

ON THE SURVEY AND EVALUATION OF RESEARCH SUPPORTED BY THE
SWEDISH RADIATION PROTECTION INSTITUTE

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ABSTRACT

The Swedish Radiation Protection Institute supports research and development (R&D) in the field of radiation protection. A review of the research programme is now being performed. An evaluation of the programme based on this review is then planned to take place. Different methods exist for the evaluation of research and development. The method presently discussed to be used for the evaluation of the Swedish research programme can be described as primarily a judgement of its relevance for the users.

INTRODUCTION

The Swedish Government has supported research and development (R&D) in the field of radiation protection as a part of its atomic research programme since 1945, channelled through the Atomic Research Council. Since July 1st, 1976 the scope of this research has been broadened and the Swedish Radiation Protection Institute (SSI) has become responsible for coordinating the radiation protection research in Sweden. An important objective of the research programme is to produce information that can assist the Institute in making decisions regulating the radiation protection in the country. At the same time support is also given to research of a more fundamental nature. The programme is also complementary and supports the research performed at the Institute. An Advisory Research Board appointed by the Government assists the Institute in establishing the yearly revised research programme and in allocation of grants to the individual research projects.

The research projects are carried out under contracts with SSI. The research is performed mainly at Swedish universities and in disciplines like physics, chemistry, radiophysics, radiobiology and medicine. It is to some extent also performed at different national laboratories and by consultants. Some of the research projects are carried out in cooperation with the equivalent authorities in the other Nordic countries. The international contacts are increasing.

The R&D budget has increased year by year and amounts to 16.6 MSEK (2.7 MUS\$) during the fiscal year 1991/92 of which 9.5 MSEK (1.6 MUS\$) was for radiation protection research connected with nuclear energy and 7.1 MSEK (1.1 MUS\$) was for other research (non-nuclear), including a cooperation with the Radiation Protection Research Programme of the European Communities.

THE RESEARCH AND DEVELOPMENT PROGRAMME

The research programme is divided into two main areas, nuclear energy and other radiation protection research. The first one is divided into projects dealing with radioecology and environmental transfer, radioactive waste and accidents in nuclear power stations. The second main area concerns sources of ionizing radiation in medicine, industry, homes, and research, and sources of non-ionizing radiation.

Nuclear Energy

Radioecology, which is presently the most important research field, involves the behaviour of radionuclides in the biosphere, especially the environmental transfer and bioaccumulation in aquatic and terrestrial ecosystems. The research is based on experimental work in the laboratory and in situ, and on theoretical studies, mainly modelling. A vital question is - how well do the models describe the real world? This has been studied in an international exercise called the Biomovs (BIOSpheric MODEL Validation Study). Phase 2 of Biomovs was initiated in October 1991. As a consequence of the wide spread of radioactive elements in Sweden from the Chernobyl accident a large number of radioecological studies have been performed (ref 1).

In Sweden, as well as internationally, large resources are allocated to research on the management of radioactive waste. Problems of special interest from a radiation protection point of view are questions concerning waste characterization, waste properties and treatment, decontamination, declassification of scrap material, transport, decommissioning and waste storage. Repositories for high level waste and spent nuclear fuel constitute specific problems due to the large time periods involved, which raises questions also of ethical and social nature. Current interests are, for example, understanding various aspects of the decommissioning of commercial nuclear power plants and developing criteria for high level waste repositories.

The research on accidents in nuclear reactors are concentrated on consequence analysis, countermeasures, dose calculations and health effects. There exists a constant development takes place of computer codes and data bases for the evaluation of possible nuclear emergencies.

Non-nuclear research

The research in this field is divided into two main areas: ionizing radiation and non-ionizing radiation.

About 15% of the average dose of ionizing radiation to a person living in Sweden is due to the medical use of radiation, while the radiation from radon and radon daughters in homes contributes 65%.

The present research includes, for example, studies of radiation doses and the quality of diagnostic radiography,

optimisation of the diagnostic procedure, studies of the doses to the patients and cost-benefit analysis, studies of the consequences of new techniques on the radiation protection, studies of optimisation in therapy, a large scale epidemiological study on the lung cancer risk due to radon in houses.

The research on non-ionizing radiation includes mainly studies of radiation in the radiofrequency region and ultraviolet radiation. The research area is relatively new and the possible health effects on living organisms are only partly known.

Besides the research fields which have been briefly described above, research is also performed on risks (analysis, perception, assessment), epidemiology and dosimetry.

A review of the research programme since 1976 is now being performed by one of the authors (L P). All the project reports are looked through and for each project a brief summary is written. The summaries are included in a report to be published in the report series of the Institute.

METHODS FOR EVALUATION OF RESEARCH PROGRAMMES

Scientific evaluation has long been a standard practice. Proposed articles in scientific publications have been reviewed by scientific editors. A so-called peer review has taken place as a normal step before publication. The importance of research for the national productivity and economic growth has lead the governments and authorities to implement research programmes and then also to rationalize the spending for research programmes in an optimal way for the country. As a result of this trend towards increased accountability of public spending, evaluation of research programmes has become an issue of importance. It is not only seen as a tool for efficient management of research but also as a help to decision-makers for the future.

There exists several methods today to evaluate research programmes. The following methods have been used for evaluations:

1. Peer reviews,
2. Judgement of the relevance for the users,
3. A cost-benefit analysis,
4. Bibliometric indicators of the scientific value, and
5. Patents as indicators of the utility.

The Commission's of the European Communities evaluation of its Radiation Protection Research Programme may be mentioned (ref 2) as an example of recent work in the field. The impact of the Research Programme on world-wide radiation protection and on human society, as well as the impact on the Commission's own regulatory and economic activities, were also reviewed. The scientific evaluation was carried out by a panel of independent scientists. The efficiency of the management and the socio-economic impact of the programme were evaluated on the basis of

discussions with managers of contracting institutions, with the present and past managers of the programme and the Commission staff. This evaluation was supplemented by the results of a questionnaire sent to all contractors. The method used may be described as a combination of methods one and two.

PREVIOUS EVALUATIONS OF RADIATION PROTECTION RESEARCH PROGRAMMES

The Swedish Natural Science Research Council decided in 1978 to evaluate the fields of radiobiology and radioecology. A peer review was carried out using a mixed Swedish-international scientific panel. Material from the research contract holders was collected and then the members of the evaluation committee performed project site visits. A final meeting was held to discuss all the projects.

The main conclusion by the evaluation panel indicated that some projects might have a considerable importance for applied studies of the environment although the importance for basic research was limited. The development of new technology for survey of environmental hazards should primarily be the responsibility of the authorities, which are concerned with surveillance and monitoring of the environment. The panel proposed negotiations be undertaken to transfer some of the projects to these authorities. The conclusions of the scientific panel have in its main lines been implemented by the Natural Research Council and the Institute.

SURVEY AND EVALUATION OF THE RESEARCH AND DEVELOPMENT PROGRAMME

The decision was recently taken to investigate the possibilities for an evaluation of the Swedish Radiation Protection Institute's radiation protection research and development programme with a judgement of its value primarily for the users. The evaluation procedure planned may, for example, involve the use of the expertise of the decision-makers of the Institute, the users of the R&D inside the Institute, and the Advisory Research Board of the Institute. The credibility of the process will in this way be guaranteed and the utilization of the results and decision-making in the future will benefit from this procedure. The evaluation paper work is carried out by the staff of Research Secretariat of the Institute as a part of its normal duties and it thus also means a building-up of competence in the field. The work to carry through the survey and evaluation of the research programme is still in progress.

REFERENCES

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