

Norwegian Radiation Protection Authority – A history from technical dosimetry service to system inspections

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Introduction

The Norwegian Radiation Protection Authority (NRPA), has under different names, been the regulatory authority concerning the use of radiation sources, dosimetry and radiation protection in Norway since 1939. NRPA has always had the authority to inspect and control the users and their radiation sources concerning safety and radiation protection. The legal framework was last updated with a complete new act in 2000 (replacing an act from 1938) and with the appropriate regulations in 2003. This updating was inspired by the need to harmonise national legislation with the latest ICRP recommendations, IAEA basic safety standards, relevant EU directives and own experience. In its more than 60 years of history, NRPA has long traditions with contacts and dialogs with the users of radiation sources being located in hospitals, industry or universities. More information about NRPA can be found at the homepage <http://www.nrpa.no>

The first two decades in NRPA's history

In this period the use of X-ray based radiation therapy increased rapidly in hospitals and became a convenient and popular method for “curing” many different conditions and symptoms of illness or bad health. However, the medical doctors did not have any dosimetry service available and from experience many realized that regular checks of the “radiation output“ was necessary. Indeed, this need was the direct background for establishing the NRPA in 1939. Thus, in the first period of the NRPA history, dosimetry controls in all hospitals having X-ray, or radium sources, for therapy was the prime activity. In addition to the dosimetry inspections or controls, the inspectors often commented on electrical safety with the open high-voltage circuits from the “valve-rooms” to the x-ray tubes – even if these questions were outside their mandate. These comments and advice on other issues were certainly welcome and did contribute to increased total safety in the hospitals. This period can be called the dosimetry service period where the main work activity was dosimetry controls and inspections with radiation therapy facilities in hospitals.

The second period (approximately 1960-1985)

In this period the characteristics were a huge growth in number of users and the new sectors where radiation sources were applied. In the medical field the diagnostic use increased significantly both in number and complexity. In the first place the NRPA inspections concentrated much on radiation protection issues for the workers by controlling shielding in X-ray rooms, measurements and tests on X-ray equipment, quality of dark-rooms etc. A new challenge was inspection of facilities for nuclear medicine in hospitals. Due to the exploiting of oil and gas resources in the North Sea, a huge demand for industrial radiography in offshore and onshore installations developed in this period and NRPA increased its inspection activities in this field. In this period many thousand of inspections and controls, mainly technical in nature, were performed and many failures were addressed in the inspection reports. The experience gained in this

period convinced NRPA that competence was a key factor that had to be addressed more systematically in order to improve the radiation protection. This was in fact a prerequisite for implementing the optimisation principle and ALARA - thinking introduced by ICRP publication 26 in the mid 1970-ties. Thus, as an initiator NRPA engaged itself in competence building, by giving courses in radiation protection both for users in the medical, industrial and research sector. This initiative led to the establishment of more formal post graduate radiograph education, special university courses for radiologists/oncologists and authorisation systems for NDT-personnel working with industrial radiography etc.

Especially when multinational big oil companies were inspected concerning radiation protection NRPA learned a lot about management of multiple risks in a working environment, where radiation hazards was only one of many other hazards the companies had to handle. In such circumstances the radiation protection issues were usually integrated in comprehensive and complex quality systems developed for the management of multi-risk operations by the companies. NRPA was faced with a very systematic approach with detailed descriptions of responsibilities and written procedures.

In this second period, the NRPA inspections were broadly technical in nature and there was a growing recognition that the many source owners and practices should take a more active role as responsible for the radiation protection. When NRPA updated regulations and codes of practice in this period the responsibility question for radiation protection in practices was a major issue.

The present period

In recent years NRPA has devoted much work in updating the national act and regulations concerning the use of radiation sources and radiation protection. The act passed the parliament 12 May 2000 and the basic regulations was adopted finally in November 2003. The structure and requirements laid down in this regulatory system is very much based on experience gained in the previous periods and international influence. The present principle mode of inspection by NRPA is developing towards a more and more *system inspection* with interviews and assessments of the operator's documentation playing a more important and vital role than technical measurements. By this approach NRPA can evaluate the organisation, dedicated responsibilities, administrative system, internal cooperation and coordination; competence in different level in the organisation, technical equipment, ALARA inspired procedures and other relevant radiation protection issues for the practice in question.

Another type of inspections carried out by NRPA in this period can be called thematic inspections where a specific radiation protection problem or equipment is addressed. Examples are inspection of high activity sources addressing source safety and security, inspection of interventional radiological procedures for better radiation protection of the involved worker and the patient, as well as "logistic" inspections in facilities licensed for industrial radiation gauges etc, with focus on possible orphan source situations. Typically these thematic types of inspections have a twofold purpose, addressing the situation at the

premise but also to increase NRPA own competence and know-how on a particular thematic issue.

Nuclear facilities are rare in Norway and only one nuclear research plant with two research reactors are commissioned and in operation. NRPA is the competent authority also for nuclear matters and do regular inspection on both nuclear safety and radiation protection at these premises. On some issues an inspection strategy has been to engage international experts via IAEA, so-called IPPAS team, to inspect, review and make assessment of the topic in question.

The total experience

Being the inspection body, the regulatory and competent authority in radiation protection for more than 60 years our experience can be summarized in two key factors being crucial to obtain the goals of radiation protection.

- Good communication with the users.

The good and fruitful dialogue is essential and in fact the most efficient way to fulfil regulatory requirement and to implement optimisation of radiation protection. In such an atmosphere well funded advice from the regulatory body and its inspectors will certainly be welcome.

- Competence

An absolute necessity for inspection authorities is to have good competence in the relevant topics of inspection. For radiation protection this includes both theoretical competence in radiation physics, chemistry and biology as well as practical skills and experience in radiation measurements, calculations and assessments.

Having these two factors well established in the organisation our experience at the NRPA is that the role to act as a police the for radiation protection authority is almost never a necessity. The normal situation is that the radiation users understand and do the best to have the best possible radiation protection on their own facilities and premises

In our judgement the major future challenge for inspection authorities will be to maintain the competence as new applications, more complex systems, more globally based operators of radiation sources and probably even more stringent protection standards will be developed.