 to discuss intermediate findings and the content of deliverables. November 2015

Nordisk kernesikkerhedsforskning
Norrœnar kjarnöryggisrannsóknir
Pohjoismainen ydinturvallisuustutkimus
Nordisk kjernesikkerhetsforskning
Nordisk kärnsäkerhetsforskning
Nordic nuclear safety research

NKS-B Status Report

Kasper G. Andersson
NKS-B Programme Manager
June 2015
Technical University of Denmark

Status summary

Overall the work in NKS-B is progressing well. Since the last NKS-B status report was made to the NKS-Board in January 2015, 4 new final reports from completed NKS-B activities have been published on the NKS website. All NKS-B activities that commenced prior to 2014 are completed. Of the 12 activities starting in 2014, 10 have been completed, and 2 are expected to be nearing completion. Of the 10 NKS-B activities that started in 2015, contracts have been agreed and signed with all. Activities that started in 2015 are all currently on schedule.

NKS-B reports

The following NKS-B reports have been published on the NKS website since the last NKS-Board meeting.

CONCORE
K. Breddam et al.
Characterisation of NORM Contaminated Objects: Reliable & Efficient

RAPID-TECH
J. Qiao et al.
Application of Rapid and Automated Techniques in Radiochemical Analysis

SEMUNARS
M. Gårdestig et al.
SemUnaRS – Seminar on Unmanned Radiometric Systems

STANDMETHOD
X. Hou et al.
Progress on Standardization of Radioanalytical Methods for determination of important radionuclides for environmental assessment and waste management in Nordic nuclear industry

NKS-B activities from 2014 (January)

FAUNA
Fukushima accident: Uncertainty of atmospheric dispersion modelling
Activity leader: Jan Havskov Sørensen (DMI)

NKS-B funding: **260 kDKK**

Milestones defined in contract:

1. Kick-off meeting
2. Literature study on source term estimates and atmospheric dispersion regarding the Fukushima Daiichi accident. The source term will be selected from this study for use by the atmospheric models.
3. HIRLAM meteorological forecast model ensembles generated for Japan and surroundings for the period covering the main atmospheric release of radionuclides from

the accident. Corresponding meteorological analyses carried out for the periods of concern.
4. Status meeting
5. Selection of scenarios for which the atmospheric dispersion models will be applied, employing the meteorological ensembles, and uncertainty estimates will be derived.
6. Final report

Status
Contract signed. The delay was caused by the coordinator's unforeseeable private problem. The above milestones have been covered, except final reporting, which is imminent.

NORMIN
NORM related mining in the Nordic countries: Legislation, practices and case studies
Activity leader: Dina Solatie (STUK)

NKS-B funding: **450 kDKK**

Milestones defined in contract:
1. Literature review, summer 2014.
2. Environmental sampling, summer 2014
3. Sample analysis, autumn 2014
4. Sampling and analysis results, Final report by end of 2014

Status
Contract signed. A comprehensive literature study has resulted in long draft reports, which have circulated among activity participants. Since the activity leader has been assigned with new tasks at STUK from the beginning of 2015, she has had little opportunity to finalise the work, but has agreed to a revised deadline of 10th of June 2015.

NKS-B activities from 2015 (January)

FAUNA (continued)
Fukushima accident: Uncertainty of atmospheric dispersion modelling
Activity leader: Jan Havskov Sørensen (DMI)

NKS-B funding: **345 kDKK**

Milestones defined in contract:
1. Kick-off meeting
2. Select Fukushima source term and generate source files
3. Apply the dispersion models to the selected source term employing the meteorological ensemble data produced in 2014 for the first phase of FAUNA.
4. Apply the methodology for calculating and presenting uncertainties developed in the NKS-B activity MUD
5. Prepare the numerical results of FAUNA in a format which facilitates import in the ARGOS DSS, which will thereby host a demonstration of the FAUNA results.
6. Investigate implications of the uncertainty estimates for decision support

7. Organize an NKS workshop on the use of uncertainty estimates for decision making during a nuclear emergency
8. Report of the results of FAUNA as an NKS report and in a peer-reviewed scientific journal.

Status
Contract signed. The activity has been delayed a bit due to the coordinator's private problem this spring, but is now on schedule, and a workshop organisation committee is currently preparing an announcement of the workshop and establishing the list of persons to invite. An overall schedule for who does what in the activity has been agreed on. The activity leader has been prompted for information to announce the seminar.

NORCON (continued)
Nordic nuclear accident consequence analysis
Activity leader: Mark Dowdall (NRPA)

NKS-B funding: **544 kDKK**

Milestones defined in contract:
1. Meeting February 2015
2. Meeting July 2015
3. Final report December 2015

Status
Contract signed. Progress on schedule.

STANDMETHOD (continued)
Standarisation of radioanalytical methods for determination of important radionuclides for environmental assessment and waste management in Nordic nuclear industry.
Activity leader: Xiaolin Hou (DTU)

NKS-B funding: **317 kDKK**

Milestones defined in contract:
1. Project meeting Feb 2015
2. Intercomparison of radioanalytical methods for water samples.
3. Establishment of standard method for Ni-63 determination in waste, Aug. – Nov. 2015.
4. Establishment of a recommended method for simultaneous determination of Fe-55 and Ni-63 in waste samples, April-Sept. 2015.
5. Evaluation and proposal of a combined procedure for determination of multi-radionuclides in waste samples, April-Nov. 2015.
6. Project meeting for evaluation of the project progress and intercomparison results, Nov. 2015
7. Final report, Dec. 2015.

Status
Contract signed. Progress on schedule.

EFMARE (continued)
Effects of dynamic behaviour of Nordic marine environment to radioecological assessments
Activity leader: Mikhail Iosjpe (NRPA)

NKS-B funding: **408 kDKK**

Milestones defined in contract:

1. Analysis of consequences of hypothetical NPP and submarine reactor accidents in coastal Nordic marine environment on the basis of models improvement by more detailed modelling of the key processes for radioecological assessment.
2. Final report with contributions from all partners.

Status
Contract signed. Kick-off meeting held in Copenhagen 16/3 2015. Progress on schedule.

GAMFAC
Advanced in-situ gamma spectrometry field activity - Chernobyl
Activity leader: Mark Dowdall (NRPA)

NKS-B funding: **417 kDKK**

Milestones defined in contract:

1. Establishment and signing of contracts with Belarus - March 2015
2. Dissemination of preparatory information and practical information – final participant lists – April 2015.
3. Invitation letters and permit in place – June 2015.
4. Necessary visas obtained by all teams – August 2015.
5. Preparatory work ncomplete in Belarus – August 2015.
6. GAMFAC activity – Sep. / Oct. 2015.
7. Final report – December 2015.

Status
Contract signed. Progress on schedule.

RAPID-TECH (continued)
Application of rapid and automated techniques in radiochemical analysis
Activity leader: Jixin Qiao (DTU)

NKS-B funding: **317 kDKK**

Milestones defined in contract:

1. Meetings and planning
2. Sample preparation and distribution for inter-comparison
3. Performance of inter-comparison and inter-exchange exercises
4. Results evaluation and summary
5. Final report

Status
Contract signed. Progress on schedule.

NORCOP-COAST
Nuclear icebreaker traffic and transport of radioactive materials along the Nordic coastline: response systems and cooperation to handle accidents.
Activity leader: Inger M. Eikelmann / Anna Nalbandyan (NRPA)

NKS-B funding: **145 kDKK**

Milestones defined in contract:
1. Preparations to the workshop. Feb. – May 2015. Each project partner will prepare a country overview on emergency preparedness systems, laws and capabilities in their country with regards for accident types mentioned in the project description. Partners jointly will prepare workshop program
2. Workshop: a 2-day workshop in Tromsø, Norway. Each partner will hold presentations and participate on joint discussions.
3. Joint report preparation: Nov. – Dec. 2015. A joint report will be written that will summarise each participated country's preparedness system, results of joint discussions and trategy for further cooperation in the project area.

Status
Contract signed. Initial planning work done. Workshop date set to 13-14 October 2015. Workshop has been announced in NewsFlash and on NKS website. Progress on schedule.

IDEA
Internal dosimetry exercise for enhanced ability
Activity leader: Mats Isaksson (Gothenburg Univ.)

NKS-B funding: **181 kDKK**

Milestones defined in contract:
1. IMBA-course with participants from the Nordic countries – planning and preparations by all partners
2. Construction and distribution of scenario exercises – contributions from all partners.
3. Analysis of results and feedback to participants – contributions from all partners
4. Final report with contributions from all partners

Status
Contract signed. Progress on schedule. Course announced in NewsFlash and on NKS website. Workshop/ course held successfully on 18-19 June 2015, with about 20 participants. Focus on dose estimation. Lectures given and possibilities for 'hands-on' training using the IMBA model from PHE (UK) for internal dose estimation. Programme available on activity web page.

CONCORE (continued)
Characterisation of NORM contaminated objects: reliable and efficient
Activity leader: Charlotte Nielsen (NIRP/SIS)

NKS-B funding: **363 kDKK**

Milestones defined in contract:
1. Third project meeting. Feb. 2015
2. All samples retrieved. April 2015.

3. Analytical start-up. April 2015
4. Fourth project meeting: presentation and discussion of results, Nov. 2015
5. Dissemination, for example, using posters and/or presentations at international meetings, Dec. 2015
6. Guideline for the characterisation of NORM and NORM contaminated equipment for operators and competent authorities, Dec. 2015
7. Final report, Dec. 2015

Status
Contract signed. Progress on schedule. Third meeting held. All needed samples received (water and tubes). Analysis in progress.

NUFORNOR
Nuclear forensics within a Nordic context
Activity leader: Ole Christian Lind (NMBU)

NKS-B funding: **363 kDKK**

Milestones defined in contract:

1. Project meeting, key focus on status in the Nordic countries and at respective participating laboratories
2. Application of some selected analytical techniques to relevant samples available in the participating laboratories
3. Seminar in Norway: 'Analytical techniques for nuclear forensics in Nordic countries with focus on novel techniques' with invited speakers.
4. Report with guidelines 'Recommended procedures and analytical techniques for specific nuclear forensic purposes in the Nordic countries'.

Status
Contract signed. Progress on schedule. Activity leader prompted for information to announce the seminar.

NKS-B Status Report

Kasper G. Andersson

NKS-B Programme Manager

Summary

Overall the work in NKS-B is progressing well

- Since last NKS-B status report
  - *4 final reports published on website*
- Delayed activities (from before 2014)
  - *None*
- Activities commencing in 2014
  - *10 (of 12) completed, 2 nearing completion (FAUNA, NORMIN)*
- Activites commencing in 2015
  - *All 10 contracts signed, work on schedule*

Final reports published on NKS website (since last Board Meeting):

- CONCORE
- RAPID-TECH
- SEMUNARS
- STANDMETHOD

FAUNA

Activity leader – Jens Havskov Sørensen (DMI)

- Coordinator has had to take leave for some time for personal reasons.
- A fully acceptable draft report has been circulated in mid-May for final commenting.
- Budget 260 kDKK

NORMIN

Activity leader – Dina Solatie (STUK)

- Final report was according to contract due by 31/1-2015.
- Mail received 25/2-2015: 'I am very sorry but we need some more time for the NKS-NORMIN final report. My new job is taking almost all my time now. So is there any change to finish the report for example in the end of April?'
- The requested extra time was granted, and the final report was expected by the end of April. However, more time was again requested. A new final deadline of 10th of June was agreed on.
- Comprehensive literature study reports have been circulated (40+ pages)
- Budget 450 kDKK

NKS-B Seminars 2015

IDEA: Internal Dosimetry Workshop, successfully held at SSM, Solna, 18-19 May, 2015. Announced on NKS website and in NKS NewsFlash, 20 participants. There is a wish for standardisation of dose estimation. IMBA favorised – used by many of the participants.

NORCOP-COAST: Two day workshop on response to nuclear icebreaker accidents. To be held 13-14 October 2015 in Tromsø. Announced on NKS website and in NKS NewsFlash.

NUFORNOR: Seminar on analytical techniques for nuclear forensics, to be held in Norway (probably Ås). Date not yet decided (probably autumn). Coordinator has been prompted for information to be used in announcements in NewsFlash and on NKS website.

FAUNA: Workshop on uncertainty of atmospheric dispersion modelling, to be held late in the project. Date and place not yet decided. Will be announced when the coordinator is back from leave.

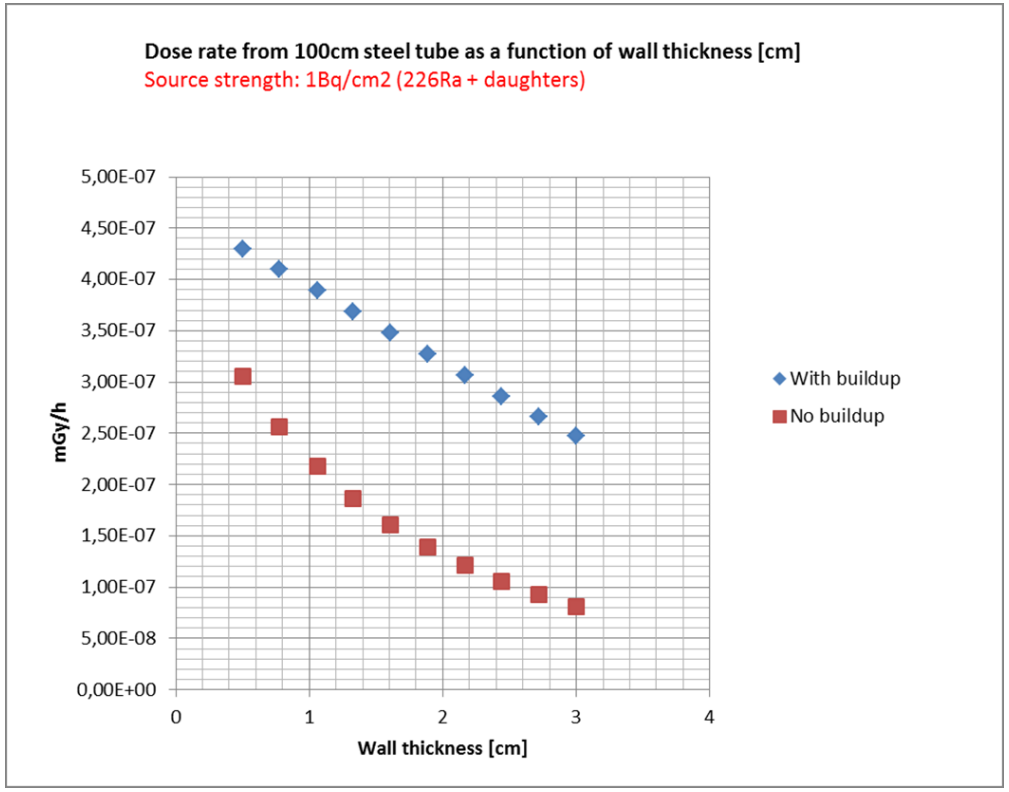
CONCORE

Activity leader: Charlotte Nielsen (NIRP); partners: DTU, NRPA, SSM

- Characterisation of NORM contaminated objects: reliable and efficient
- The report contains a review of existing methods to perform initial characterization of NORM contaminated equipment.
- It also contains an experimental section dealing with the basic investigations required to evaluate factors affecting external dose rate measurements.
- Measurements on pipes show that the decontamination currently performed by companies leaves non-detectable residues (satisfactory).
- Analysis of scale-containing pipes: radioactivity distribution spatially homogeneous with variations <10% on decimetre scale.
- Equilibrium between radon and radium is a key factor in calculating and measuring external dose from tubes.

CONCORE

Activity leader: Charlotte Nielsen (NIRP); partners: DTU, NRPA, SSM



Dose rate as a function of steel wall thickness of a 100cm long tube.

RAPID-TECH

Activity leader: Jixin Qiao (DTU); partners: STUK, FOI, IFE

- Application of rapid and automated techniques in radiochemical analysis
- Nordic experts were gathered to examine needs in developing rapid and effective radiochemical methods.
- Based on a screening of current methods in each country, challenges and needs were described by each participating institute.
- Experiments in applying distinct novel techniques in each institute were performed.
- Results and learning points obtained were scrutinised and summarised in the report, providing method recommendations.
- The report contains detailed methodological descriptions, which may be applied as standard SOPs by other institutes.

RAPID-TECH

Activity leader: Jixin Qiao (DTU); partners: STUK, FOI, IFE

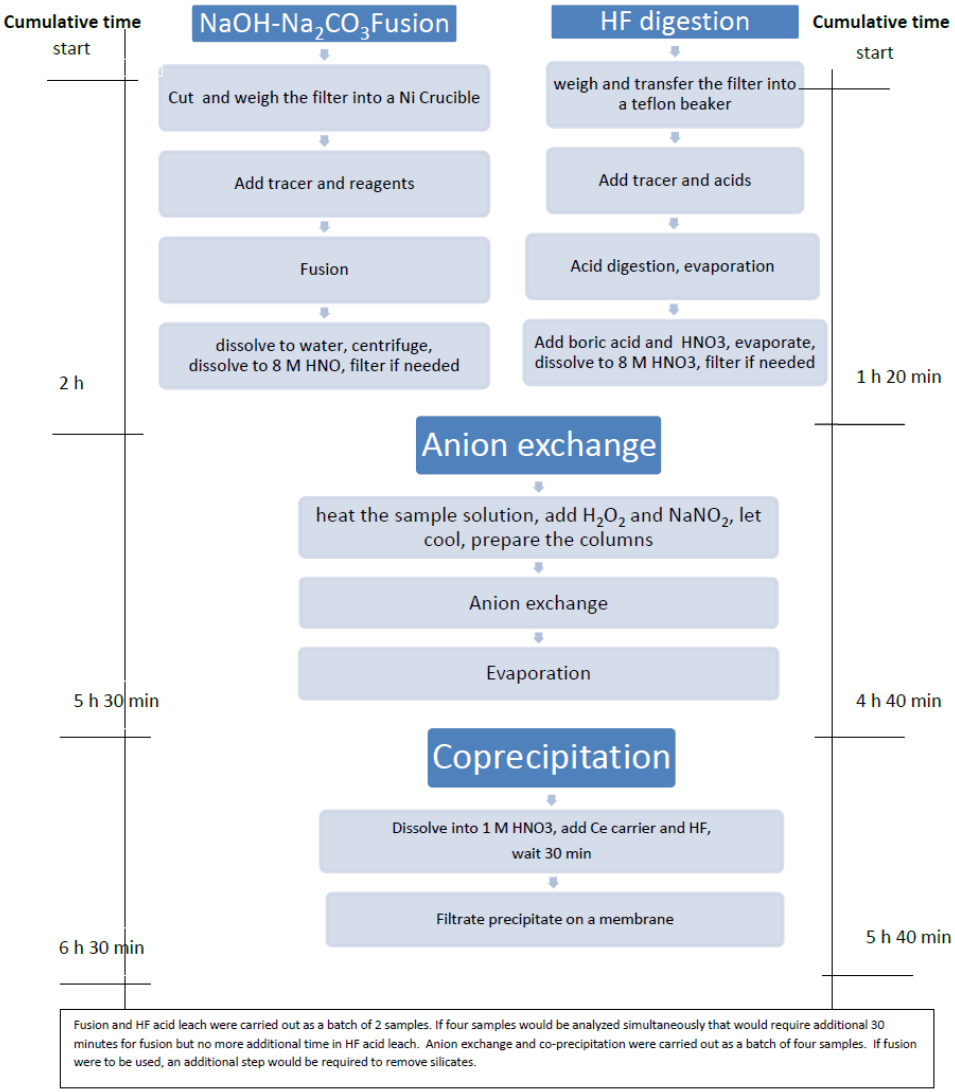


Figure. 22. Time scheme for analysis of Pu from glass fiber filters in emergency conditions

SEMUNARS

•Activity leader: Magnus Gårdestig (Linköping U.); partners: STUK, NRPA

- Seminar on Unmanned Radiometric Systems
- The purpose of the SemUnaRS activity (2-day seminar held in October 2014) was to stimulate the planning process for the Nordic countries' development of unmanned aircraft radiometric systems, UARS.
- The report contains recommendations from the work group on a number of related issues, including development of surveillance equipment for unmanned aerial vehicles.
- Discussions and conclusions from the seminar are summarised.
- A list with 14 key questions was drawn up will to assist Nordic Radiation Protection Authorities in their long-term strategy planning.

SEMUNARS

- Activity leader: Magnus Gårdestig (Linköping U.); partners: STUK, NRPA

Petri Smolander (STUK) presenting

A fixed wing aerial system is demonstrated

STANDMETHOD

•Activity leader: Xiaolin Hou (DTU); partners: STUK, IFE, Studsvik, Forsmark, OKG, Ringhals

• Standardization of radioanalytical methods for determination of important radionuclides for environmental assessment and waste management in Nordic nuclear industry

• Intercomparison exercise conducted (focusing on Ni-63) for determination in spiked water, reactor coolant water, and an acid digested reactor filter (7 labs participated).

• Different analysis techniques applied in different countries – results and methods discussed in report.

• Relatively good agreement for spiked water, but not for coolant water and filter. Indicates that methods used in some labs do not sufficiently remove interferring nuclides, and method improvement and follow-up exercise are needed.

STANDMETHOD

- Activity leader: Xiaolin Hou (DTU); partners: STUK, IFE, Studsvik, Forsmark, OKG, Ringhals

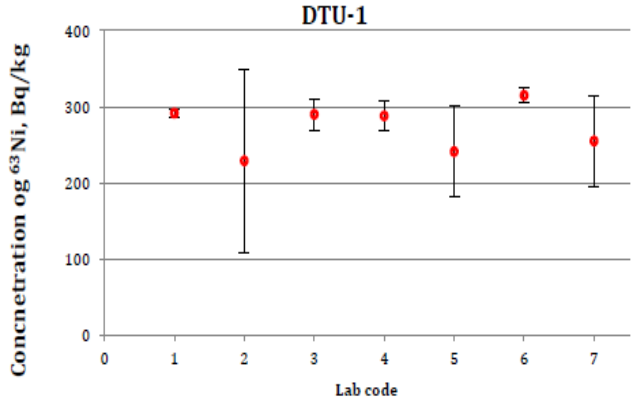


Fig.3 Intercomparison results of ^{63}Ni in DTU-1 sample (Spiked water)

Table 1. Major Nordic laboratories involved in radiochemical analysis of radionuclides difficult to measure

Country	Organization	Purpose of analysis	Main radionuclides
Denmark	Technical University of Denmark	Environmental radioactivity, radioecology, environmental trace, characterization of decommissioning waste, emergency preparedness	^{3}H, ^{14}C, ^{36}Cl, ^{41}Ca, ^{55}Fe, ^{63}Ni, ^{89,90}Sr, ^{99}Tc, ^{129}I, ^{210}Po, ^{210}Pb, ^{222}Rn, ^{226,228}Ra, Isotopes of U, Th and Pu, ^{237}Np, ^{241}Am, ^{244}Cm, gross alpha, gross beta
Finland	Radiation and Nuclear Safety Authority (STUK)	Environmental radioactivity, bioassay of radioactivity, emergency preparedness	^{3}H, ^{14}C, ^{89,90}Sr, ^{99}Tc, ^{210}Po, ^{210}Pb, ^{222}Rn, ^{226,228}Ra, ^{234}U, ^{235}U, ^{238}U, ^{232,230,228}Th, ^{239,240}Pu, ^{241}Am, gross alpha, gross beta
	University of Helsinki	Environmental radioactivity and radioecology, analysis of nuclear waste	^{3}H, ^{14}C, ^{41}Ca, ^{89,90}Sr, ^{210}Po, ^{210}Pb, ^{222}Rn, ^{226,228}Ra, Isotopes of U, Th and Pu, ^{237}Np, ^{241}Am, gross alpha, gross beta
	Loviisa NPP	Monitoring of radioactivity in the power plant, discharges and surrounding environment	^{3}H, ^{14}C, ^{63}Ni, ^{55}Fe, gross alpha, gross beta
	Olkiluoto NPP	Monitoring of radioactivity in the power plant, discharges and surrounding environment	^{3}H, ^{14}C, gross alpha, gross beta
Norway	Institute for Energy Technology (IFE)	Environmental radioactivity, waste management.	^{3}H, ^{89,90}Sr, ^{210}Po, ^{210}Pb, ^{222}Rn, ^{226,228}Ra, Isotopes of U, Th and Pu, ^{237}Np, ^{241}Am, gross alpha, gross beta
	Norwegian Norwegian University of Life Sciences	Environmental radioactivity, radioecology, environmental trace,	^{89,90}Sr, ^{99}Tc ^{210}Po, ^{210}Pb, ^{222}Rn, ^{226,228}Ra, isotopes of U, Th and Pu, ^{237}Np, ^{241}Am
	Norwegian Radiation Protection Authority (NRPA)	Environmental radioactivity and radioecology, environmental trace, emergency preparedness	^{89,90}Sr, ^{99}Tc, ^{1210}Po, ^{210}Pb, ^{222}Rn, ^{226,228}Ra, Isotopes of U, Th and Pu, ^{237}Np, ^{241}Am, gross alpha, gross beta
Sweden	Studsvik Nuclear AB	Waste management, characterization of decommissioning waste, emergency preparedness	^{3}H, ^{14}C, ^{36}Cl, ^{55}Fe, ^{63}Ni, ^{89,90}Sr, ^{99}Tc, ^{129}I, ^{210}Po, ^{226,228}Ra, Isotopes of U, Th and Pu, ^{237}Np, ^{241}Am, ^{242}Cm, ^{244}Cm
	Forsmark NPP	Monitoring of radioactivity in the power plant, discharges and surrounding environment	^{3}H, ^{14}C, ^{63}Ni, ^{90}Sr, ^{235}U, ^{238}Pu, $^{239+240}$Pu, $^{242, 243+244}$Cm, gross alpha, gross beta
	Oskarshamn NPP (OKG AB)	Monitoring of radioactivity in the power plant, discharges and surrounding environment	^{3}H, ^{14}C, ^{55}Fe, ^{63}Ni, ^{89,90}Sr, ^{238}Pu, ^{239,240}Pu, ^{241}Am, ^{244}Cm, ^{243,244}Cm, gross alpha
	Ringhals NPP	Monitoring of radioactivity in the power plant, discharges and surrounding environment	^{3}H, ^{14}C, ^{63}Ni, ^{89,90}Sr, ^{238}Pu, ^{239,240}Pu, ^{241}Am, ^{244}Cm, ^{243,244}Cm, gross alpha, gross beta
	Lund University	Radioecology, environmental trace, emergency preparedness	^{14}C, ^{55}Fe, ^{63}Ni, ^{89,90}Sr, ^{99}Tc, ^{238}Pu, ^{239,240}Pu, ^{241}Am, ^{244}Cm, ^{243,244}Cm, gross alpha, gross beta

Kasper G. Andersson
NKS-B Programme Manager

NKS-B CfP 2016

Only one current NKS-B activity will apply for money in 2016: problem and 'sales argument'.

42 selected potential activity leaders contacted (mostly by mail) last week, urging them to send in proposals. A number of positive responses came promptly.

Will follow up on this systematically when the CfP is announced.

We also have excellent opportunities to 'sell' at the NSFS conference.

May be useful to also ask for Board members' assistance this year.

NKS seminar

12th-13th January 2016

Karin Andgren & Kasper Andersson
NKS Programme Managers

Board meeting,
Copenhagen, 12 June 2015

Objectives

Promotion of NKS ("A successful seminar is one of the best ways of disseminating information about the work NKS does and the results it achieves" quote from the Administrative Handbook)

1. Ideas on new Nordic research topics (if high ranked speakers give their view on important fields for future research, this can give new ideas for NKS proposals)
2. Share results from recent NKS research
3. Networking – Between colleagues working in the same field and also between R and B people.

Title, venue and key note speakers

"*Nordic perspectives of Fukushima: Where are we now and where do we go?*"

12th-13th of January 2016 at Vattenfall, Solna

Confirmed key note speakers:

- Gustavo Caruso
- Ted Lazo
- Chris Clement

Suggestion for additional key note speaker:

- Petteri Tippana

Seminar layout

- Length of presentations should be typically 15 min. The session chair should ask one (or a few) question to the speaker immediately after the presentation. At the end of the session, 15 min are reserved for questions from the audience.

- Each session typically starts with an invited speaker (e.g. Florian Gering, Juhani Hyvärinen, etc) followed by activity specific presentations. The aim is that about 50 % of the on-going NKS activities should be presented at the seminar. The activity presentations should be appropriate for the audience.

Day 1, 12th of January, 13:00 – 17:00

- ***Key note: Gustavo Caruso***
  IAEA report into the seminar context
- **Risk and preparedness**
  How are the results of risk assessment (NKS-R related) connected to emergency preparedness (NKS-B related)? E.g. Florian Gering followed by activity specific presentations of e.g. L3PSA, NORCON, EFMARE, MUD.
- **Which is our tsunami?**
  Defense-in-depth strengths and deficiencies. E.g. Juhani Hyvärinen followed by presentations of ADdGROUND and MODIG.
- **Hope for the best and prepare for the worst**
  Flaggboken (OIL's etc.), Update of the emergency preparedness planning zones in Sweden (SSM), countermeasures – lessons learned from Fukushima. EMSEM, NORCON

Day 2, 13th of January, 08:30 – Lunch

- ***Key note: Petteri Tiippana***

Presentation on Nordic progress after Fukushima. Effect of Fukushima on new guidelines and newbuilds.

- **Nordic progress after Fukushima**

Improvements at the Nordic NPPs due to Fukushima. Examples from different licensees. Maybe someone from SSM or the industry presenting implementations at NPP:s followed by presentation of the NKS activity DECOSE

- **Measuring the right things**

Needs for tactical operational guidance, including training. Relation to OIL's, area mapping, measurements for different time phases and objects, measurements for intervention optimisation. MOMS, THYROID, NOVE, MOBELRAD, RAPID-TECH, SEMUNARS

Day 2, 13th of January, 13:00 – 16:00

- ***Key note speakers: Chris Clement and Ted Lazo***

- **Deal with it**

Health (radiation related+other), economical and environmental consequences. Communication with the public: Timely, correct and understandable information. Effects of Fukushima - are there any?

- **Learning by accident**

Evolution of safety culture thinking TMI – Chernobyl – Fukushima followed by a presentation of the NKS activity LESUN

- ***Summarising words of seminar***

Senior Nordic persons summarises the seminar and highlight topics for future research (one from R (e.g. Tarja, Jorma or Petteri) and one from B (e.g. Jack Valentin)

Practicalites

Fee:

- A fee of 1000 SEK is suggested. To make sure that those who register actually shows up. Important since we have a limit of 100 participants.

Dates:

- Dead line for preliminary program: 30th September
- Opening of registration: 7th September
- Dead line for registration: 15th December

Others:

- Energiforsk are also planning a Fukushima seminar in January.

Short note on status of the website, NewsLetters etc.

Finn Physant

The Secretariat

NKS Board Meeting, Copenhagen
12 June 2015

Website

- The present version of the website was opened in 2012 and still a state-of-the-art everyday website working tool.
- For the new sites we started obtaining statistics from a Google site starting in 2012. Here you have some main monthly figures for more than two years:

nks.org user statistics

Date	Dec 12	Jan 13	Feb 13	Mar 13	Apr 13	May 13	Jun 13	Jul 13	Aug 13	Sep 13	Oct 13	Nov 13	Dec 13
Visitors	771	2110	841	727	1030	815	623	577	643	1249	967	742	578
Unique visitors	562	1342	642	550	718	562	459	415	481	803	628	546	459
New visitors	536	1226	539	474	584	448	374	348	406	648	511	461	397
Return visitors	235	884	302	253	446	367	249	229	237	601	456	281	181
Av. visit time	2:54	2:36	2:25	2:32	2:40	3:20	2:50	2:32	2:26	3:33	3:20	2:49	3:35
Video views					344	92	55	58	27	48	22	17	19

nks.org user statistics

Date	Jan 14	Feb 14	Mar 14	Apr 14	May 14	Jun 14	Jul 14	Aug 14	Sep 14	Oct 14	Nov 14	Dec 14
Visitors	878	1011	969	722	659	717	823	762	904	865	712	736
Unique visitors	672	763	771	581	471	499	696	620	680	625	536	578
New visitors	380	370	296	203	243	298	178	207	332	356	231	221
Return visitors	498	641	673	519	416	419	645	555	572	509	481	515
Av . visit time	2:36	2:09	2:11	2:31	4:27	3:17	2:35	2:28	2:58	3:40	4:01	3:18
Video views	15	11	11	12	5							

nks.org user statistics

Date	Jan 15	Feb 15	Mar 15	Apr 15	May 15	Jun 15	Jul 15	Aug 15	Sep 15	Oct 15	Nov 15	Dec 15
Visitors	1067	723	1046	848	864							
Unique visitors	751	547	857	648	670							
New visitors	431	244	249	272	279							
Return visitors	636	479	797	576	585							
Av . visit time	3:40	3:05	2:17	2:55	2:37							

NewsLetters and NewsFlashes

- Since the last board meeting two NewsFlashes have been distributed.
- January 19: summary report from the January board meeting including the result of the 2015 call for proposals.
- April 24: 1st announcement of the January 2016 R and B seminar in Stockholm, other seminars and new reports.
- A NewsLetter will be prepared for distribution a week before the board meeting June 2015.
- There is a list of approximately 480 e-mail addresses, to which our electronic letters are forwarded.
- June 24: summary report etc. from today's meeting .

Other kinds of info material –new pamphlet

- A new and updated version of the pamphlet "Nordic Nuclear Safety Research"has been published in 2015.

2015-05-29/FP

Note for the Board meeting 12 June 2015

NKS participation in the NSFS Conference August 23-27 in Roskilde

Participants with exhibition stand: the coordination group

Exhibitor talk:

- Sigurður M Magnússon

Oral presentations by:

- Karin Andgren: R
- Kasper G Andersson: B
- Jens Havskov Sørensen: B-FAUNA
- Xiaolin Hou: B-STANDMETHOD
- Jixin Qiao: B-RAPID-TECH
- Mikhail Iosjpe: B-EFMARE

Poster presentations:

- Karin Fritioff: R-L3PSA
- Charlotte Nielsen: B-CONCORE

Exhibition stand: the coordination group with Wifi-internet-connection, rollups, folders etc.

NKS sponsorship: conference material - bags with NKS logo and name badges for conference participants.

Costs:

Sponsorship: EUR 2000

Exhibition stand: EUR 1330

Participation fee: EUR 530 per person