



## Contents 1/03

<b>Radiological consequences of the Elbe flood</b>	1
<b>Intermediate storage sites of Lingen and Grohnde approved</b>	2
<b>Results of the International Decommissioning Conference in Berlin, 14 – 18 Oct 2002</b>	2
<b>Announcement of intercomparison tests for radon exposure meters</b>	3
<b>Evidence of insignificant increase of Cs-137 activity concentration in air by trace analysis</b>	3
<b>Site-independent waste acceptance requirements</b>	4

### **Radiological consequences of the Elbe flood**

The heavy rainfall in August 2002, and the consequent flooding of the Elbe catchment area were accompanied by considerable shifts of sediments. In the Elbe tributaries coming from the Erzgebirge, sediments and other solid matter were mobilised, also from contaminated areas, and transferred with the flood into the Elbe. In addition a great deal of water and sediments derived from the Böhmerwald area.

The work group on the pollution control of the Elbe river (ARGE-ELBE) has immediately started a special investigation programme to assess the concentration of harmful substances in the flooded areas. In September 2002, in the scope of these investigations 37 samples of recently deposited sediments have been taken along the whole course of the Elbe from the Czech Republic to its estuary. In the scope of an interdisciplinary analysis campaign the samples are currently analysed for relevant harmful substances. The BfS is in charge of the determination of radionuclides. The results are planned to be published as ARGE ELBE Report in summer 2003.

With reference to radionuclides, it can already be seen that the specific activity of uranium, radium and thorium isotopes as well as of Pb-210 in the recently deposited sediments does not exceed 0.2 Bq/g, and is therefore in the range of the natural level. The specific activities of the man-made nuclide Cs-137 are also low (< 0.07 Bq/g), so that according to the current state of knowledge, no increased radiation exposure is expected from sedimentation in the flood area of the Elbe. The rather obvious effect of the Mulde water on the specific activity of the Elbe sediments, as it was seen in earlier investigations, is not immediately reflected in the flood sediments, which can be explained by the considerable thinning of the Mulde water within the Elbe river. Compared to earlier sample results the nuclide distribution in the flood sediments of August 2002 along the whole length of the Elbe is very homogenous. Some events, e.g. increased uranium and radium activity concentrations in sediments extracted near Pillnitz (Dresden), or increased Ra-228 activity concentrations above Wittenberge cannot be clearly interpreted yet. Fur-

### **Imprint**

**BfS aktuell** appears quarterly

#### **Publisher**

Bundesamt für Strahlenschutz  
Postfach 10 01 49  
38201 Salzgitter  
Tel.: +49-(0)1888/333-0  
Fax: +49-(0)1888/333-1885  
Internet: [www.bfs.de](http://www.bfs.de)

#### **Editorial Office**

Lutz Ebermann  
Tel. +49-(0)1888/333-1122  
Fax: +49-(0)1888/333-1105  
eMail: [LEbermann@bfs.de](mailto:LEbermann@bfs.de)

ther clarification is expected here from the integral evaluation of all data.

Furthermore, the BfS has carried out examinations in the Land Saxony at different time periods of seepage water in tailings management areas of uranium mines after the heavy rainfall in August 2002. Specific activities of U-238, Ra-226, Pb-210, and Po-210 were measured in 16 seepage water outlets of 6 tailings ponds. The results show a tendency of decreasing specific activities at high seepage water bulk within days after the rainfall event and increase to the original level at the withdrawal of the bulk. The measuring results are currently evaluated together with other experimental data, and shall be made available in a report in spring 2003.

*Jürgen Gerler*

*Department Radiation Protection and Environment*

### **Approval of the on-site intermediate stores at Lingen and Grohnde nnp**

On 6 Nov. 02, the Federal Office for Radiation Protection has given its approval in accordance with the Atomic Energy Act, for the intermediate storage site of Lingen and has thus approved for the first time the deposit of burnt fuel elements on the site of a nuclear power plant in operation. On 20 Dec. 02, the intermediate storage facility at the Grohnde site being of the same building type and also located in Niedersachsen, was approved.

The intermediate storage site of Lingen is licensed for the storage of spent fuel elements (with up to 1,250 tons heavy metal in total,  $6.9 \times 10^{19}$  Bq activity, and 4.7 MW heat release) in maximally 125 transport and storage containers of the CASTOR V/19 type from the Emsland nuclear power plant. In the smaller Grohnde intermediate storage facility, the storage of up to 100 transport and storage containers of the CASTOR V/19 type (with up to 1,000 tons heavy metal in total,  $5.5 \times 10^{19}$  Bq activity and 3.75 MW heat release) is approved.

On account of its early application, in December 1998, and the legal situation existing at that time, the Lingen intermediate storage site was not subject to a formal Assessment of Environmental Impact (Umweltverträglichkeitsprüfung, UVP). Therefore the early construction of the storage building was possible. Contrary to this a UVP is required for the Grohnde site and the rest of the intermediate storage sites, because their applications were only filed after the amendment of the UVP guideline which came into force on 15 March 1999. Nevertheless the BfS has examined, also for the Lingen storage facility, the effects relevant to the environment. It came to the result – the same as with the Grohnde intermediate storage facility – that no significant environmental impacts may be derived from this project. Since April 2002, the construction of the storage building in Lingen has been completed and therefore operable already at the time of the licensing decision according to the Atomic Energy Act.

The Nuclear Power Plants Lippe-Ems GmbH, an enterprise of the RWE Power AG, has started operation of the intermediate storage facility a few weeks after the license was granted on 10 Dec. 02 with the acceptance of the first CASTOR cask. The building of the storage hall at Grohnde site cannot be started until the local construction supervising authority has given its consent to build. Commissioning of the facility is planned in the year 2004.

The storage period for the intermediate storage facilities is limited to 40 years from the storage date of the first container. Since it is the aim of the Federal Government to have a repository available by the year 2030, an earlier stepwise transport of the containers into the future repository can be assumed. Until then the produced waste will be stored on-site so that transports - especially into the central intermediate stores Ahaus and Gorleben – will be unnecessary.

Wording of the licenses for the Lingen intermediate storage site can be downloaded now and for Grohnde by the end of January 2003 via internet ([www.bfs.de](http://www.bfs.de)). There can be found as well the licenses granted in 2001 for interim stores at the sites Neckarwestheim, Philippsburg, and Biblis.

The BfS will handle the licensing applications for ten additional on-site intermediate storage facilities and two more interim storage facilities by the year 2003.

*Bruno Thomauske*

*Department Safety and Nuclear Waste Management*

### **Results of the International Decommissioning Conference in Berlin, 14 to 18 Oct. 2002**

On behalf of the Federal Republic of Germany, BfS has organised and carried out the IAEA International Decommissioning Conference "Safe Decommissioning for Nuclear Activities: Assuring the Safe Termination of Practices Involving Radioactive Materials" from 10 to 14 Oct. 2002, in Berlin. Mr. Wolfgang Renneberg, Head of Department, BMU (Federal Environmental Ministry), acted as president of the conference.

The conference was organised as plenary session accompanied by a poster presentation and an industrial exhibition. On the last day scientific excursions were made to the decommissioning projects of Greifswald and Würgassen and to the remediation project of the Wismut GmbH (Uranium mining).

The conference covered 5 subject areas: strategy, planning and implementation, financing, social problems, and discharge from the control according to the Atomic Energy Act. Each subject area was introduced with lectures and specified in a panel discussion. All lectures and discussions as well as poster presentations and the final conclusions will be compiled in a volume of proceedings which will appear by April 2003.

In its final speech Mr. Renneberg summarised the results of the conference. Two interesting aspects

important for Germany are presented in the following:

During the conference, expert opinions showed a remarkable trend towards the immediate dismantling of finally shut-down nuclear installations. This was the clear opinion from the view of planning and implementation (use of available expert knowledge), financing (security of financing), and social problems (job preservation, minimising of local economic problems). The dismantling method after "safe enclosure" (e.g. of 30 to 100 years) due to the decay of radionuclides which was preferred earlier, has lost interest since the new methods of decontamination and (remote controlled) dismantling have been developed. In this context it was also mentioned, however, that the lack of financial means and the missing repositories were the biggest problems in view of the immediate dismantling of decommissioned plants.

Furthermore the clearance of material, buildings and sites was discussed controversially. There were particularly votes for the urgent requirement of internationally accepted clearance values, after an approximately ten-year discussion, mainly in view of border-crossing material transfers. France, in particular, did not and still does not agree to regulations of this kind. In Germany, the clearance is legally regulated in the Amendment to the Radiation Protection Ordinance. It was also emphasised that besides the clearance values, agreement on the method of the discharge of clearance values should be obtained. In many countries rules were developed on the collection of funds for future dismantling already during the operational period of nuclear plants. Nevertheless problems arise even with rules of this kind, because they are connected firstly with insecurities in cost estimations for activities in the distant future, secondly concerning the development in value of capital investments, e.g. falls in value and inflation, and which are related thirdly to the operation period of the plants, e.g. in case of their early shut-down. IAEA intends to analyse the results of the conference and to transfer them into a work programme which will be implemented by the council of governors.

*Ernst Warnecke*

*Operational Unit Decommissioning*

### **Announcement of intercomparison tests for radon exposure meters to assess occupational radiation exposure**

The Radiation Protection Ordinance requires for workplaces quoted in Annex XI, the estimation of radiation exposure, and in the case of exceeding intervention levels, the introduction of monitoring measures and measures to reduce radiation exposure. For workplaces quoted in Annex XI, Part A involving exposures to radon and radon decay products, passive personal radon exposure meters can be used for the estimation and monitoring of radiation exposure as well as for the performance review of reducing measures.

In March 2003, in the scope of its quality assurance tasks, the Federal Office for Radiation Protection carries out intercomparison tests for passive radon exposure meters with solid matter trace detectors or with Electret ionisation chambers. With their participation measuring laboratories which have or apply for the accreditation to assess radon-222 activity concentrations meet the requirement for validation of their measuring method according to DIN/ISO 17025.

The participating measuring laboratories receive a certificate of participation together with their results and the reference exposures. In addition the participants receive a summary of results with anonymous results of all measuring laboratories and the detailed exposure conditions.

Measuring laboratories wishing to participate at the intercomparison analyses should contact the

Federal Office for Radiation Protection  
Section SW 1.1.1.

Reference: Radon Intercomparison 2003  
Köpenicker Allee 120-130  
10318 Berlin.

*Thomas Beck*

*Department Radiation Protection and Environment*

### **Evidence of insignificant increase of Cs-137 activity concentration in air by trace analysis**

Trace analytical methods are used in the BfS to assess quantitatively the currently very low radionuclide concentrations in the near-to-surface air on the basis of weekly sampling. They allow evidence of values in the range of millionth of Becquerel ( $\mu\text{Bq}$ ) per  $\text{m}^3$  air. In Germany, the current basic level of Cs-137 activity concentration is at about  $0.7 \mu\text{Bq}/\text{m}^3$ . In the period from 26 Aug. 02 to Sept. 02, an insignificant increase of Cs-137 activity concentrations in the near-to-surface air was observed in parts of North and Central Europe. The values decreased within Germany from North to South. The highest value of  $18.4 \mu\text{Bq}/\text{m}^3$  was measured at the German meteorological service centre on the isle of Fehmarn. The BfS trace analysis laboratory on the Schauinsland mountain showed, however, a value in the range of the basic level. To compare: after the Chernobyl reactor accident, higher daily mean values of about one million were observed in the South of Germany.

According to information of other European trace analysis laboratories, increase was also observed at laboratories in Denmark, the Netherlands and in Sweden, which corresponded approximately to the values measured in North Germany.

Apart from Cs-137 no further man-made radionuclides have been detected by gamma-spectrometric analyses. Due to their lack, a potential release from a nuclear plant or after a nuclear explosion can be excluded. The release is possibly caused by the so-called resuspension of Cs-137 from the areas with high caesium activities in the vicinity of Chernobyl. In view of the frequently occurring fires

in forests or marshland in that season of the year, it can be assumed that caesium stored in soil or plants was released into the atmosphere and then dispersed over large distances.

This example demonstrates the capacity of the trace analysis to identify also insignificant changes of radionuclide activity concentrations in air. The close cooperation of BfS with other German and European trace measuring centres allows in a case like this a large-scale evaluation of the situation and facilitates conclusions about the possible origin of radionuclides.

The Cs-137 activity concentration in air measured in Germany with regard to radiation exposure of man is insignificant, because it is less than one millionth of the man-made radiation exposure.

*Jacqueline Bieringer, Clemens Schlosser  
Department Radiation Protection and Environment*

### **Site-independent waste acceptance requirements**

According to the waste management concept of the Federal Government, a repository mine for all types of radioactive waste shall be available and ready for operation appr. by the year 2030. From the view of waste management, the immediate consequence from this is the need to stipulate technical marginal conditions for the waste processing and conditioning, considering particularly requirements from the areas of

- safe intermediate storage on the surface during a period of up to 40 years, and
- future storage possibility in a repository of which site and host rock will only be determined in some years.

To date the conditioning of radioactive waste with negligible heat generation has been adapted to the waste acceptance requirements for the Konrad mine and the Morsleben repository. These requirements have to be revised so that prerequisites may be established which guarantee a safe future long-term intermediate storage and the required conditioning in compliance with radiation protection regulations. In this case the main objective is to fulfil future waste acceptance requirements possibly without major technical expenditures and a minimum of additional radiation exposure to the staff.

Site-independent waste acceptance requirements are especially the demand of the representatives of the Laender (here: 41st LAFAB conference from 25-26 April 2001 in Brunsbüttel) for a compilation of all requirements as to the state of the art of science and technology, with regard to the final disposal of radioactive wastes with negligible heat generation.

In the course of developing these rules, the following aspects showed to be important for the BfS:

For the disposal of radioactive waste the Federal Government still pursues the concept of final disposal in deep geological formations. Therefore it can be assumed that only few changes in the fun-

damental requirements for the final storage of radioactive waste, waste packing drums, waste products and waste containers/packings - possibly also for parts of additional product-specific and container-specific requirements - will be expected in comparison with the waste acceptance requirements of the Konrad mine. Taking this fact into account and balancing further marginal conditions which are important for the conditioning today and in the coming years, it was concluded that the pretreatment, processing, and packing of radioactive waste with negligible heat generation should be adapted to the waste acceptance requirements of the Konrad mine (state: December 1995). They should include the additional requirements in the license, however these conditions have to be handled flexibly and amended by additional guidelines. This includes mainly additional requirements to the waste product (possible chemical reactions / gas generation), the radionuclide inventory (radionuclides relevant to incidents and long-term safety), parts of the law relating to water (non-radioactive chemotoxic substances), and the documentation of waste specific indications (basis for future examinations of the final storage capacity):

Therefore the site independent-waste acceptance requirements developed by the BfS (draft, state of December 2002) are therefore based on the waste acceptance requirements of the Konrad mine including the respective granted additional requirements in the licence, they anticipate the flexible use of these requirements and are supplemented by several additional requirements. Because the above-mentioned requirements correspond to the current knowledge on characteristics of waste relevant to final disposal (without reference to a specific site or host rock), they are of mainly qualitative character and are orientated more in the direction of waste characteristics. In this way the necessary instructions and data which will be necessary regarding the justification of the final storage capacity according to future binding waste acceptance requirements are determined. Therefore it is precautionarily recommended to consider these requirements - where applicable - during the pretreatment and/or conditioning of radioactive waste, and to have their adherence controlled and justified in the scope of the BfS product control measures.

The site-independent waste acceptance requirements are reviewed and continued corresponding to the future knowledge and scientific progress in view of the conditioning of radioactive waste with negligible heat generation.

*Peter Brennecke  
Department Safety and Nuclear Waste Management*