



Research, Capacity building, Knowledge Management

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Instructions for Swedish Radiation Safety Authority (2008: 452)

<http://www.notisum.se/Pub/Doc.aspx?url=/rnp/sls/lag/20080452.htm>

- **6 §**...contribute to national competence for current and future needs within the authority's area of activity. The Authority shall therefore take the initiative to research, education and conduct scenario analysis and development



Our research activities

- Funding provided for both basic and applied research.
 - Many projects provide direct assistance to the work of the Authority and give essential input so that decision-making and recommendations rest on scientific grounds.
 - This research gives new knowledge, which in turn is useful in the Authority's regulatory supervision.
 - Support to PhD-students and other research positions as part of our competence building activities.
- Annual research budget: approx. 85 million Swedish kronor.
- The research activities are mainly conducted by institutions of higher education and consulting firms.



Important research organisations

- Swedish universities
 - Chalmers University
 - Uppsala University
 - Royal Institute of Technology
- Consultancy firms
 - Inspecta technology
 - Studsvik
- International organisations
 - OECD/NEA (Halden, SCIP)
 - US-NRC
 - SAFIR (Finnish research programme in nuclear safety)
- SKC Swedish Centre for Nuclear Technology



Research process

- support in planning and prioritization of research projects
- describe the management model for the planning, monitoring and evaluation of research activities
- enable effective management and evaluation of SSM's research, where quality assurance forms a central part
- the research SSM finances meet requirements of relevance, scientific soundness and quality



Central components

- ➔ “Out-side world” analysis with focus on research
 - get a picture of what is happening in the world
- ➔ Regular evaluations by an external reviewer
- ➔ Increased focus on follow-up
- ➔ Research areas rather than organizational units
- ➔ Review panels
- ➔ Research committee
- ➔ More focus on open calls



Review panels

➔ Scientific quality

- For example: quality of the research question, project methodology, will the results be publishable in the scientific journal, innovation/research front/know the international research field, project is part of an international collaboration

➔ Competence

- For example research skills, previous publications, the researchers' knowledge in the field

➔ Feasibility

- The feasibility of the specific project

➔ Relevance

- For example: contributing to the knowledge of supervision, investigations, or licensing, provide access to expertise that is important to SSM or the country, the project's importance for international cooperation, also consider the long-term knowledge.



Research areas (under review)

Man, Technology and Organization (MTO)

Includes: design of human-machine interfaces, risk management and quality assurance, control management and safety culture (both in the nuclear field and in healthcare). Also risk assessment and risk communication in emergency preparedness is addressed.

Reactor safety

Includes: fuel, core, severe accidents and thermal hydraulics

Structural integrity

Includes: material and strength issues in the nuclear field and repository

Safety Analysis

Includes: electricity, instrumentation and control, PSA, physical protection and other safety analysis

Decommissioning and Waste

Includes: demolition, financial control, risk analysis and radioecology related to waste/disposal. Material issues belongs area structural integrity

Measurement technology

Includes: measurement and methods for nuclear preparedness and nuclear non-proliferation

Radiation Protection

Includes: medical exposures, systematic evaluation of clinical radiological methods, metrology and dosimetry, low-dose research, personnel radiation protection, non-ionizing radiation, radon.



Critical areas

Reactor safety (including reactor physics, thermohydraulics and nuclear data)

Severe accidents and nuclear chemistry

Nuclear non-proliferation

Radiation biology

Radiation ecology

Radiation dosimetry



Research committee

- Our research program aims at high scientific quality, and therefore has the support of a research committee.
- Appointed by the Director General and consists of the chairman and seven members who are elected for a period of three years with possibility of extension.
- Provides recommendations and viewpoints on our research.
- Usually convenes up to four times per year.



Presentation of research findings

- Research findings are published either in the Swedish Radiation Safety Authority's report series, in scientific journals or in some other way.
- Every two years – we arrange a research conference
- Internal seminars



Basis for the government's new research policy

- We formulate goals for our three main areas:
 - Radiation protection
 - Nuclear safety
 - Non-proliferation/safeguard
- We wanted to make the government aware of:
 - deficiencies that we identify
 - challenges that we need to deal with
- We formulate a number of recommendations



Why radiation safety research?

- ➔ Necessary with a high level of competens and a national competence development to ensure:
 - a continued safe operation and decommissioning of Swedish nuclear power plants
 - a safe final storage of nuclear waste
 - that activities involving radiation is carried out safely.

Challenges & deficiencies

- ➔ Changes within the Swedish nuclear industry:
 - Earlier decommissioning of older nuclear power plants
 - An industry that signals the need to prioritize research efforts
- ➔ Three investigations regarding the status of radiation safety research and education in Sweden.
- ➔ IAEA notes (2012) that Sweden did not fully live up to the requirement of having a national policy and strategy that ensures adequate competence to maintain and develop safety.



Radiation protection

- **Competence mapping 2011 & 2015 & 2018:**
 - Deficiencies found in competence, research and education
- **Conclusion:**
 - We need to strengthen national expertise in radiation protection research and create a platform for strong research environments.
 - We contribute to radiation protection research focusing on fundamental research issues and competence building



Nuclear safety

- ➔ **Competence mapping 2011:**
 - The situation stable regarding competence, research & education
- ➔ **Competence mapping 2015 & 2018:**
 - Challenges due to earlier decommissioning of older power plants, strained economic situation for the nuclear industry, rapid decline in the number of students interested in nuclear subjects
 - Conclusion: Need to go back to 2011-level.



Recommendations to the Government

- ➔ SSM formulates objectives, priorities and suggests a way to ensure the future of research and expertise in radiation safety.
- ➔ We recommend that
 - SSM is given the overall responsibility for financing, monitoring and evaluating research in the radiation safety area.
 - Funds are allocated to the Authority so that research and training in the radiation safety area - and thus the access to expertise – are secured.