

THE LEGAL SITUATION OF RADON IN SWEDEN

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ABSTRACT

The Swedish Local Authorities are responsible for decreasing the radon concentration in homes. The National Board of Health and Welfare regulates and supervises this programme. The National Board of Occupational Safety and Health regulates the radon levels in mines. The National Board of Housing, Building, and Planning regulates the upper level of radon indoor in newly built houses. The Swedish Radiation Protection Institute is responsible for measuring techniques and risk assessments of radon.

INTRODUCTION

Due to the natural conditions (U-rich ground, Ra-rich building materials, and the cold climate), there often exists high levels of radon and its decay products in the air of houses, mines and other working places in Sweden. The work to reduce the levels of radon started with the improvement of the ventilation of the mines in the late 1960's. During the 1970's the interest was focussed on houses and indoor air.

PUBLIC INVESTIGATIONS

In 1979 the Swedish Government authorized the Minister of Agriculture to appoint an investigator to study the question of countermeasures against radiation risks in buildings. The investigation was carried out by The Radon Commission. The Commission submitted its final report to the Swedish Government in January 1983 (1).

Most of the Commission's work was devoted to practical issues connected with radon in housing. The radon problem in Sweden was originally considered to derive from building materials containing radium. The measuring activities performed by the Local Authorities and a nationwide investigation of the occurrence of radon in housing by the Swedish Radiation Protection Institute indicated the ground as the principle source of radon. The number of buildings, in which the radon daughter concentration exceeded 400 Bq/m^3 , was estimated to be about 40 000. In Sweden the limits are given as annual averages of the Equilibrium Equivalent Concentration of Radon (EER), also called the radon daughter level.

The Commission proposed a radon daughter action level of 400 Bq/m^3 , and that homeowners be provided with possibilities of obtaining special loans for financing countermeasures if the radon levels exceeded this figure. The Commission also proposed that the National Board of Health and Welfare and the National Board of Housing, Building and Planning, in collaboration with the Swedish Institute of

Radiation Protection, should undertake the responsibility that the Local Authorities receive information and directives concerning radiation in buildings. The Commission proposed that research in the radon protection field should be carried out or supported by the Swedish Institute of Radiation Protection and the National Council for Building Research.

The Swedish Government decided in 1985 to follow the main recommendations of the Radon Commission. The Government's decision was now also based on the proposals and risk estimates of the Swedish Cancer Committee, which in 1984 submitted its report (2) to the Government.

The Swedish Committee for Revision of the Radiation Protection Legislation submitted in 1985 its report (3) to the Government. The Committee proposed that the new law should cover also natural radiation sources such as radon. The tasks of the Swedish Radiation Protection Institute with respect to natural radiation should be the development and standardization of measuring techniques and methods and the risk assessment of radon. It was also proposed that the law should grant authorization to the Radiation Protection Institute to impose directives with respect to measuring and protective equipment as well as testing, supervision or inspection of natural radiation. The Swedish Parliament accepted these proposals in 1988 (4).

NORDIC CO-OPERATION IN THE RADON FIELD

There exists a close cooperation in the radiation protection field between the five Nordic countries and its radiation protection authorities (5). A working group with the aim of developing radiation protection recommendations for natural radiation in the Nordic countries was set up by the radiation protection institutes in Denmark, Finland, Iceland, Norway, and Sweden. The working group reported in 1986 its recommendations (6). The main recommendation of the working group was that the action level for existing houses should not be higher than 400 Bq/m³ radon daughters. If the radon daughter concentration exceeded this value in a house, remedial action to bring the concentration down to a level as low as reasonably achievable should generally be an obligation. The possibilities for remedial action with financial support from the authorities should also be considered, if the radon daughter concentration exceeded 100 Bq/m³.

PRESENT RISK ASSESSMENT AND LEGAL SITUATION

The risk assessment for radon made by the Swedish Radiation Protection Institute (7) is based upon ICRP's principles for limiting exposure to natural radiation sources (8). The recent Swedish experience in radon control has been reviewed by Swedjemark and Maekitalo (9) and the Swedish view on radon control by Mjoenes (10).

Several authorities and different laws are involved in the field of radon protection in Sweden as follows:

* The Swedish Local Authorities are responsible for decreasing the radon daughter concentration in the homes and working places other than mines in each municipality. These authorities act according to the Health Protection Legislation. In 1990 the action level for remedial measures of existing buildings and working places has been decreased to 200 Bq/m³ radon daughters by the National Board of Health and Welfare according to an authorization by the Government (11). For houses with radon daughter levels between 70 and 200 Bq/m³ simple remedial actions should be carried out. The Board of Health and Welfare supervises the indoor radon gas remedial programme.

* The National Board of Occupational Safety and Health in 1986 issued a regulation on rock work (underground work) with an upper exposure limit of 2 MBq per m³ and year for the radon daughter exposition (12).

* The National Board of Housing, Building and Planning has issued a regulation on the permitted upper level of radon indoor in newly built houses based on the Act on Planning and Building (13). The radon daughter level must be lower than 70 Bq/m³. The health risk from radon must be taken into account in the building planning process. The Board has thus recommended that the Local Authorities and builders ensure that they take into account the risk of radon from the ground, when planning for building and the use of land (14). For planning purposes the ground should be classified into high, normal and low risk areas. This classification should be based on geological criteria but it must also be related to building structure. For details see ref. (9).

* The Radiation Protection Law (4) also covers natural radiation including radon. According to this act the Swedish Radiation Protection Institute is responsible for target-oriented research and monitoring of international developments, risk assessment and principles of risk management, recommendations concerning limits on activities and doses for the implementation of certain measures, development and standardization of measuring techniques and methods, requirements concerning testing and inspection of measuring techniques and equipment, and consultation and provision of information on injuries that may be caused by radon.

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