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Decreased radiation exposure in occupational work - 2002 Annual Report of the Radiation Protection Register

The BfS Radiation Protection Register has published its 2002 report on occupational radiation exposure in Germany. The report documents the development of occupational radiation exposure from 1999 to 2002, with emphasis on evaluations in the year 2002. The Radiation Protection Register documents in a centre persons who may receive increased radiation doses from their occupational work and monitors the adherence to the present exposure limits.

In the calendar year 2002, about 313,000 persons were monitored for occupational radiation exposure in Germany. 15 percent of these persons received a detectable radiation dose at their occupational work. The mean annual dose of these persons was 1.0 mSv which is about five percent of the new exposure limit of 20 mSv. In 1999, this value was still 1.3 mSv. The decrease was significant in industrial radiography where the mean annual dose was reduced from 3.2 mSv to 2.2 mSv in the years from 1999 to 2002. The collective dose, i.e. the sum of all occupational radiation doses in Germany, decreased in this period by 10 % from 52.8 person Sv to 47.3 person Sv. Moreover, definitely less persons were exposed to annual doses exceeding 20 mSv. In 1999, 33 persons from 100,000 monitored workers exceeded this formerly admitted value whereas in 2002, only six from 100,000 monitored persons received an annual dose exceeding this new exposure limit.

A focal point of the amendment to the Radiation Protection Ordinance was the protection of women in the age of reproductive capacity. Therefore, the

report of the Radiation Protection Register considered for the first time the difference in radiation exposure between sex and different age groups. Definitely more women in the young and medium age group are monitored and also radiation exposed as corresponds to their proportion in the population; half of all German women are aged between 15 and 40 years. However, the group of women monitored for radiation protection purposes, who work for instance in non-medical areas, include 68 % in this age group. 57 % of these women receive a detectable radiation dose.

The problem of maintaining responsibility in radiation protection is not only of growing importance because the elder generation quit professional life. The report also demonstrates how important professional training is for radiation-monitored young workers: the group aged between 18 and 24 years received a somewhat higher average radiation exposure than the group aged 24 to 29 years. Furthermore, the younger age group includes definitely more women than men. Besides the statistic evaluations of occupational radiation exposure and issue of radiation passes to about 74,000 persons, the report also describes the cooperation of regional measuring centres and supervising authorities with the Radiation Protection Register. It shows the historical development of occupational radiation protection monitoring and gives an overview on the tasks of the Radiation Protection Register as well as an outlook on its future development.

The annual report can be ordered now at the following address:

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Results of in vitro intercomparison tests of the BfS Coordinating Office Incorporation Monitoring

The BfS *Coordinating Office Incorporation Monitoring* is responsible for quality assurance and standardisation of procedures in measurements, analyses and interpretation; it initiates R&D work and gives advice and reports. Their main task is quality assurance in the scope of intercomparison tests (in vivo, in vitro, case studies). This task is assigned to the Federal Office for Radiation Protection according to § 41, subpara 8, Radiation Protection Ordinance (StrlSchV) and on the internal level by the

Coordinating Office Incorporation Monitoring at the BfS.

In Germany, in vitro intercomparison tests have been carried out on a regular basis since 1981. Since 1997, the Coordinating Office does in vitro intercomparison tests on its own responsibility. Incorporation laboratories from Germany and foreign countries (Belgium, Brazil, Austria, Switzerland, Spain) participate in these tests. During this time, intercomparison tests determined activity concentration in urine C-14 and Th-nat (1998), Am-241 and Sr-90 (1999), Pu-240 (2000), S-35 (2001) and Pu/Am (2002). The Coordinating Office carries out a statistical evaluation pursuant to DIN 38402, Part 42 (1984), and determines the results in accordance with the currently used "Guideline for Requirements for Measuring Laboratories" of 1994. The evaluation is done by an acceptance criterion which requires that the relative deviation of data measured in the laboratory should lie between -25 % (underestimation) and +50 % (overestimation) from the reference value.

Since the Guideline for Requirements came into force, the general results of the in vitro intercomparison tests are as follows:

- The majority of test results in the laboratories was within the above-mentioned acceptance criterion. The reason for outliers was clarified in coordination with the respective measuring centre.
- As from 1986, a decrease in the number of outliers has been observed, e.g. in uranium. This means the reliability of results from analyses and measurement procedures has significantly increased since then.

This indicates that regular intercomparison tests contribute definitely to the improvement of the analysing and measuring quality in the participating incorporation measurement laboratories. However, it remains unclear to which extent the results of intercomparison tests are representative for the quality of all routine results of a measuring laboratory. Therefore, in order to ensure the quality of routine results, self-controls in the laboratory by means of frequent control analyses – possibly integrated at random and anonymously - are required in addition.

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BfS/BGR workshop on clay and mudrock

On 12th and 13th February 2004, a common workshop of the Federal Office for Radiation Protection (BfS) and the Federal Institute for Geosciences and Natural Resources (BGR) on clay and mudrock was held in Berlin. Aim of the meeting was to demonstrate the state-of-the-art and experience in clay and mudrock, to point out critical items, open questions and gaps in view of a future site-selecting procedure for a repository of all types of radioactive waste in deep geological formations. In the scope of 10 lectures the current geoscientific studies on clay and mudrock were demonstrated and the level of knowledge about basic problems was demonstrated in view of the possible use of clay and mudrock formations for the future disposal of radioactive wastes. The subjects areas for the clay and mudrock research for which more future work will be necessary are, among others, stability, strengthening properties, understanding of remote field processes, site-specific dependencies and possible transfers. Future investigations will be necessary, in particular to find out the special features in rock mechanism and hydraulics and sorption characteristics. In summary, it was demonstrated that the characteristics of clay and mudrock as geological barrier are well-known, but that there are still many open questions about the suitability of clay and mudrock as host rock for a repository of all types of radioactive wastes. An example is given by the stability of a host formation which is important for the operation period of a repository but less suitable for the decommissioning period, except for areas requiring gate or dam structures. It is planned to publish the manuscript of the contracts in a special volume of the BGR Annual Geological Report.

Peter Brennecke

Department Safety and Nuclear Waste Management

Status report on the use of nuclear energy in the Federal Republic of Germany

Since 1993, BfS draws up this report on behalf of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). It serves BMU and BfS to inform the different bilateral commissions and expert groups on nuclear safety and for public relation purposes.

Issued yearly by 31 December, the BfS report gives a survey on the use of nuclear energy in the Federal Republic of Germany. The report lists essential data of all nuclear power plants, the research reactors with a continuous thermal rating over 50 kW, and the nuclear fuel fabrication and recycling plants. Concerning nuclear power plants, the report includes a summary of operating results and indications about

the nuclear licensing procedure in the year of report. The nuclear power generation is demonstrated quantitatively compared to other energy carriers. The current status of shut-down and decommissioned nuclear power plants as well as the abandoned projects are listed in a summary. For research reactors of a continuous thermal rating over 50 kW, the type, the rating (thermal rating, thermal neutron flux) and the using purpose of the plant are demonstrated. Furthermore, an overview is given on history and current state of operation.

Concerning the nuclear fuel fabrication and recycling plants, information is provided on their operational purpose and performance capacity; furthermore the licensing history and the present state of operation and licensing are specified. Main topics of the current status report are intermediate storage of spent fuel elements and long-term storage of radioactive wastes.

All information is summarised in tabular form to give an overview at the end of the report. The report is available at the public relations section of BfS, and few copies also from the authors.

Frank Philippczyk

Department of Nuclear Safety

Conclusion of the first licensing steps for decentralised intermediate storage sites

On 19th December 2003, the Federal Office for Radiation Protection has issued the last three (Gundremmingen, Krümmel, Philippsburg) of twelve licenses altogether for intermediate storage at the sites of nuclear power plants. Permission was also given at four of the five interim storage sites applied for. The applicant did not pursue a notification for the interim storage site of Brunsbüttel in 2003, because priority was given to the intermediate storage sites of Brunsbüttel and Krümmel. Apart from the concluded licensing procedures for the interim storage sites of Biblis, Neckarwestheim and Philippsburg, the issued licenses refer to first licensing steps of all applications put in for the period December 1998 to February 2000. In the meantime the applicants informed on their intention on which of the declined applications should now be decided. The licenses issued by end of 2003 consider the reduction of the heavy metal mass originally applied for. Permission was granted for the storage of totally 14,025 Mg heavy metal in transport and storage containers of the CASTOR V/19 and CASTOR V/52 types, which can be deposited on 1,435 sites altogether in reinforced concrete storage buildings; in case of the intermediate storage site Neckarwestheim they will be deposited in a tunnel system. The storage time for intermediate storage is limited to 40 years as from the storage date of the

first container, and to 5 years for interim storage. Since the Federal Government plans to have a repository available by 2030, an earlier transport of the containers can be assumed. The ecological compatibility was examined for all projects and the consequences of an intentionally caused crash of a large commercial aircraft was evaluated. 245,000 persons made objections in the scope of public participation. The discussions took 63 days altogether where about 1,700 objectors participated. For the sites situated in South-Germany, a border-crossing examination of ecological compatibility with the Austrian Republic was made for the first time in a nuclear licensing procedure. Objections of about 26,000 persons were discussed at a 1-day-hearing. To date, immediate enforcement was ordered for the intermediate storage site Lingen and Grafenrheinfeld. In case of early granted building permissions and building periods scheduled up to 28 months, the intermediate storage sites could be commissioned within the period of 2005 to mid 2006. The intermediate storage site Lingen and the interim storage sites Biblis, Neckarwestheim and Philippsburg have already started operation.

Jürgen Brenner

Department Safety and Nuclear Waste Management