Report on SÚJB Results Achieved in the Surveillance of Nuclear Facility Safety and Radiation Protection for 2003

Contents

1. INTRODUCTION

In the introduction part of our last annual report we remembered the tenth birthday of our life and at the same time ten years of determined and difficult effort of guarding the nuclear safety and radiation protection in our country as an indication of the framework, under which we will evaluate our activity in 2003. Did we succeed?

The start-up process of Temelín NPP was completed, both units are in trial operation and their operating reliability is improving, as expected. In Dukovany NPP the reconstruction of Instrumentation and Control System (I&C System) and transition to new advanced fuel run successfully at full power. This will conduce to maintenance or even improvement of achieved level of the nuclear safety, which is comparable with current good practice in advanced countries.

The results of SÚJB's own inspections and reviews (surveillance of nuclear safety) allow us to state that in 2003 all requirements decisive for nuclear safety and radiation protection were met, as demanded by the law, on both nuclear power plants as well as in all nuclear facilities and premises around the Czech Republic where sources of ionizing radiation were used. No nuclear or radiation related facility experienced any serious failure causing a leak of radioactivity into the environment, nor was there an above-the-limit radiation threat to workers or to inhabitants living close to such facilities. The facts that neither nuclear safety nor radiation protection of our nuclear facilities has been compromised and that the inspection results of individual events tended towards the technical area without any influence on nuclear safety are undoubtedly positive. The area of activities related to both fresh and spent fuel management is evaluated as completely trouble-free, in particular the fulfillment of international obligations of the Czech Republic contractually confirmed.

SÚJB achieves the same results in the state administration area. There was another significant progress in the area of radiation protection. The Restatement of Law and amendment of relevant legislation were completed. The entire surveillance over provision of requirements for radiation protection became, after appropriate modifications, a unified body able to systematically and almost immediately deliver any information on management and surveillance from a full range of premises using sources of ionizing radiation. The results of SÚJB's inspection activity in this area could be, with respect to its scope, evaluated as positive and thus individual particular findings as less significant.

The countrywide Radiation Monitoring Network is coordinated as a single structure and linked to international systems so that radiation related data could be freely exchanged. There was also a Registry of Ionizing Radiation Sources and a Record of Occupational Doses established, both acting countrywide.

Task of the crisis management workplace increased extremely. Actions' coordination and cooperation with the Integrated Rescue System (IZS), methodical preparation of exercises and their performance, cooperation with the Crisis Staffs in the regions as well as significant participation in table-top and general exercises coordinated internationally (in cooperation with the Central Crisis Headquarters of the Czech Republic) are the most significant contributions of this SÚJB department towards protection of populations in case of radiation or nuclear accident or during terrorist threat with use of nuclear, biological and chemical weapons.

Similar results have been achieved in the newly unfolding area of surveillance and inspection activities aimed at monitoring the discharge of obligations laid out in the treaties banning nuclear, chemical, biological and toxin weapons. Particular international cooperation improves and the Office is more often given important tasks in coordination of international activities both in the area of information exchange and in the area of exercise and training.

The broad process of bilateral and multilateral international cooperation continued. When compared to the previous years, the positions of the cooperating agencies, particularly that of IAEA, have not changed. All international organizations taking part in the assessment process focused on the Czech nuclear power plants and other nuclear facilities agree that SÚJB meets its obligations as they follow from negotiations on these issues, especially those held on the EU platform. The Office thus enhances the confidence in the adequacy of the Czech nuclear safety precautions and radiation protection measures, in particular when some of our measures belong among the strictest ones in Europe. Access process towards the European Union proved this in full extent. Our roles and positions within IAEA change fundamentally. From the position of country accepting international support of this institution we change over to a position of country providing support, contributing to IAEA budget and financing some of the projects.

SÚJB does not perceive the positive results of last year as a reason for self-complacency. Quite the contrary, we see it as a challenge and an opportunity to analyze our hitherto activities. Based on the analysis of our own experience we begin

to be concerned about real relations between the surveillance and operators or license's holders, removal of excessive formalism and enhancement of effectiveness of our inspection activity. It happens sometimes that in spite of relatively extended control carried out in accordance with legislative requirements and in spite of relatively large set of stored corrections the long-term results of inspections are limited only, respectively in relation to the principal – prevention of events' repetition and to the improvement of long-term reliability and life of components important for the nuclear safety. In near future, besides fulfillment of our routine tasks we want to aim at addressing the above mentioned, at this moment rather theoretical, problem.

Ing. Dana Drábová
SÚJB Chairwoman

2. STATE OFFICE FOR NUCLEAR SAFETY

The State Office for Nuclear Safety (hereinafter SÚJB or Office) is a central state administration agency independently budgeted and headed by a chair person appointed by the government of the Czech Republic.

SÚJB performs state-governed administration and surveillance of the use of nuclear power and ionizing radiation and covers the area of radiation protection and the area of nuclear, chemical and biological control. The Office's sphere of authority, granted by Act No. 18/1997 Coll., on the peaceful exploitation of nuclear energy and ionizing radiation (Hereinafter "Atomic Act"), Act No. 19/1997 Coll. and Act No. 281/2002 Coll. encompasses particularly:

- Performing state-governed surveillance of nuclear safety, nuclear items, engineered safety features employed to ensure the physical protection of nuclear facilities, radiation protection and emergency preparedness within nuclear facilities and premises using sources of ionizing radiation;
- Licensing activities conducted pursuant to Act No. 18/1997 Coll., such as locating and operating nuclear facilities and premises using major sources of ionizing radiation; handling ionizing radiation sources and radioactive waste; shipping nuclear materials and radionuclide radiation sources;
- Approving nuclear and radiation protection related documentation as stipulated in the Atomic Act; Limits and Conditions included in Technical Specifications, methods of engineered safety features implementation, emergency rules used to govern the transportation of nuclear materials and some selected radionuclide radiation sources, on-site emergency plans for nuclear facilities and premises with sources of ionizing radiation;
- Determining the conditions and requirements for the public protection from radiation as well as the workers engaged in jobs involving sources of ionizing radiation (e.g. the stipulation of exposure limits, the delineation of a controlled area); defining the Emergency Planning Zone and the requirements for emergency preparedness of the License Holders as set forth in the Atomic Act;
- Monitoring the exposure of the public and workers handling sources of ionizing radiation;

- Operating the activities of the Radiation Monitoring Network within the Czech Republic and taking care of the international exchange of data on radiation situation;
- Operating the system of State Registry and Inspection of Nuclear Materials and maintaining the State Registry of License Holders; selected imported and exported items; sources of ionizing radiation and keeping track of the exposure of the public and workers handling ionizing radiation sources;
- Providing technical cooperation to the International Atomic Energy Agency (IAEA);
- Supplying community authorities and regional municipalities with data on radioactive waste management as related to the territories they administer; delivering relevant information on the Office's activities and their results to the public and the Czech Government;
- Disseminating information on measurements and reviews of the effects that the nuclear, chemical and biological substances may have on humans, including the appraisal of the level of protection from such substances that individual and collective protective means offer to humans;
- Coordinating and organizing efforts aimed to deal with tasks following from the Convention on Banning Development, Production, Stockpiling and Use of Chemical Warfare and on Its Disposal as envisaged in Act No. 19/1997 Coll. and the Convention on Prohibition of Bacteriological (Biological) and Toxin Warfare as envisaged in Act 281/2002 Coll.;
- Performing competence of national authorities according to the Treaty on General Ban on Nuclear Weapons Tests, the Convention on Prohibition of Bacteriological (Biological) and Toxin Warfare and the Convention on Banning Development, Production, Stockpiling and Use of Chemical Warfare and on Its Disposal.

To suit the SÚJB's purposes and to facilitate its duties, the Office's structure has been designed thus:

- *Nuclear Safety Division*

Comprise the Nuclear Facility Assessment Department, Nuclear Facility Inspection Department, and the Nuclear Materials Department,

- *Radiation Protection Division*

Comprise the Sources and Nuclear Power Engineering Department, Exposure Management Department, Environment & Radioactive Waste Department, and an independent License Department.

- *Management And Engineering Support Division*

Comprise the International Cooperation Department, Economic Department and the Office Secretariat. The Division also embraces the National Authorities for Monitoring the Ban on Chemical Warfare, Bacteriological and Toxin Warfare and General Ban on Nuclear Weapons Tests.

The Office's chair is vested with the direct authority over an independent Emergency Response Center, which ensures the surveillance over the emergency preparedness, the Emergency Response Center (as envisaged in Act No. 240/2000 Coll.) and coordinates the Czech Radiation Monitoring Network, the Euro Center, which ensures the coordination of activities related to the preparation for accession to the EU, the Internal Audit and the Safety Manager.

SUJB has established Regional Centers (RCs) in Praha, Plzeň, České Budějovice, Ústí nad Labem, Hradec Králové, Brno, and Ostrava, plus two detached field offices at the Dukovany and the Temelín NPPs ensuring the fulfillment of the Office's duties in direct relation to the regions, in which the nuclear facilities and very significant ionizing radiation sources are located. The Office controls a budgetary organization, namely the State Institute for Radiation Protection (SÚRO) based in Prague and a contributory organization, namely the State Institute for Nuclear, Chemical and Biological Protection (SÚJCHBO) based in Příbram – Kamenná.

Throughout 2003 the SÚJB's operation and management was governed by Act No. 579/2002 Coll., dated December 17, 2002, on the Czech State Budget for the year of 2003 as amended, as enacted by the Chamber of Deputies of the Czech Parliament. To use its competencies and to fulfill its duties over a period of years, the Office was assigned the following capital and workforce:

Selected expenditures spent from Budget Chapter 375 - SÚJB – reality, in "000" CZK

year	2000	2001	2002	2003
Overall running expenses	**215 158**	**237 573**	**249 097**	**285 317**
itemized:				
water, fuel and energy	4 859	6 033	6 605	7 442
services	56 503	52 508	55 918	62 092
science and research	26 449	37 449	42 414	49 276
Overall capital expenses	**29 169**	**50 805**	**93 012**	**90 880**
itemized:				
tangible assets	4 560	41 622	84 582	76 640
intangible assets	23 891	3 048	3 720	7 133

Workforce development – SÚJB (state administration)

Indicator	category	2000	2001	2002	2003
Planned workforce	Expected figure (persons)	178	190	193	197
Real workforce (as registered)	Actual figure (persons)	184	187	192	195

Progressive increase in the 2003 expenses has several reasons. One of the reasons is the expansion of SÚJB scope of activities. This fact reflects in the increase in expenses in the area of research and development and provision of services. Another reason was the increase in prices of products and services in order to ensure the operation provided by external suppliers. The instrumentation and equipment used for inspection activity influence the expenses related to assets, where the capital-operation ratio is being modified. When compared to the previous year, the number of employees did not increase, although the Office supported many tasks related, for example, to the preparation of accession of the Czech Republic into the EU or to the extension of requirements and needs in inspections in the area of nuclear, chemical and biological control.

Within the field of legislative activity, works related to the set of implementing regulations or their changes, amendment to Act No. 18/1997 Coll., as a result of harmonization with the EC law were completed in 2003. Decree No. 185/2003 Coll., on decommissioning of nuclear facilities or workplaces of the 3rd or 4th category was involved. The amendment to Decree No. 318/2002 Coll., on emergency

preparedness details for nuclear facilities and workplaces with the sources of ionizing radiation and on requirements for the contents of emergency plan and emergency rules was completed.

SÚJB participated in preparation of many extensive acts (Act on Customs Authority, Act on Budget Tax Rating, Act on Classified Information, Act on Transgressions and Act on Work Inspection), whose part form associated acts containing amendments to related acts, including Act No. 18/1997 Coll. (Atomic Act).

In 2003 SÚJB representatives, the Ministry of Labor and Social Affairs, the Ministry of Trade and Industry, and the National Bureau of Standards negotiated an integration of the state surveillance of safety of selected engineering facilities in nuclear power, which is currently in the Ministry of Labor and Social Affairs' field of competence. Amendment to act and decree, which cover the surveillance of technical safety in the nuclear area into the activities subject to SÚJB surveillance, was drawn up. Negotiations continue.

Within the harmonization of Czech legislation with EU legislation in the area of medical irradiation the provisions of Directive 97/43/EURATOM were enforced into upcoming health regulations (Acts on Education of Medical Workers, Act on Health Care and implementing regulations). In this connection and in connection with SÚJB guarantee for fulfillment of the Implementation Plan of Directive 97/43/EURATOM negotiations with representatives of the Ministry of Health of the Czech Republic and professional companies and health institutions took place.

"Image Theory Indication Criteria" prepared for print by SÚJB employees and relevant specialized companies associated to the Czech Medical company JEP according to foreign copy (EU No. 118 Radiation Protection) were published in the Bulletin of the Ministry of Health of the Czech Republic, part 11 dated November 2003. Thus the requirement of Directive 97/43 EURATOM, Article 6, Paragraph (2) was met in order to place such manual at the disposal of all doctors indicating radiological examinations.

SÚJB collaborated with the Ministry of Finance (MF) on issue of Decree No. 107/2003 Coll., (including the Guideline dated June 20, 2003), according to which, in conformity with §§ 46a and 47 of Act No. 18/1997 Coll., as amended, and in conformity with Government Decree 970 dated October 7, 2002 on the Radon

Program of the Czech Republic the requests for grant towards radon sanitary measures are cleared.

3. STATE SURVEILLANCE OF NUCLEAR FACILITIES SAFETY

Main subjects of performance of state surveillance of nuclear safety in accordance with SÚJB legal competence are utilization of nuclear energy and observance of conditions established by Atomic Act for performance of activities related to utilization of nuclear energy. The following is involved:

- Activities performed in nuclear facilities, namely structures and operational units with nuclear reactor; plants for production, treatment, storage and disposal of nuclear materials; radioactive waste repository and radioactive waste storage facilities;
- Design, location, construction and commissioning;
- Operation, reconstruction and decommissioning;
- Design, development, verification and restoration of systems in nuclear facilities and their components;
- Design, development, verification and restoration of canisters for nuclear material management;
- Disposal of nuclear materials and selected items designed for dual use;
- Nuclear material transport;
- Physical protection of nuclear materials;
- Special training for selected employees;
- Research and development of activities related to nuclear energy utilization.

Performance of state administration and surveillance is carried out through:

1) Inspection activity, when the correspondence of fulfillment of legislative requirements with safe performance of activities allowed is checked;

2) Administration activity consisting in approval of activities established by law and in approval of documentation provided by law and decrees.

Besides the above-mentioned fundamental activities the surveillance performs the check of fulfillment of requirements resulting from international conventions.

3.1 Nuclear Facilities Overview

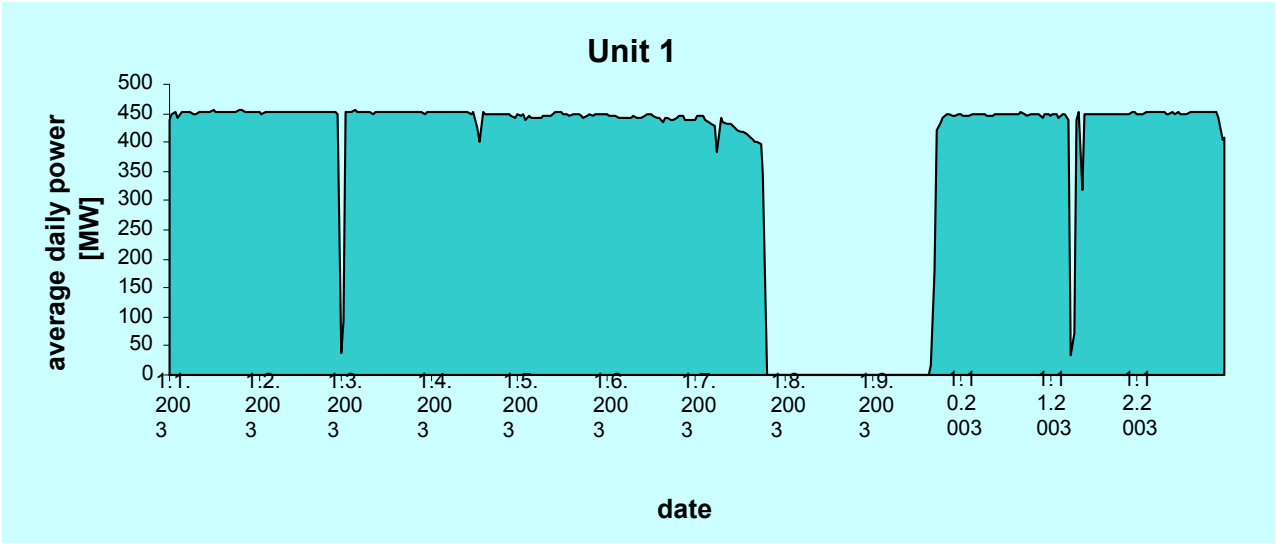
Nuclear Power Plants

Company ČEZ, a.s., operating two nuclear power plants – Dukovany and Temelín is the only operator of nuclear-power reactors in the Czech Republic. In 2003 ČEZ, a.s., commenced an establishment of new Nuclear Power Division, which includes all activities related to administration and management of both nuclear power plants' operation. This way of management was carried out in two stages and fully implemented on January 1, 2004.

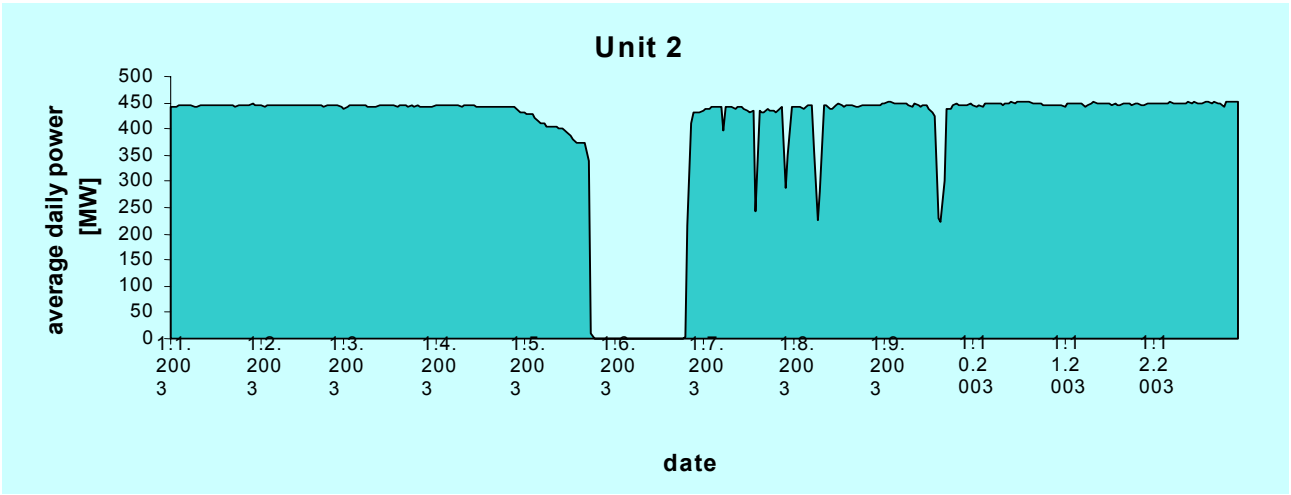
Dukovany Nuclear Power Plant

In 2003 the operation of all four Dukovany Nuclear Power Plant (Dukovany NPP) units was stable, without any serious anomaly resulting in an impermissible release of radioactive substance into the environment. Units were operated in the base load mode as required by the Power Control Center, with several decreases in power related to actual energy situation. The operation history is shown in the figure no. 2.1.1. in this report. In the course of the year scheduled refueling outages related to equipment periodic maintenance, inspections and repairs were performed. The Unit 1 underwent extended outage, during which all fuel was removed from reactor pressure vessel, including incore parts, and both outside and inside surface of reactor pressure vessel was checked.

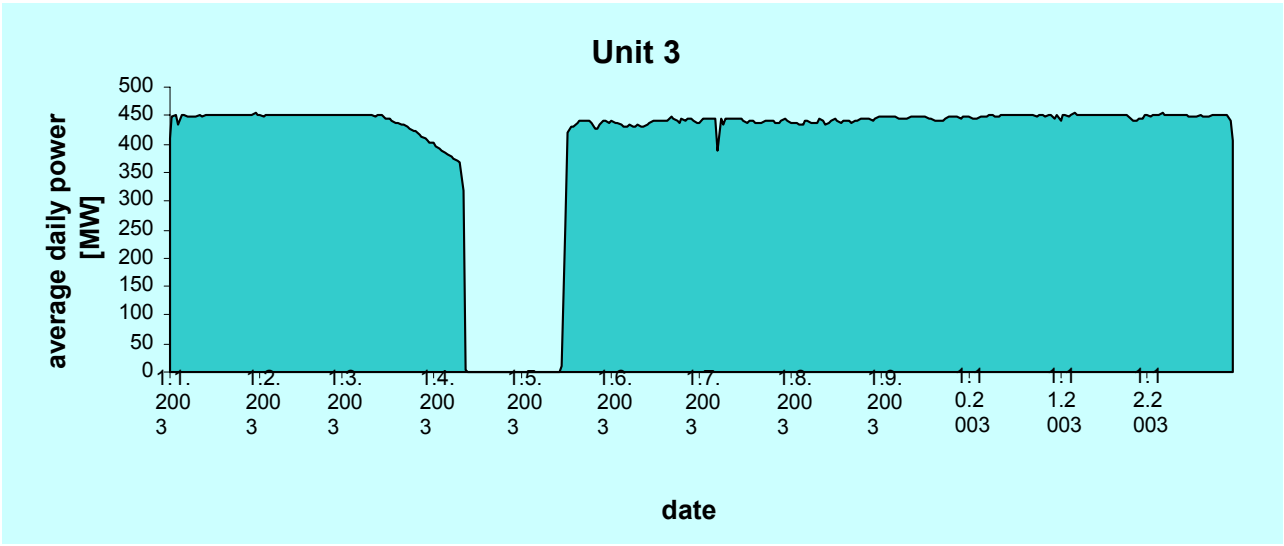
Fig.2.1.1 The course of operation of Dukovany NPP units



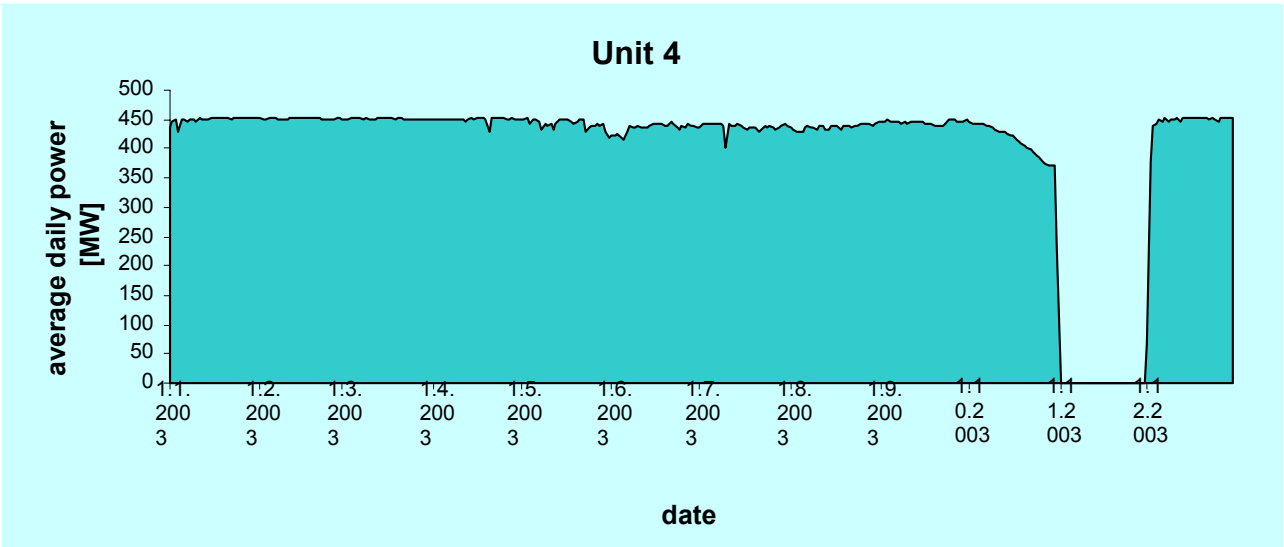
28.2. - 2.3. 2003	mode 2, electric line repair
25.7. - 20.9. 2003	refueling outage
7. - 12.11. 2003	work in switching station Slavětice



23.5. - 24.6. 2003	refueling outage
8.7. 2003	secondary control test
19.7. 2003	scram manual with the effect of Emergency Protection
29.7. - 30.7. 2003	steam header leak
8.8. 2003	leaks on 7th sample
18.9. - 21.9. 2003	turbine blade repair



11.4. - 15.5. 2003 refueling outage
7.7. - 9.7. 2003 secondary control test



30.5. - 7.6. 2003 secondary control test
10.7. 2003 secondary control test
31.10. - 30.11. 2003 refueling outage

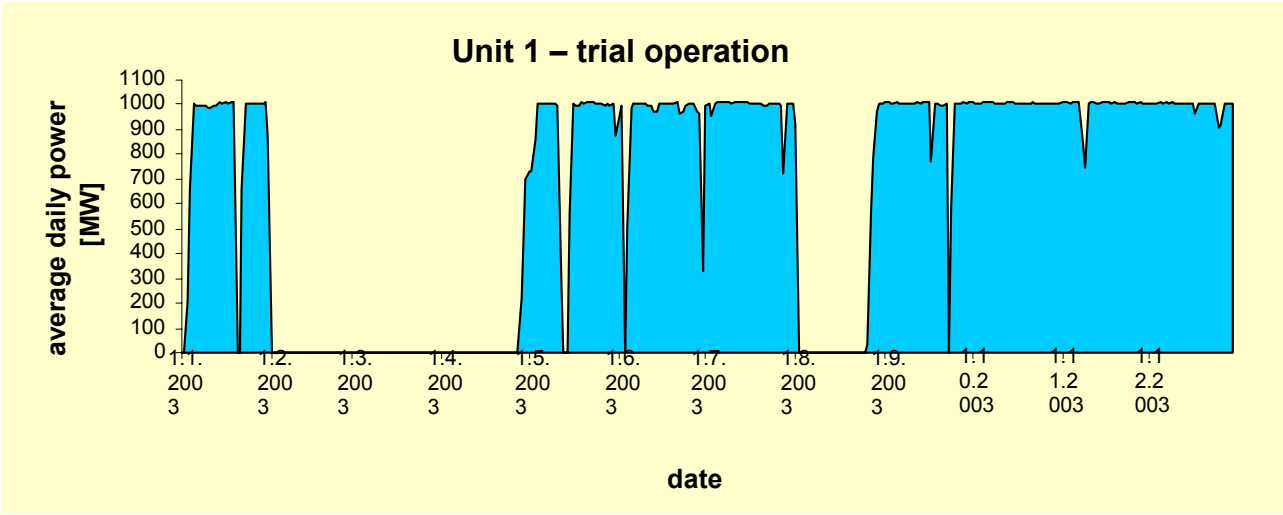
Temelín Nuclear Power Plant

In 2003 the trial operation of Unit 1 continued. This unit underwent first guarantee repair and refueling in the period from February to March, during which one-quarter of fuel assemblies was replaced by fresh fuel assemblies. Another scheduled outage for maintenance and repair purposes proceeded in August.

The power start-up tests at partial power levels up to full nominal power continued on Unit 2 until April 2003, following the final complex testing of the whole unit was performed and the Unit 2 has been in trial operation since April 18, 2003 in conformity to the issued SÚJB permission. Unit outage related to maintenance and repairs proceeded in October.

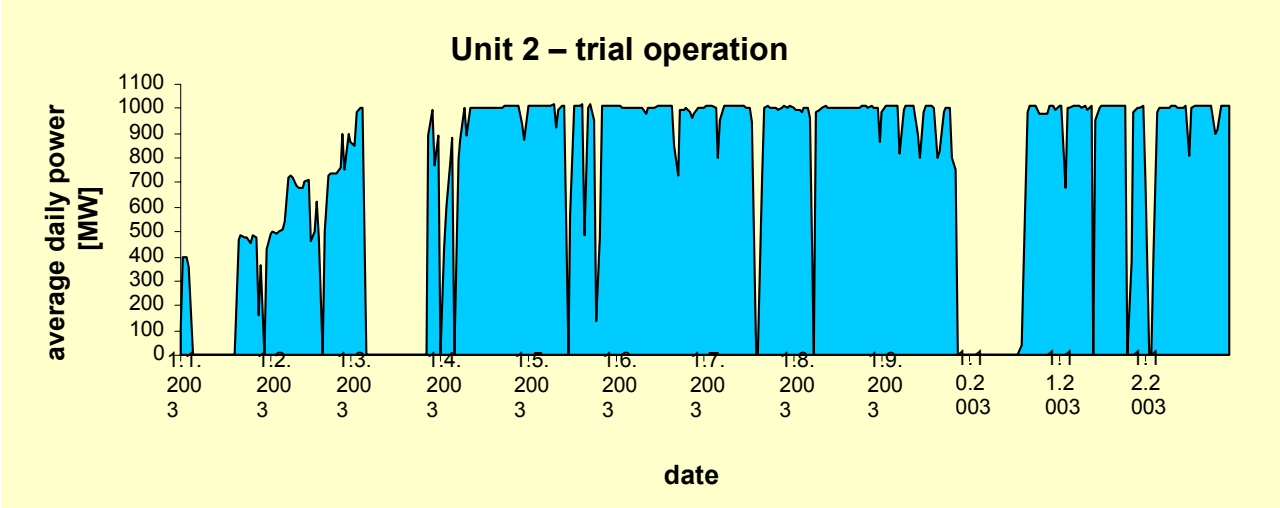
Within the trial operation the two Temelín Nuclear Power Plant (Temelín NPP) units are operated in a standard way, when routine operating activities and tests are performed in conformity to the approved program of trial operation. The operation history of both units is shown in the figure no. 2.1.1.2.

The course of trial operation of Temelín NPP Unit 1 and 2



2.1. 2003	synchronization problems
20.1. 2003	oil leakage from the oil system for turbine
1.2. - 1.5. 2003	refueling outage
13. - 14.5. 2003	control system self-testing
3.6. 2003	steam header leak, mode 3
29.6. 2003	turbo-feed pump failure
28.7. 2003	short-circuit on cable 6kV
2. - 28.8. 2003	intermediate outage
23.9. 2003	scram manual following prior false effect of limitation system

9.11. 2003 pumps vibrating



1.1. - 18.4. 2003	power start-up – tests up to 100% N_{nom}
15.5. 2003	failure of generator exciting
25.5. 2003	operator initiated failure
19. - 20.7. 2003	compressors' failure
8.8. 2003	unstable level in steam generator
27.9. - 20.10. 2003	immediate outage
13.11. 2003	turbine flap valve closure
25.11. 2003	failure in protection system
1.12. 2003	repeated failure in protection system

Research nuclear facilities

Two research reactors LVR-15 and LR-0 in the premises of ÚJV, a.s. Řež and one training reactor VR-1 at the Nuclear Engineering Faculty of Czech Technical University (FJFI ČVUT) are subject to the surveillance of nuclear safety.

In 2003 the LVR-15 reactor was operated for 3561 hours in total, i.e. 30389,4 MWh. The reactor operation was aimed primarily at irradiation activities and operation of RVS 4, RVS 3 and BWR 2 experimental loops. In the course of the year the reactor was shut down several times due to external electric network failure. All such unscheduled shut downs were in conformity to operating procedures without any influence on nuclear safety level.

The LR-0 reactor was out of operation until May and then it was operated for 65 hours in total with performance of tests required for reactor full start-up. In the 2nd

half of 2003 the reactor was operated for 414 hours and its operation was aimed at measuring within the scope of two programs supported by the European Union (REDOS and RENION) and within the scope of order of the company Gidropres for incore instrumentation of the VVER 1000 reactor.

The VR1 training reactor was operated for 1150 hours in total for teaching purposes. They comprise four training courses within the scope of ENEN foreign program and preparation as well as implementation of other reactor experiments. An innovated reactor control system improving the nuclear safety level of this facility has been put into operation since September.

All research nuclear facilities operated without any fault and in compliance with the approved operating procedures and Limits and Conditions.

Storage facilities, Repositories

Other nuclear facilities subject to the surveillance of nuclear safety are the Interim Spent Fuel Storage Facility (Dukovany NPP), the Fresh Fuel Storage Facility (Temelín NPP) and the High-Level Waste Storage Facility (ÚJV a.s. Řež). All above-mentioned nuclear facilities were operated in compliance with the approved Limits and Conditions, safely and without any emergency event occurrence. The construction of the new Spent Fuel Storage Facility, location of which on Dukovany NPP site has been already approved, is subject to the surveillance as well.

At the end of 2003 the Interim Spent Fuel Storage Facility in Dukovany NPP housed 48 CASTOR canisters accommodating 4032 fuel assemblies altogether, and 2994 fuel assemblies in the spent fuel pools. In Temelín NPP the spent fuel pool on Unit 1 stored 42 fuel assemblies and the Fresh Fuel Storage Facility housed 45 canisters with fresh fuel designated for refueling on Unit 2. The High-Level Waste Storage Facility in ÚJV Řež stored 206 EK-10 fuel assemblies and 240 fuel assemblies of the IRT-M or IRT-2M types.

3.2 Inspection Activities

The inspection activities followed primarily the approved half-year Inspection Schedule, in which the inspections are classified according to individual areas and

activities to be performed on nuclear facilities. In case any operation anomaly (event) occurs, the purpose inspections will be performed in order to determine the details related to the particular anomaly (event).

The basic monitored areas are the following: quality assurance, operation, maintenance, technical and engineering support and finally other support activities. The purpose of classification is to cover all activities significant in terms of nuclear safety and requiring thus the state surveillance with scheduled inspections.

Results of inspection activities and their evaluation

ČEZ, a.s., Nuclear Power Division

Inspection activities in ČEZ, a.s., is performed on both nuclear power plants, in the Interim Spent Fuel Storage Facility and in the Fresh Fuel Storage Facilities. The constant periodic surveillance on both power plants is performed by site inspectors monitoring the course of operation or trial operation, in particular in terms of adherence to the Limits and Conditions of safe operation, operating procedures, safety culture and documents creating the established quality assurance system.

Team inspections were performed in the course of unit outages to check units' preparedness for the reactor start-up to the power state. These inspections covered all important safety systems of the power plant, their maintenance, repairs and testing of their operability. Special stress was laid on the check of reactor core parameters, safeguards leak tests, protection systems reliability tests and personnel readiness.

The investigation of selected events and the activities of the Failure Commissions were checked. In Dukovany NPP 11 of such checks were conducted. It was stated that during the events' investigation the prescribed procedures were met. In Temelín NPP three specialized team inspections attended to the investigation of events. The inspections dealt with the investigation procedure adequacy of 143 selected events, which include, considering the running trial operation, the events evaluated outside the International Nuclear Event Scale (INES). The inspections found that the events are investigated properly and that corrective actions are drawn from the investigation results. However the corrective actions did not always prevent

that the failure was repeated. Nevertheless the safety significance of all events was very low.

Specialized inspections monitored the process of Instrumentation and Control Systems replacement in Dukovany NPP. The inspections found no graver deficiencies.

In Dukovany NPP two scheduled inspections were performed in order to check the adherence to the Limits and Conditions for safe operation of the Interim Spent Fuel Storage Facility and one unscheduled inspection was performed in order to evaluate the corrosive attack on tightening screws of supporting journals for selected OS CASTOR 440/84. The inspections found no deficiencies. No deficiencies were found during the inspection of the adherence to the Limits & Conditions for storage in the Fresh Fuel Storage Facility (Dukovany NPP).

For more details as for the results of inspections performed in accordance to individual areas see the following:

Operation

The operation evaluation is based on findings of 66 inspections performed on Dukovany NPP. The operation of all four units in 2003 was stable, safe and on maximum good level. During the monitored period the SÚJB inspectors revealed with the controlled person neither deficiency in the performance of legal duties stipulated by laws related to monitored problems, nor any violation of the Limits & Conditions. One shut down occurred during the monitored period, when the operating personnel manually shut down Unit 2 to the MODE with lower nuclear charge number in conformity to the Limits & Conditions requirements.

The evaluation of operation of Temelín NPP is based on findings of the 23 inspections performed. Both units were operated in accordance with the nuclear safety requirements and conditions. The Limits & Conditions for safe operation were complied and terms of the SÚJB decisions were met. Nevertheless, some deficiencies were found during the inspections performed. It involved primarily minor, or formal infringement of the operating procedures, which is contrary to good level of the safety culture and it highlights the need for continuous care within this area taken both by the operator and the surveillance.

Maintenance

The maintenance activities in Dukovany NPP were assessed by 56 inspections, particularly periodic monthly checks and checks of unit readiness for operation resumption after refueling. The inspections found no deficiencies. The maintenance staff training was organized in accordance with the legislation requirements applicable within this area, and there were no events caused by the lack of maintenance activities.

The maintenance activities in Temelín NPP were evaluated based on the results of 12 inspections. Special inspections aimed both to implement the repairs on systems significant in terms of nuclear safety, such as steam piping leak repairs and weld repairing on high-pressure emergency boration piping, and to verify the fulfillment and performance of operation checks. The checks conducted on Unit 2 revealed no deficiencies during the monitored activities.

The checks of Temelín NPP Unit 1 readiness for operation resumption to criticality after refueling found generally satisfactory adherence to both the nuclear safety and radiation protection principles. Nevertheless, in some cases tests were conducted in accordance with the operation checks program not approved by the SÚJB. The periodic inspections found some minor departures from approved test procedures, for example change of initial parameters during the test, or non-conformance of signaling for the states of tested fittings with the actual state. Although the above-mentioned facts did not affect the safety and conclusiveness of tests, they are contrary to the principles for safety culture.

Technical and Engineering Support

The technical support on Dukovany NPP was the subject matter for 49 inspections, which proved standard level of activities within this area. Nevertheless, some deficiencies occurred in the performance of organizational changes. For example some deficiencies, formal and administrative in the initial phase, lead to the event related to transport wagon contamination. Deficiencies were disclosed in the development of management documentation. The influence of organizational changes on the quality of activities within this area will be one of the priorities of the inspection activities next year.

In Temelín NPP the evaluation was assessed based on the findings of 19 inspections. In the technical and engineering support area the deficiencies from commissioning period persisted. In some cases the formal observance of SÚJB protocols' requirements was persistent deficiency. The inspection revealed deficiencies in the sub-area of Quality Assurance, namely in the suppliers' control. The inspection also revealed deficiencies in the internal documentation, which subsequently affected significantly the operator activities' quality in other areas. Insufficient description of procedures relating to unsuccessful tests and non-conformance in operating procedures prove the facts mentioned above.

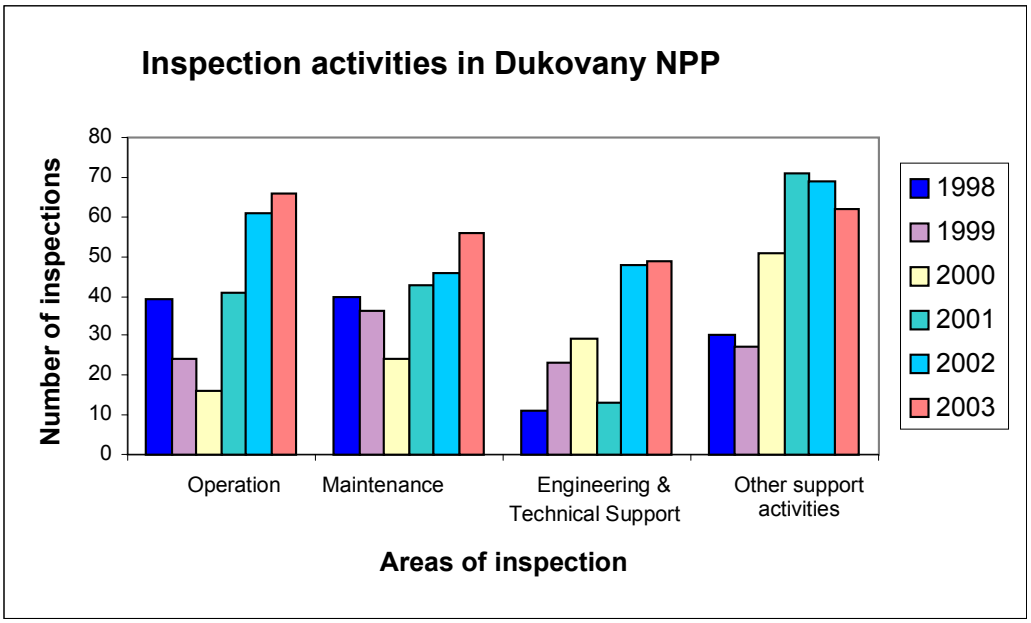
Specialized inspections conducted in the sub-area of project control and management and technical solutions on both power plants brought positive findings, in which it was stated that the license holder pays adequate attention to the way and determination of regulations for the evaluation of changes influence on nuclear and radiation safety and their application during changes implementation.

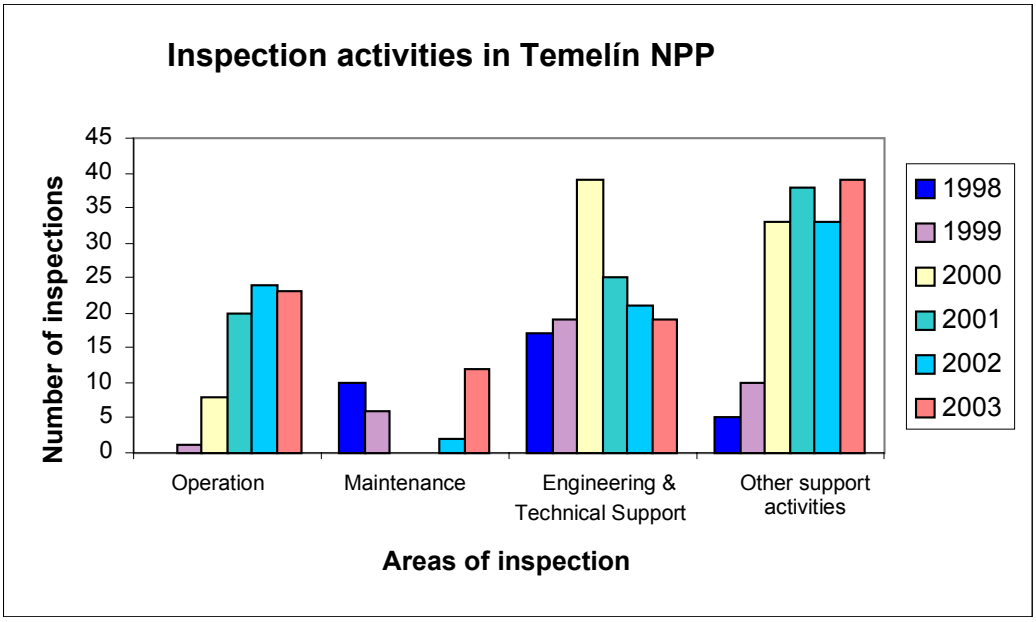
Support Activities

The evaluation is based on 62 inspections performed in Dukovany NPP and on 39 inspections performed in Temelín NPP. The results of all inspections for verification of nuclear materials performed altogether with inspections from the International Atomic Energy Agency (IAEA) in the area of material balance and checks of procedures and regulations for this sub-area on both power plants confirmed that all activities are carried out in accordance with the legislation requirements. Also the physical protection is implemented in conformity to the SÚJB decisions and fully corresponds to the requirements of the relevant legislation. All tests proved reliability performance of the engineering safety features in compliance with the approved documentation.

In the first half of 2003 several violations of radiation protection principals occurred in the sub-area of radiation protection, such as contamination of the Unit 3 reactor hall and the wagon for the transport of canister for spent fuel (see above). Even though this event was evaluated within the scope of the International Nuclear Event Scale (INES) system as a degree 0, it could be deemed an anomaly that should not occur if all regulations are followed in a regular manner. Minor administrative deficiencies were revealed during the inspections on the management

of the ionizing radiation sources for the workplaces of chemical control – spectrometry. In the first half of 2003 several deficiencies were revealed in this sub-area in Temelín NPP. The deficiencies were related to the leakage control and monitoring, and the control of non-compliance in the management documentation and in the Transport Regulations for the defectoscopy workplace. SÚJB investigated all deficiencies revealed in a regular manner and supervised their removal and prevention from their recurrence in future. In 2nd half of 2003 the situation improved and only two out of 17 performed inspections stated minor formal deficiencies in this sub-area.





Other Nuclear Facilities

The inspections checked the readiness of the research reactors in ÚJV a.s. Řež for operation resumption. The inspections of adherence to the Limits, Conditions and operating procedures in these facilities were conducted independently. The inspections of protocols on compliance of the innovated management system tests together with their approved program and the physical verification of equipment were conducted in case of the VR-1 training reactor. The results of all inspections proved the fulfillment of requirements for nuclear safety in monitored facilities.

In 2003 three operation checks were conducted in the High-Level Waste Storage Facility in ÚJV a.s. Řež. The first inspection scrutinized a selected range of Limits & Conditions of safe operation. The second inspection aimed to check the performance of corrective action stipulated in the SÚJB's decision and to verify the EK-10 spent fuel storage. The last inspection performed in December 2003 focused again on the observance of Limits & Conditions for the storage facility operation and on the procedure of permitted reconstruction of the storage facility. The inspections revealed neither defects nor violation of conditions of the decision.

Engineered Safety Features of Nuclear Facilities and Nuclear Items Management

Total 29 inspections were performed in order to verify the engineered safety features of nuclear materials and facilities, of which 15 inspections focused on the engineered safety features applied to nuclear materials in transit. In addition, the following inspections were conducted: six focused on the international transfer of nuclear materials, four on on-site transfer of nuclear materials and two on inland transfer of nuclear materials. Moreover the Office checked the propriety of testing conducted to examine the transportation canisters for the transfer of radioactive materials and to test the radioactive substances in the Testing Plant. The SÚJB conducted an inspection focused on the quality assurance system established with the producer of canisters. Based on the results of inspections conducted we can state that the requirements for law and conditions of relevant decisions of the SÚJB were met in the field of transfer of nuclear materials and selected radioactive substances.

In 2003 the SÚJB executed 135 inspections aimed to verify adherence to the requirements for the management of nuclear items. Of this number 46 inspections

were conducted in cooperation with the IAEA inspectors and 82 inspections were performed by the SÚJB inspectors unassisted. The inspections aimed to verify the initial declaration according to the Supplemental Protocol and the readiness of localities concerned for the IAEA inspections performed according to the Supplemental Protocol. Moreover, the inspections focused on the import and export of some selected items and items designed for dual use in the nuclear area.

In response to the deficiencies detected, four unscheduled inspections were performed in Temelín NPP aimed to solve the problems related to required purity of water in the storage pool on Unit 1 and the problems related to the installation of optoelectronic fiber for the sealing of manipulation pit head in the transport corridor on Unit 2. It was stated that both deficiencies were removed.

New component in the inspection activities were common inspections of the IAEA and SÚJB inspectors carried out in response to the verification of initial declaration of the Supplemental Protocol making use of two-hour or twenty-four-hour period of preliminary notification of access to the facility. The first inspection related to the verification of description of the locality of ČEZ, a.s., Temelín NPP and the second inspection focused on verification of submitted data on mining of uranium ore in DIAMO, s.p. o.z. GEAM Dolní Rožínka. Moreover, such inspections were performed in ÚJV Řež a. s., Isotrend s.r.o. Praha and at the Czech Metrology Institute in Prague. All inspections mentioned above found correspondence between submitted data and actual state.

It can be stated, based on the protocols from the inspection activities in the field of nuclear items management, that neither misuse of nuclear materials, selected items and items for dual use in the nuclear area, nor violation of the international obligations of the Czech Republic entailed by the Non-Proliferation Treaty nor international obligations entailed by the inspection mode enhancing this Treaty occurred in 2003.

3.3. Evaluation of Nuclear Safety

Dukovany Nuclear Power Plant

In 2003 the surveillance on Dukovany NPP experienced 14 safety significant events. One case involved the automatic actuation of limitation protections and safety

systems caused by the spare voltage converter substitution and the action of limitation system. In addition, Unit 2 experienced one short-term reactor scram following the drop of control assembly when the staff evaluated newly emerging state as a loss of information on reactor core state and activated the scram manually. No violation of the Limits and Conditions of safe operation was found and reported to SÚJB; all operation events (anomalies) were always properly reported and investigated.

Based on the evaluation 13 events were rated INES level "0" according to the International Nuclear Event Scale (INES), i.e. non-safety significant event, and one event was rated INES level "1" as a deviation from approved operating procedures. This event was caused by delay in hydro-accumulators connecting in the resumption stage of Unit 4 after refueling.

Temelín Nuclear Power Plant

In 2003 Temelín NPP experienced and evaluated altogether 32 safety significant events, out of which Unit 1 experienced 19 events and Unit 2 experienced 13 events. According to the International Nuclear Event Scale (INES) 30 events were rated INES level "0" and two events only were rated INES level "1". One of the events (failure of external line 400 kV) was evaluated in terms of requirements for emergency preparedness as degree 1 emergency event, and in terms of nuclear safety it was evaluated INES level "0". The violation of the Limits and Conditions was neither reported nor found.

Unit 1 experienced the first event evaluated INES level "1" in August. In the course of unit after-cooling a short-term over-speeding (of allowed trends) of the primary circuit heat-up was experienced. Although this event did not affect the facility availability and service life, it was evaluated INES level "1" with respect to deficiencies in operating procedures and their adherence.

On Unit 2 the failure in reactor protection system caused the activation of reactor scram signaling, during which the scram was not experienced in effect and the reactor power was automatically lowered partially only. In compliance with the operating procedures the operator therefore shut the reactor down manually using the pushbutton. The event was categorized as INES level "1" primarily because it

involved repeated event. When the same event occurred one month earlier its causes were not detected and accepted measures thus could not prevent recurrence of the same problem.

During the year Unit 2 experienced two automatic reactor scrams. The first reactor scram evaluated as an unusual event occurred in March during scheduled tests of turbo generator shutdown. The second reactor scram caused by signaling of inadmissible changes to the level in steam generator was rated INES level "0". Both of the reactor scrams were in compliance with regulations.

Altogether 14 experienced deficiencies related to the interventions by the limitation system causing temporary unscheduled power reduction or reactor shutdown. It involved primarily the intervention by the limitation system due to problems on the secondary circuit. One shut-down was caused by the operator error. All the above-mentioned unscheduled actions of the limitation system were reported to SÚJB in compliance with requirements of the Atomic Act and investigated by the consequent inspections.

The evaluation of operation-safety indicators achieved in the individual areas provided sufficient overview of the way in which Dukovany NPP ensures nuclear safety; the results do not indicate any potential weak points for the future. In all of the assessed areas the hitherto high level of operation as well as nuclear and radiation safety was confirmed.

The evaluation of operation-safety indicators for Temelín NPP in 2003 provided initial data for Unit 1, and the Data Acquisition System to be used in other operation periods was verified. As regards the anomalies typical for the trial operation, the operation results as well as the way this power plant ensures nuclear safety can be evaluated positively.

ÚJV a.s. Řež

The electronics failure of the loading device on the LVR-15 reactor in ÚJV a.s. Řež occurred in September. This failure caused withdrawal of the head of loading device outside the shielding and consequently unscheduled increase in dose rate in the reactor hall occurred. This event was classified as degree 1 emergency event and in compliance with regulations it was reported to SÚJB. In the course of the event no

radioactive substances escaped to the environment and no consequences, which would require removal, arose.

3.4 Administrative Activity

The administrative activity consisted primarily in permitting, assessing and approving the specified documents. In 2003 SÚJB issued 330 decisions to the undertakers subject to the surveillance of nuclear safety. Out of the number 50 decisions related to the issue of authorization to perform the activities on nuclear facilities.

Permits

In 2003 the SÚJB granted 200 permits to perform activities subject to the surveillance of nuclear safety. The permits related primarily to the performance of selected changes and modifications in nuclear facilities. The decisions issued also included the permits to manage nuclear materials, to transfer nuclear materials and to import or export nuclear items.

ČEZ, a.s., Nuclear Power Division

SÚJB granted 32 permits to ČEZ, a.s. In addition to permission for reactor power-up to the minimum controlled power issued after each refueling outage (all four Dukovany NPP units and Temelín NPP Unit 1), the permit to commence the trial operation of Temelín NPP Unit 2 is to be considered as significant. In response to the establishment of the Nuclear Power Division within ČEZ, a.s. the permit to train selected employees was reviewed and reissued based on the inspection.

The permit to use new fuel type on Dukovany NPP Unit 1 and 2 within the scope of the project "The Adoption of Improved Fuel Cycles with Advanced Fuel Assemblies and First Generation of the Fuel with Gadolinic Burnable Poison" belongs in a category of significant changes. It involves significant improvement in the fuel cycle economics together with considerable improvement in nuclear safety.

Another significant permitted change being implemented in stages on all four Dukovany NPP units is the management systems exchange. This action is implemented in four stages during the relevant unit outages in compliance with the approved Quality Assurance Plan. SÚJB monitored the development of modifications to the documents of the safety-related and project documentation in order to meet

the requirements stipulated in pending request for supplementary information applied by SÚJB in the course of licensing process.

VAO Storage Facility in ÚJV a.s. Řež

Based on the appraisal of submitted safety-related documentation SÚJB granted permit to redevelop the High-Level Waste Storage Facility (VAO) in ÚJV Řež, a.s. This redevelopment aims to improve nuclear safety primarily with respect to relatively risk management of the spent EK-10 fuel (used in the reactor in 1957-1974). In this regard SÚJB granted permit to modify the method of physical protection of ÚJV Řež, a.s. Upon appraising the documentation for construction of the hot chamber in the VAO Storage Facility ("Implementation Project of Redevelopment Works to Elimination of Old Environmental Loads") and upon discussing with IAEA, SÚJB drew up a proposal for necessary changes to approach the application of safeguards on this nuclear facility. Based on the above-mentioned changes and final IAEA requirements, SÚJB will grant new permit to manage nuclear materials in the field of material balance. In cooperation with ÚJV Řež, a.s. the SÚJB developed necessary update of the Initial Report according to the Supplemental Protocol for the locality in question.

Research reactors

In response to the expiry of permission, ÚJV Řež a.s. submitted two requests for permit to further operate the LVR-15 and LVR-0 research reactors. The condition of previous decision to perform feeding recovery was met in order to obtain new permit to operate the LVR-15. Upon appraising the submitted documentation, SÚJB granted permit to further operate both of the research reactors. SÚJB permitted the innovation of management system for the VR-1 training reactor at the Nuclear Engineering Faculty of Czech Technical University (FJFI ČVUT). This innovation is part of the comprehensive innovation of the whole control system on the VR-1 reactor. Engineering as well as program solution will improve operational reliability and safety of this reactor.

Nuclear materials management

In 2003 SÚJB granted 15 new permits to manage nuclear materials. As of 31 December 2003 the State Registry of Nuclear Materials kept a list of 185 License Holders within the Czech Republic; the Holders were authorized to manage nuclear

materials in 209 operational-organizational units. This figure also encompasses 9 Holders of multiple permits allowing them to manage nuclear materials in 33 operational-organizational units. Also, SÚJB granted 122 permits to import/export nuclear materials, selected items, or items designed for dual use in the field of nuclear technology.

Approvals

Part of the decision on permission is usually approval of documents related to the permitted activities. Some documents, such as the Limits and Conditions of safe operation of the nuclear facility, periodically performed activities programs, step-by-step programs, quality assurance programs, the manner of securing physical protection of the nuclear facility, documentation of how the selected employees are trained and its modifications, are approved independently. The type approval of canisters for transport, storage or disposal of nuclear material is also significant.

The Quality Assurance Program for the 2nd stage in the establishment of the ČEZ Nuclear Power Plants Division was appraised and approved in order to implement the organizational changes within ČEZ, a.s. establishing the Nuclear Power Division (NPD). This Program includes descriptions of NPD structure and division of activities in individual areas of the division competence, including competencies related to nuclear safety and radiation protection. In response to new management structure, SÚJB approved the Quality Assurance Programs for the operation of Dukovany NPP and the trial operation of Temelín NPP, including related Quality Assurance Programs for principal activities on the above-mentioned nuclear facilities.

In the course of the year the Quality Assurance Programs for location of the Spent Fuel Storage Facility, change to the method of securing physical protection, operation inspection program for Unit 1 and reactor buildings, revisions of programs for stages of Unit 1 and 2 active testing, program for Unit 2 trial operation, the List of Selected Equipment for Unit 1, changes to the Test Programs and three changes to the Limits and Conditions were approved for Temelín NPP. The Test Program for the 3rd stage of the system of Engineered Safety Features (TSFO) restoration, revision of the List of Selected Equipment and the Quality Assurance Program for Instrumentation and Control Systems restoration were approved for Dukovany NPP.

SÚJB assessed submitted documentation of canisters whose approval for use had expired, found the documentation satisfactory, and based on the satisfactory assessment approved seven new canisters of domestic origin as types for transport of nuclear substances, and two canisters of domestic origin and two of foreign origin as types for transport of nuclear substances and for transport of nuclear materials. The administrative action for the type approval of the CASTOR 440/84M canister for spent fuel transport and storage in the planned spent fuel storage facility was discontinued.

Licensing

Special group of decisions forms the decisions on licensing activities to be performed on nuclear facilities. The State Test Commission, which held a total of fifteen meetings in 2003, verified the special expert qualification for activities important for nuclear safety for 94 selected employees of the nuclear facilities. The SÚJB granted a license to successful applicants to work on nuclear facilities in the Czech Republic.

In 2003 the SÚJB revised and updated the set of test questions for selected employees of the research nuclear facilities, including training materials to be issued as revised safety-related instructions.

The verification of special expert qualification for activities, important especially in terms of the radiation protection, also continued. The State Test Commission verified the special expert qualification for 793 individuals. The license was granted to 714 persons, and 79 persons did not succeed.

4. STATE SURVEILLANCE OF RADIATION PROTECTION

The State Office for Nuclear Safety in the field of health and environmental protection against the adverse effects of ionizing radiation ensures the following:

- State administration and surveillance in the field of radiation protection at all workplaces with ionizing radiation sources - from nuclear facilities, workplaces with open radionuclide sources, and dental X-ray equipment, including type

approval of ionizing radiation sources, radioactive waste management and discharge of radionuclides to the environment;

- Monitoring, assessment and control of personal exposure including exposure to radon and other natural sources of ionizing radiation, exposure in emergency situations;
- Control of activities of the countrywide radiation monitoring network (hereinafter referred to as RMS) including assurance of international data exchange on the radiation situation;
- Countrywide records of ionizing radiation sources (hereinafter referred to as ZIZ) and countrywide records of professional radiation;
- Enforcement of radiation protection measures including enforcing corrective measures and imposing penalties.

Summary of ionizing radiation sources and respective associated workplaces

The scope and demanding character of work associated with the performance of the state administration and supervision in the field of radiation protection may be presented by data on the number of the ionizing radiation sources and workplaces with such sources. Pursuant to Act 18/1997 Coll., as amended, (hereinafter the "Atomic Act") ionizing radiation sources are classified according to the increasing degree of possible personal health hazards and environmental hazards into five classes – unimportant sources, minor sources, simple sources, important sources and major sources. The higher the class of the sources, the more rigid and extensive are the requirements for assurance of radiation protection; the licensing procedure is more complicated and requires a thorough professional knowledge. Inspections are primarily focused on the management of the potentially most hazardous sources and relevant inspections are more frequent, extensive and detailed. In a similar way, the workplaces with such sources are classified into 4 categories, from the workplaces of the 1st category (the least hazardous) to the 4th category (potentially the most hazardous).

The workplaces of the 4th category and the most important workplaces of the 3rd category are as follows:

- Workplaces with nuclear reactors and associated technologies (detailed in the 2nd section of the report), particularly 4 operated power reactors in Dukovany

NPP and 2 power reactors in trial operation in Temelín NPP, 2 research reactors in ÚJV Řež, a.s. and 1 training reactor at Nuclear Engineering Faculty of Czech Technical University in Prague, the Interim Spent Nuclear Fuel Storage Facility in the premises of Dukovany NPP, the Radioactive Waste Repository in mine "Richard" near Litoměřice, the High-Level Waste Repository in ÚJV Řež, a.s., the Radioactive Waste Repository in mine „Bratrství",

- Uranium-mining industry workplaces – mining and processing of uranium ore in Dolní Rožínka, mine liquidation in the Příbram area and the closed mine Hamr, liquidation of chemical mining in the Stráž pod Ralskem area, and liquidation of sludge beds Mydlovary,
- Workplaces with large industrial irradiators - workplaces for the irradiation of food (particularly spices), owned by company Artim Praha s.r.o. and the workplace for radiation sterilization of medical stores owned by company Biostér Veverská Bitýška a.s.,
- Workplaces producing and distributing (possibly using both open and sealed) radionuclide high activity sources, particularly the workplaces of Prague companies Isotope Products Cesio s.r.o., Sorad s.r.o., Isotrend s.r.o., and workplaces of ÚJV Řež a.s. and the Nuclear Physics Institute of Czech Academy of Sciences Řež.

The summary of important and simple ionizing radiation sources as of December 31st, 2003 is outlined in tables No. 3.1 through 3.3 by type of ionizing radiation sources.

Table No. 3.1. Workplaces with open radionuclide sources

	3rd category	1st and 2nd category
health service and veterinary applications	4	140
industry	1	15
other applications (research etc.)	5	110
total	10	265

Table No. 3.1 indicates the number of workplaces with open radionuclide sources, i.e. workplaces with an occurrence of radioactive substances in a form, which does not exclude the possibility of dispersion of radionuclides at the workplace or their leakage to the environment. These sources are usually of a chemical preparation nature and not of a piece product; mostly they are radionuclides with a short half-life, so their current activity quickly changes over the course of time. The categorization of workplaces with open sources is stipulated by the Decree 307/2002 Coll. Table 3.1 does not include the above-mentioned workplaces with open radionuclide sources.

Table No. 3.2 indicates the number of sealed radionuclide sources, i.e. radioactive substances encapsulated and tested in such a way that under predictable conditions of the application, the dispersal of radionuclides at the workplace or their leakage to the environment are eliminated. Sealed radionuclide sources have piece character; except for calibrating sources they are not applied directly, but are fitted into respective devices (e.g. crack detection or logging sets). The number of particular sealed radionuclide sources is not identical to the number of facilities with sealed radionuclide sources – in practice such facilities can, either gradually or simultaneously, include more sealed radionuclide sources and not even in the same number (typical when using sealed radionuclide sources for radiotherapy, so-called Brach therapy).

Table No. 3.2. Facilities containing sealed radionuclide sources (URZ)

	URZ in facilities with important ionizing radiation sources	URZ in facilities with simple ionizing radiation sources
health service	746	0
industry and other applications	1,046	3,832
total	1,792	3,832

Table No. 3.3 indicates the number of radiation generators, i.e. facilities where ionizing radiation is generated only during operation, such as X-ray equipment. The radiation generators are (in compliance with their definition in Act 18/1997 Coll.) deemed only such facilities whose operation results in radiation of power exceeding 5

keV. If (such as e.g. X-ray diagnostic apparatus) the combination of one generator with several X-ray tubes is possible, the number of generators is stated.

Table No. 3.3. Radiation generators

	important ionizing radiation sources	simple ionizing radiation sources
health service and veterinary applications	2,769	4,132
industry	4	369
other application (research etc.)	5	215
total	2,778	4,716

Pursuant to Act 18/1997 Coll., the use of the minor sources does not require any permit, however their reporting to the State Office for Nuclear Safety is necessary. The total number of these recorded sources is nearly 160,000. Unimportant ionizing radiation sources are not even subject to the reporting duty, because the nature of these sources is not hazardous to health and environment; these sources are not even subject to state records.

Emergency cases

In 2003 the inspection of radiation protection division (outside of the area of nuclear facilities) reported and investigated 97 emergency cases related to ionizing radiation source management or activities resulting in exposure:

- 37 vehicle captures (railway wagons, trucks) transporting iron scrap; the vehicles were captured by measuring equipment at the entries into metallurgical works:
  - in 21 cases it involved the contamination with natural radionuclides (in particular Ra-226),
  - in 7 cases it involved the capture of materials contaminated with artificial radionuclides (in particular Co-60),
  - in one case it involved the capture of Cs-137 radionuclide source (see below); following the decision of the Inspection of the State Office for Nuclear Safety, contaminated materials were located, isolated or safely stored,
  - in 8 cases the contaminated load was return to the carrier outward.

- 46 captures of collective wagons with municipal waste at the entry into waste incinerating plants or trash disposal sites:
  - in 14 cases medical stores (diapers, etc.) contaminated with radionuclides used in therapy and diagnostics at nuclear medicine workplaces (Tc-99^{m}, In-111, I-131, Cr-51, etc.) were isolated,
  - in 24 cases objects (dials, electronic devices, fire detectors) or materials (uranium ore, uraninite) were found containing natural radionuclides (Ra-226, natural uranium),
  - in 1 case a level indicator containing the radionuclide source Cs-137 (see below) was secured,
  - 7 cases concerned capture of materials containing natural radionuclides (5 cases), false reports (cold municipal waste), capture of collective wagon which driver was examined in the nuclear medicine department and who had residual amount of radioactive substance in his body.
- 3 cases related to captures at the border crossings, when in 1 case the freight was released (zirconium ore), 1 case concerned false report and **1** case concerned contaminated component on captured vehicle (Co-60).
- 6 cases related to workplaces with ionizing radiation sources:
  - contamination at the workplace of nuclear medicine - unimportant, disposed in accordance with emergency instructions,
  - locating covers for radium needles (false alarm – empty covers),
  - level indicators sealing-in (with radionuclide source Co-60) with liquid steel at Třinecké železárny, a.s. due to power failure – equipment was repaired by authorized person, no damage to sources, no inadmissible exposure of persons occurred,
  - two losses of control over the radionuclide source (see below),
  - uncontrolled oxidation of depleted uranium occurred due to infringement of the operating instructions in the workplace of ÚJP Praha a.s., fire did not occur;
  - 5 cases related to another unplanned or inadmissible escape of radionuclides to the environment or management of ionizing radiation sources – finding old military engineering containing natural radionuclides (see below), finding fire detector (with Am-241) on the street, securing fissile material (see below); smelt contamination (Co-60 – however the activity of forged pieces did not

exceed escaping levels stipulated by Decree 307/2002 Coll.); load of metal waste returned from Netherlands (no increase in dose rate detected after re-measurement and the load was returned to the owner).

Only 6 of the mentioned 97 cases required a specific investigation performed by the radiation protection inspection:

- finding bulk of old military engineering (frost cover gauges and other instruments containing radionuclides) in former Czech Republic Army (AČR) storage facilities; contaminated material secured and disposed by person authorized thereto,
- securing fissile material by the Police of the Czech Republic; in cooperation with SÚJB inspection the material was analyzed (confirmed capture of natural uranium with total mass of 2831,02g) and stored at ÚJV Řež, a.s.; information on the capture was submitted to the database with events on illegal trade in nuclear materials and other ionizing radiation sources maintained by IAEA. The Police of the Czech Republic is still investigating the case;
- level indicator found and isolated in municipal waste (Cs-137, producer Tesla Liberec), source stored at VF Černá Hora, a.s., the Police of the Czech Republic and SÚJB inspection are still investigating the case,
- wagon with lead container containing source (Cs-137, producer Tesla Liberec) captured in ISPAT Nová Huť Ostrava, a.s., source serial number was not found, according to the producer the density meter supplied to sugar mills was involved, source is stored at ZAM-SERVIS Ostrava, s.r.o., the SÚJB inspection and the Police of the Czech Republic are still investigating the case,
- 2 losses of control over the source as a consequence of privatization and change of owner on the workplace in question:
  - thickness gauge in the wood-chips processing line – the source have not been found yet, administrative proceedings with former owners of the equipment was commenced, the SÚJB inspection and the Police of the Czech Republic are still investigating the case;
  - density meter in sugar mill, the source have not been found yet, administrative proceedings with the owner of sugar mill was commenced, the SÚJB inspection and the Police of the Czech Republic are still investigating the case.

The SÚJB radiation protection inspection recorded 38 emergency cases in Dukovany and Temelín NPPs; the inspection paid particular attention to five of them:

- Dukovany NPP - contamination of transport wagon during the CASTOR container transport due to infringement of the operating procedures (see Chapter 2); wagon decontaminated; neither exposure to persons nor escape to the environment occurred,
- two excesses of exposure reference level for employee – in the first case the personal dose of external exposure of 1.33 mSv was involved, in the second case the surface contamination (15 Bq/cm^2) of the employee was involved – in both cases the infringement of the operating procedures at Temelín NPP contractors was involved,
- exceeding reference level for outlets of noble gases through inner stack of Temelín NPP caused by improper process design of outlets' monitoring trace – corrective (engineering and organizational) actions were adopted – the outlets represented percentage fractions of permitted authorized annual limit,
- contamination of vehicle (semi-trailer) in reactor hall during the outage of Dukovany NPP Unit 3 – 14 corrective actions were adopted – neither inadmissible contamination of persons nor environment occurred.

Other recorded cases concerned minor failures of technology (leakage, damage to components – often in the course of tests being performed, followed by unimportant medium escapes to technological spaces intended therefor) or infringement of the operating procedures during repairs and inspections; all these cases did not affect radiation protection level; in addition, it involved captures of transport means containing natural radionuclides on inlets/outlets from NPP or even of employees, who took an examination at nuclear medicine department.

The above-mentioned overview of emergency cases does not list measuring system alarms at border crossings not requiring investigation of SÚJB inspection. The General Customs Directorate executed measurement by stationary measuring systems at border crossings (Mosty u Jablunkova, Bumbálka, Bartultovice, Horní Lideč – Střelná, Horní Lideč - Sidonie, Bylnice, Sudoměřice, Velká nad Veličkou, Rozvadov). The measuring procedures applied by the customs authorities in case of suspicion of capture of the sources of ionizing radiation, the substances contaminated with radionuclides or containing radionuclides were discussed with SÚJB and the measurement modes (recording and investigating levels) were

agreed. Each exceeding of recording levels is recorded by the customs authorities of the Czech Republic, particularly for the case of subsequent finding of freighter within the Czech Republic. SÚJB receives summarized information on exceeding of reference levels from border crossings every month. The detection systems are currently set fine, therefore most of the exceeding of recording levels was caused by legal transports of materials, substances and subjects containing natural radiation sources. The Regional Center Ostrava recorded on average 280 cases of exceeding of recording level a month, the Regional Center Brno recorded on average 60 cases of exceeding a month, new equipment was installed at border crossings within the competence of Regional Center Plzeň, where 270 cases of exceeding of recording level a month are recorded on average.

Permission of activities with ionizing radiation sources

Administrative activities of the State Office for Nuclear Safety in the field of radiation protection predominantly consist of issuing permits to manage ionizing radiation sources and permits to operate the 3rd or 4th category workplaces pursuant to Act 18/1997 Coll. This procedure concerns over 5,600 legal entities in the Czech Republic and most of them act in the field of health services.

In 2003, in association with the execution of state administration, the section of radiation protection issued a total of 3,467 decisions; of this number 3,096 decisions were issued by regional centers. A comparison of the total number of decisions issued in 2003 with previous years (7,555 decisions in 2002; 2,341 decisions in 2001; 2,381 decisions in 2000) shows that upon an increase in the requirements for issue of the permits in 2002 in connection with the amendment to Act 18/1997 Coll., effective from July 1st, 2002 the situation returns to routine state.

Inspection activities

In 2003, as in previous years, inspection activities were carried out through the combination of regional inspections (inspections of the Regional Centers of the State Office for Nuclear Safety) and specialized inspections (focused on specific types of ionizing radiation sources in the whole territory of the Czech Republic). This procedure was verified in past years as effective as well as the only one possible which that enables inspections to be carried out with a limited number of inspectors

participating also in extensive administrative activities of the Office and in other tasks as deemed by law, in observance of the necessary expert level of the inspections.

In accordance to the above-mentioned aspects the inspections are categorized as follows: inspections of SÚJB Regional Centers (hereinafter referred to as "RC") performed by inspectors of individual RCs in the territory of region in compliance with approved inspection plans, and specialized inspections carried out by Specialized Inspection Teams. The activity of Specialized Inspection Teams is focused on specific types of ionizing radiation sources and their workplaces where it is required to reach higher level of radiation protection practice integration in the whole territory of the state (e.g. nuclear medicine workplaces and workplaces with open radionuclide sources of 2nd and higher category, nuclear power, radiotherapy workplaces, etc.). This system of inspections is supplemented with inspections carried out *ad hoc* by formed inspection teams, particularly for difficult inspections (in terms of expended time and their subject matter) at the workplaces of 3rd and 4th category.

In 2003 the Internal Regulation VDS 043 "Planning, preparation, execution and evaluation of inspections in radiation protection" was revised, which unified the practice of execution and evaluation of inspections within the whole SÚJB as much as possible. Based on the experience and the most frequent failures, the four-degree evaluation system of the inspections was improved according to the following criteria:
Degree 1 - Only small defects were detected, failure to radiation protection requirements that do not impede safe performance of permitted activities resulting in exposure, without any further conditions.
Degree 2 – Serious defects detected, the inspected person can, under certain (supplementary) conditions (of mode), proceed with activities resulting in exposure.
Degree 3 – Defects detected that impede safe performance of activities resulting in exposure; some activity resulting in exposure must usually be limited or suspended until corrective measures are taken.
Degree N – Sufficient information is not available to evaluate the state; the inspection was not or could not be executed, or was not evaluated, e.g. due to insufficient background papers submitted by the inspected person, or termination of activities.

in the field of radiation protection, in 2003 a total of 1,526 inspections were carried, of which 1,248 inspections were executed directly by Regional Centers of the State

Office for Nuclear Safety. Remaining inspections were carried out by Specialized Inspection Teams (hereinafter referred to as "SIS") or by inspectors of individual departments. In the field of nuclear power a total of 81 inspections were performed. The scheduled inspections focused primarily on adherence to radiation protection requirements in the controlled areas on both NPPs, during services performed by NPP contractors, compliance with the approved documentation requirements, instruments designed to check conformity to the Limits and Conditions. Unscheduled inspections focused primarily on cases when the violation of radiation protection requirements (see above) could occur, or occurred. Two inspections were evaluated with degree 3 for NPP (non-adherence to the Limits and Conditions and contamination of transport canister), for NPP contractual organizations also 2 inspections were evaluated with degree 3 (non-compliance with mode measures). In the field of radioactive waste management 19 inspections were carried out, of which one was evaluated with degree 3 due to non-adherence to the Limits and Conditions of safe radioactive waste management. In the field of uranium and other mining activities, and old loads (within the competence of RC Kamenná) a total of 55 inspections were carried out focused primarily on compliance with mode measures in the workplaces and adherence to monitoring programs. No serious deficiencies were revealed in this field and all inspections were evaluated with degrees 1 or 2.

In comparison with the year 2002 (a total of 1,495 inspections) a slight increase in the number of inspections by approx. 2 % occurred in 2003, due to high number in administrative acts (tests of a special professional competence, renewal of the permit to manage ionizing radiation sources and approvals of documentation amended in conformity to new regulations) enforced by legislative changes executed in 2002, favorable data concerning inspection activities of the section of radiation protection.

Table 3.4. Evaluation results of inspections in the field of radiation protection in 2003

radiation protection area	number of inspections evaluated by degree (%)			
	1 or 2	3	N	total
artificial IR sources	1,109 (97.3)	17 (1.5)	14 (1.2)	1,140
natural IR sources	379 (98.2)	4 (1.0)	3 (0,8)	386
total	1,448 (97.5)	21 (1.4)	17 (1.1)	1,526

A comparison with the 2002 results (taking into account a change in evaluation in compliance with VDS 043) in the field of artificial ionizing radiation sources shows an improvement of the radiation protection level with the inspected entities - in 2002, 86.6% of the inspected entities were evaluated with degrees 1 or 2 in comparison with 97.3% in 2003. In the field of natural ionizing radiation sources, the situation is also improved than in 2002, when approx. 85% of inspected entities were evaluated with degrees 1 or 2, while in 2003 it was 98.2 %.

A cause of degree 3 evaluation with checked persons managing ionizing radiation sources is the absence of the permit issued pursuant to § 9 of the Atomic Act; the permit is issued to an entity which over the course of time changed form or was transformed into another entity (privatization process, change of owners, etc.). With manufacturers of building materials and water suppliers assuring public water supply, the most frequent reason for degree 3 evaluation is a violation of the duty stipulated by § 6 par. 3 of the Atomic Act, i.e. the duty to assure systematic measurement and evaluation of the content of natural radionuclides, to record the data and report to the State Office for Nuclear Safety.

In a total of 17 cases (i.e. less than 1.1 %) the inspection could not be carried out or evaluated (evaluation N), by reason of termination or non-performance of activities subject to inspection, or insufficient background papers for inspection evaluation.

Based on the inspection results, main attention in 2004 shall be paid especially:

- In the field of nuclear power – to the readiness of Temelín NPP units for routine operation and to adherence to legislative requirements with suppliers for both NPPs.
- In the field of uranium activities, old loads and mining activities – to the evaluation of the impact of radionuclide discharges to the environment and to compliance with approved monitoring programs.
- In the field of radioactive waste management – to the adherence to stipulated Limits and Conditions when managing radioactive waste and to the issue of solid subject discharge to the environment.
- In the field of nuclear medicine and open radionuclide sources – to personnel protection in connection with the adoption of methods with PET radionuclides and to compliance with Quality Assurance Programs.

- In the field of management of artificial sources of ionizing radiation – to the inspection of the entities executing the import, distribution, production and export of the ionizing radiation sources with stress on radionuclide sources, and to utilization of sealed radionuclide sources in industrial applications and on veterinary X-ray workplaces.

Personnel exposure control

Personnel exposure at workplaces with ionizing radiation sources in 2003 was monitored by five dosimetric services, currently existing and licensed by SÚJB – The Nationwide Service of Personal Dosimetry Praha, s.r.o., dosimetric services of NPPs Dukovany and Temelín, dosimetric service of the Nuclear Research Institute Řež, a.s., and dosimetric service of the State Institute for Nuclear, Chemical and Biological Protection that assures personnel monitoring in uranium-mining industry (Diamo, s.p.). The license was also issued to the Dosimetry Institute of Czech Academy of Sciences for the execution of dose calculations for the aviation personnel. A total of about 20,000 employees with ionizing radiation sources were monitored, as with every year. The doses of these employees are recorded in the Central Registry of Occupational Exposure kept by the State Office for Nuclear Safety. The preliminary evaluation of the doses shows the following:

- In Dukovany NPP in 2003 in total 2,016 employees were monitored (of this number 693 employees were the skeleton personnel of Dukovany NPP and 1,323 supplier employees), the cumulative collective effective dose was 0.90 Sv (including all doses exceeding 0.05 mSv) and an average personal effective dose 0.63 mSv, the highest yearly individual effective dose was detected with an employee of the supplier organization (15.11 mSv).
- In Temelín NPP in 2003 in total 1,691 employees were monitored (of this number 510 employees were the skeleton personnel of Temelín NPP and 1,181 supplier employees), the cumulative collective effective dose was 0.20 Sv (including all doses exceeding 0.10 mSv) and an average personal effective dose 0.12 mSv. The highest yearly individual effective dose was detected with an employee of ČEZ ETE company (5.64 mSv).
- In the uranium-mining industry, a total of 402 employees were monitored at the underground workplaces of GEAM Dolní Rožínka. The cumulative collective effective dose was 3.4 Sv, the average individual effective dose was 8.55 mSv.

The highest individual effective dose in 2003 was 28.97 mSv (underground); a total of 608 employees in the uranium-mining industry were monitored with a cumulative collective dose of 3.8 Sv.

- With other industrial applications, about 2,200 employees were monitored whose average individual effective dose, depending on their profession, ranged from 1 to 2 mSv; professions with higher doses are crack detection (1.5 mSv) and logging work (3.5mSv).
- At medical workplaces with ionizing radiation sources, doses were evaluated for almost 12,000 employees. Of this number, nearly 50% had a yearly individual effective dose below recording level, remaining employees showed an average yearly individual effective dose of 1.0 mSv; with certain professions the average yearly individual effective dose is higher as usual, e.g. with doctors. Cardiologists' ranged about 3.2 mSv.
- Specialized personnel such as service and inspections at the sources, personnel of approx. 960, achieved an average yearly individual effective dose of about 0.5 mSv.

The collective effective dose in 2003 was estimated at 14 Sv. The average yearly individual effective dose per single monitored employee was estimated at 0.7 mSv.

In 2002, Decree 419/2002 Coll., on personal radiation ID cards came into effect. This decree states that the "external personnel", i.e. the personnel of category A working on a contract basis in the controlled area of another operator, be equipped with a personal ID card. The radiation ID cards are to be issued and recorded by the Office. This decree will take effect in 2004. The system of personal radiation ID cards is to ensure a proper and complete evaluation of doses to external personnel, particularly personnel contracted for work in controlled areas of nuclear power plants. Based on the request from license holders, the Office issued 2,058 of the radiation ID cards in 2003.

In 2003 one case of single-shot exposure of personal dosimeters with doses exceeding 20 mSv was examined (for the relevant inspection period). Dosimetric services reported 6 cases when holders reported impersonal exposure of the dosimeters due to improper handling. This concerned in particular the personnel of companies involved in crack detection.

Within the evaluation of yearly doses in 2002 (the Central Registry processes annual data only in the 2nd quarter of the following year based on the data received from dosimetric services) 33 cases were detected in which the values of personal doses (in total) exceeded 20 mSv. Of this number 13 cases were personnel in the uranium mining industry, where inspection and control of personal doses is assured continuously and these doses are thus not re-examined. 18 cases in the health service field were re-examined; found data were reduced to attenuation with protective apron. One case in the field of crack detection was evaluated as impersonal dose. In general, crack detection ranks among the activities where personnel exposure is relatively high (an average dose is about 2 mSv); all the same, optimization procedures and subsequent technical measures must assure that individual doses of the personnel do not permanently move at the level of stipulated limits. This positive trend occurred in 2002 and is confirmed by the results from the Central Registry for 2003.

In accordance with an amendment to the regulations concerning radiation protection (Decree 307/2002 Coll.), expert workshops were held aimed to familiarize with legal regulations requirements, theoretical grounds and primarily measuring techniques. This launched subjects on the labor market – authorized dosimetric services – able to evaluate working activities with an increased exposure from natural sources. This involves or an increased presence of natural radionuclides, particularly in workplaces processing materials containing natural radionuclides, or operations with an increased air radon level for geological and ventilation reasons, e.g. caves, underground operations, or an increased cosmic radiation effect (air transport crews).

Inspection activity in this field is focused on inspection of the above-mentioned workplaces and on obligations to ensure measuring performed by an authorized dosimetric service. The activity of "measuring firms" is continuously monitored, possibly corrected according to demanding character of the assessed workplace as well as to the quality of measurement reports.

Control of population exposure from natural sources

The main effort made in reduction of population exposure was focused on the reduction of radon exposure in buildings that form a predominant part of the cumulative effective dose to which the Czech Republic's population is exposed. This component of personal exposure has a very wide range, and higher exposure levels are, based on experience of the past years, controllable with reasonably achievable cost.

The State Office for Nuclear Safety (directly or through the State Institute for Radiation Protection) also fulfilled the responsibilities in this area, stipulated primarily by the Czech Government Decree No. 970 dated October 7, 2002 on the Czech Radon Program:

- SÚJB in cooperation with assigned employees of regional offices and employees of the State Institute for Radiation Protection, proceeded with a target search for inhabitants residing in exceptionally high radon risk areas (the search statistics are always prepared for the entire previous calendar year),
- SÚJB used the database of the results of a target search procedure, which enables, in addition to usual outputs, processing the results in the form of a map to the level of particular municipalities. This enables one to forecast the expected radon exposure in a municipal housing stock,
- SÚJB through regional offices continuously reported the results of measurements carried out in houses and apartments through to the house owners, and if an increased risk is found, these owners are notified that they may apply for an allowance from the state budget for radon curative measures,
- SÚJB participated in the process of payment of grants for radon curative measures, developing the opinions for regional offices, in 2 school buildings and 13 water mains supplying drinking water determined for public supply (sanitation of 8 water mains was recommended and implemented, with 5 water mains the requests were found unreasonable),
- SÚJB in the granting process assured radon curative measures for house owners, besides opinions to the right to apply for a grant in terms of radiation risk, also opinions to adequate effectiveness of implemented curative measures, before the payment of grant.

- SÚJB cooperated with the Ministry of Finance on issue of Decree 107/2003 Coll. (including the Guideline dated June 20, 2003), according to which, in compliance with §§ 46a and 47 of Act 18/1997 Coll., as amended, and with the Government Decree No. 970 dated October 7, 2002 on the Czech Radon Program, the applications for allowance for radon curative measures are cleared.
- In cooperation with other sections new development and operational tasks as solutions to the Czech Radon Program were set along with solution monitoring and their fulfillment was evaluated; it concerned primarily new methodology for radon index evaluation of lands and research on new methods of radon measures in objects and water sources,
- The report was prepared as to the task fulfillment of the Czech Radon Program for 2003 and submitted to public.

Medical exposure

The technique of monitoring and evaluating population exposure from sources applied in medicine is dealt with, as in previous years, mostly in co-operation with the State Institute for Radiation Protection in the field of radio-diagnostics and the Teaching Hospital Olomouc in the field of nuclear medicine. The State Office for Nuclear Safety receives, from the General Health Insurance Company, data files on examinations using ionizing radiation sources. Based on this data it carries out statistical evaluations that serve to control medical exposure. In 2003 the solution of task of the field of science and research to prepare a detailed technique for the evaluation of doses in radio-diagnostics, also with regard to the instrumentation of particular workplaces was commenced.

As part of the harmonization of the law of the Czech Republic with the law of the European Union/European Community in the field of medical exposure (in particular Directive 97/43/EURATOM), repeated meetings were held between SÚJB representatives and the representatives of the Ministry of Health of the Czech Republic, committees of societies of the Czech Medical Society of J.E. Purkyně – the Radiological Society, Nuclear Medicine Society, the Society of Radiation Oncology, Biology and Physics, the Society of Radiological Laboratory Technicians and Assistants, the General Health Insurance Company and other health service institutions. The meetings dealt with reflection of this directive to the relevant "health

service regulations" in preparation (e.g. act on health service personnel education, the Health Care Act and implementing decrees).

In the Czech Ministry of Health Bulletin Section 11 from November 2003 the "Indicating Criteria for Image Theories" prepared for printing according to foreign copy (EU No. 118 Radiation Protection) by the staff of SÚJB and relevant expert companies associated in the Czech Medical Society of J.E. Purkyně were published. This met the requirement of Article 6, Paragraph (2) of the Directive 97/43 EURATOM to place this manual at the disposal of all physicians indicating radiological examination. Detailed information on these working papers was presented at the plenary of Science Advisory Board of the Czech Ministry of Health on December 15, 2003 together with the request for contribution from present representatives of branches of medicine to their effective implementation in daily medical practice.

The issue of medical exposure was discussed with the representatives of the health service branch at several expert workshops and special meetings. High attention was paid to the assessment of the teaching and practical training and placement of radiological physicists that will be, in compliance with the referred directive, assured in a higher number not only for the radiotherapy and nuclear medicine departments, but also for radio-diagnostic departments.

Employees of the State Office for Nuclear Safety are members of expert commissions of Czech Ministry of Health and Czech Medical Society of J.E. Purkyně, of which primarily the meetings of the Commission for breast tumors screening in 2003 were time-consuming and content-demanding, as well as the meetings of the Commission for allocation assessment of select sanitary engineering instruments. Another commission, in which the SÚJB representatives act, is the Commission for the assessment of occupational diseases and the joint Working Group of Radiological Physicists.

Medical aspects of radiation protection

In 2003 the State Office for Nuclear Safety assessed a total of 98 suspect cases of occupational disease, of which:

- With uranium mine personnel this concerned 75 cases of lung cancer and 17 cases of other diseases (twice skin basal cell carcinoma, three times malignant

lymphoma, chronic lymphatic leukemia, twice chronic myeloid leukemia, myeloproliferative syndrome, five times larynx cancer, twice epiglottis cancer and melanoma). With 28 cases of lung cancer, two cases of larynx cancer and both cases of skin basal cell carcinoma, the probability of causality between the disease and work in underground uranium mines was evaluated as predominant; with eight cases of lung cancer and one case of epiglottis cancer it was evaluated as boundary. In the other cases the connection between the disease and work in the ionizing radiation risk area was not proven.

- With the personnel of other jobs this concerned a total of six cases of evaluated diseases – four cases of lung cancer (two employees of uranium mine, service engineer of X-ray equipment and employee sent in 1986 for half-year to Kiev) and two cases of eczema (radiographers). Causality between the work in an ionizing radiation risk area and the disease was not proved in any case.

In 2003, SÚJB reacted to the initiation from the Confederation of Political Prisoners related primarily to the objectification of working conditions of political prisoners in the surface uranium mines in 1948 - 1960. The evaluation hitherto was based on results of measurement performed after 1960, which indicated relatively low exposure on surface workplaces. The documentation kept in the archive of s.p. Diamo, declassified in 2001, brought interesting results in this matter. Closer cooperation with the Directorate General of the Czech Prison Service and with eyewitnesses was entered to obtain as much available data on the work character and risk on surface workplaces as possible. The objectification of this risk in cooperation with the Confederation of Political Prisoners will continue in the future. The group of SÚJB employees, engaged in the assessment of suspect of occupational disease, visited, among others, the underground as well as surface workplaces of a.s. Diamo in Dolní Rožínka, and in order to reach higher quality in cooperation it called up several meetings with the representatives of the Society of Occupational Medicine and the Society of Occupational Diseases of the Czech Medical Society of J.E. Purkyně and other experts. In September 2003, some of the questions related to the above-mentioned problems were discussed with the representatives of both societies at the Congress of Occupational Medicine, held in Hradec Králové.

The dose estimate to the fetus as a result of diagnostic examination of the mother was measured in a total of 49 cases. In four cases this concerned examination within nuclear medicine examination. Only with one patient was a higher dose estimated (21.0 mSv), in eight cases the dose ranged from 5.0 to 10.0 mSv and in other cases it did not reach 5.0 mSv. The result was submitted – mostly within 24 hours – to the applicant, mostly the workplace that performed examination, or genetic consultation clinic.

In cooperation with the Czech Ministry of Health the system of rendering assistance and special medical assistance to persons irradiated during radiation accidents continued to be assured. Service regulations and proposals for equipment of four "Special Health Care Centers" were assessed, which is to be published soon in the Czech Ministry of Health Bulletin. The discussion with the Czech Ministry of Health on the way of iodine prevention for the territory of the Czech Republic outside the area of emergency planning was initiated. The health service section (“traumatology plan“) of the on-site emergency plan of Dukovany and Temelín NPPs and off-site emergency plan of Temelín NPP was assessed.

Central registers and databases formed in radiation protection

Over the course of 1997 - 2003 the State Office for Nuclear Safety developed management tools for the state records systems as stipulated by Act 18/1997 Coll. (the Atomic Act). This concerns the central evidence (registers) of professional exposures, ionizing radiation sources, license holders, and the reporting entities and population exposure in the application of ionizing radiation sources in medicine as well as population exposure due to natural radiation sources.

Central Registry of Occupational Exposure (CRPO)

This registry is presently fully and routinely utilized at the workplace of the State Office for Nuclear Safety in Prague. The registry includes data processing tools from particular suppliers designed for updating their own database. The registry enables information retrieval on recorded personnel, collective information sorted by particular workplaces or professional groups, and collective information in summary statistical outputs according to selected parameters. The records are kept in compliance with

legislative requirements for personal data protection. In 2003 the records were extended with the records of radiation ID cards issued to external personnel.

Registry of Ionizing Radiation Sources (RZIZ)

Since 2000 this application has routinely operated and it is accessible to the Regional Centers of the State Office for Nuclear Safety. It enables the retrieval and display of historical data on recorded sources and includes administrative tools of the scope of separate sealed radionuclide sources, as well as the facilities containing the sources and ionizing radiation generators. It is continuing to develop, and the registry will also include the records and evaluation of long-term stability tests. The data required from license holders into the state record system are the subject of the annex to Decree 307/2002 Coll. The State Office for Nuclear Safety distributes registration cards of particular types of the sources for reporting purposes. From 2002, those holders permitted to import, export, distribute and produce sources have been under obligation to send the summaries of the sources distributed by them to the State Office for Nuclear Safety twice a year. These summaries are subsequently used to inspect the completeness of the central records of ionizing radiation sources. From 2002, data from the registry of sources concerning the location of radionuclide sources have also been provided for the purposes of the Rescue Fire Brigade. In 2003, data on workplaces with open ionizing radiation sources were added to the records.

Registry of License Holders and Reporting Entities

In 2000 implementation commenced of the Registry of License Holders and Reporting Entities as an integrating tool of the registries operating at the State Office for Nuclear Safety. The Central Registry of Occupational Exposure and the Registry of Ionizing Radiation Sources are connected to the Registry of License Holders and Reporting Entities as are the Registry of Nuclear Materials and the Registry of Decisions. In 2003 the Registry of the data on executed inspections was completed – *Registry of Inspections*.

Central Database of Medical Exposure (CDLE)

This database contains data provided by the General Health Insurance Company based on the application of the State Office for Nuclear Safety and is kept separately without a link to the above registers. The processing of the data provided by the General Health Insurance Company makes it possible to detect frequencies of particular types of examinations in the fields of X-ray diagnostics and nuclear

medicine for selected age groups of patients and also depending on their sex. In case of nuclear medicine, the quantity of applied pharmaceutical can be assigned to each examination. The last period of processed data is 1998 -1999. The data are anonymous as per persons and workplaces.

Radioactive waste management

DUKOVANY NUCLEAR POWER PLANT

After the approval of ČEZ, a.s. company request – Dukovany NPP was approved the change in the Limits and Conditions of safe radioactive waste management. The reconstruction of pipeline traces for transport of liquid radioactive waste was permitted.

Temelín Nuclear Power Plant

Based on the detection that Temelín NPP exceeded the Limits and Conditions of radioactive waste management – unavailability of electric power reserve for air-conditioning in the premises for radioactive waste management, SÚJB issued a decision of corrective action. The time schedule of corrective actions proposed by the operator is met (confirmed by the inspection).

The State Office for Nuclear Safety approved the Limits and Conditions of radioactive waste management based on submitted safety analyses.

Nuclear facility – repository Dukovany

Requirements for safe radioactive waste management in the repository Dukovany stipulated by the Limits and Conditions of safe operation are met.

Nuclear facility – radioactive waste repository Richard and repository Bratrství

Based on the requirement of the Administration of Radioactive Waste Repositories, the positive assessment of submitted documentation required by Act 18/1997 Coll., and performed inspections, SÚJB granted a permit to operate the repository Richard and the repository Bratrství. At the same time the Office approved the Limits and Conditions of safe operation, Quality Assurance Program, Monitoring Program, On-Site Emergency Plan and Decommissioning Method Proposal for this repository. Based on the above-mentioned the State Office for Nuclear Safety permitted radioactive waste management to the Administration of Radioactive Waste

Repositories through placement to the repository Richard and the repository Bratrství.

Other workplaces

Based on the request from ÚJP PRAHA a.s., the State Office for Nuclear Safety approved, in its relevant decision, change to the Limits & Conditions of safe radioactive waste management related to canister for gathering of waste.

SÚJB permitted the reconstruction of former workplace for preparation of ^{226}Ra sources used in medicine in the premises of radioactive waste repository Richard.

Based on the submission of required documentation, its positive assessment and following inspections the State Office for Nuclear Safety granted a permit to manage radioactive waste in the premises of ČEZ, a.s. – Dukovany NPP to WADE, a.s., based on the contract concluded between these two subjects.
New Limits & Conditions for safe radioactive waste management were approved for the company ZAM-SERVIS, s.r.o.

Discharge of radionuclides to the environment

In 2003, the State Office for Nuclear Safety paid attention to monitoring of gaseous and liquid effluents from nuclear power plants to the environment. In 2003, the total gaseous effluents with both power plants were lower than 1% of authorized limits. The authorized limits for effluents to streams for 2003 were drawn approx. from one third at Dukovany NPP and from two thirds at Temelín NPP.

In the course of the year the corresponding documentation of Dukovany NPP – the Effluents Monitoring Program and the Environment Monitoring Program, was updated.

Decommissioning of Nuclear Facilities

Dukovany Nuclear Power Plant

Based on a positive assessment of submitted documentation, the State Office for Nuclear Safety in its decision of June 18, 2003 approved the proposal for the method of decommissioning Dukovany NPP, on condition that the next proposal for the method of decommissioning, which is ČEZ, Inc. - Dukovany NPP obliged to submit once in five years at least, will include the comments contained in the annex to this decision. The conditions relate primarily to modification in the time schedule for

decommissioning in response to the termination of operation in accordance to individual decommissioning options, elaboration of data on financial costs of individual decommissioning options, as well as final solution for ion exchangers and sludge within the scope of radioactive waste management.

LVR-15 research reactor at ÚJV Řež

The State Office for Nuclear Safety approved an updated proposal of the method of LVR-15 research nuclear reactor decommissioning to ÚJV Řež, a.s. The approval is based on a positive assessment of submitted documentation modified in compliance with SÚJB comments. The estimate of costs of decommissioning verified by the Administration of Radioactive Waste Repositories was submitted together with the proposal of method. The updated proposal of nuclear facility decommissioning includes several independent objects and it was submitted as a postponed decommissioning in three stages, when the time delay between the preparation stage and the liquidation stage is considered to be 10 years. During this time delay, the premises of nuclear facility will be closed safely using safeguards against unauthorized discharge of radionuclides to the environment.

LR-0 research reactor

Based on a positive assessment of updated documentation and a request from the operator ÚJV Řež, a.s., the State Office for Nuclear Safety approved, by its decision, the proposal of method of LR-0 research nuclear reactor decommissioning. The estimate of costs of decommissioning verified by the Administration of Radioactive Waste Repositories was submitted together with the proposal of method.

High-Level Waste Storage Facility at ÚJV Řež

As part of the decision for the permit to reconstruct the High-Level Waste Storage Facility (VAO), the State Office for Nuclear Safety approved the document containing proposal of the method of decommissioning the reconstructed VAO.

Radioactive Waste Repository "Richard"

Based on a positive assessment, the State Office for Nuclear Safety approved the updated proposal of the method of decommissioning (closing) radioactive waste repository submitted by the Administration of Radioactive Waste Repositories. An independent documentation, which included an updated estimate of costs of

decommissioning, was submitted together with the proposal. The proposed method of decommissioning this nuclear facility was presented as one-stage decommissioning, during which time the stored waste remain accessible and its transport to the repository will comply with the conditions for storage acceptability.

Other workplaces

As part of the issue of operational permit, the State Office for Nuclear Safety approved the proposal of the method of decommissioning radio-pharmaceutical section of PET Centra Praha required by ÚJV Řež, a.s.

5. EMERGENCY PREPAREDNESS

5.1 State Surveillance of Emergency Preparedness

In 2003, the continuous preparedness of the entire emergency organization of emergency response was ensured at Dukovany and Temelín NPPs, when the preparedness of the whole shift of the organization personnel was checked in 40 cases of exercise at Dukovany NPP and in 54 cases of exercise at Temelín NPP. The exercises reached the success rate of 100% at Dukovany NPP and 99,8% at Temelín NPP.

In 2003, in compliance with approved criteria in the on-site emergency plan, no emergency event was classified at Dukovany NPP. There was one event classified, for technological causes, as an emergency event of 1 degree in compliance with the on-site emergency plan occurred at Temelín NPP in 2003. The extraordinary event on Unit 1 occurred on February 4, 2003; all activities, to cope this extraordinary event, were in compliance with the on-site emergency plan and relevant operating procedures. The staff of technical support center was mobilized and the event got under control in approx. 2 hours. The information was communicated to the State Office for Nuclear Safety in conformity to Decree 318/2002 Coll.

In compliance with the relevant activity plans, both nuclear power plants carried out both the call of shift emergency headquarters and exercises, or drills of specified

activities. Thus, there were 13 partial and 2 cooperation emergency exercises at Dukovany NPP, and 5 emergency exercises at Temelín NPP.

Both nuclear power plants conducted check of technical resources' functionality, as well as verification of emergency preparedness in compliance with the requirements of Decree 318/2002 Coll., and on-site emergency plans. In 2003, the training on emergency preparedness stipulated by Decree 318/2002 Coll. was held, i.e. it concerned primarily basic training on personnel and contractors preparedness and periodic training for shift engineers, shift personnel, members of emergency organization of emergency response and members of shelter teams.

For the purpose of assessing the state of emergency preparedness of nuclear installations and other workplaces, the Emergency Response Center (hereinafter referred to as KKC) performed a total of 24 inspections in 2003; five of them were conducted at Dukovany NPP, two at Temelín NPP, three at the workplaces of the Radioactive Waste Repository Authority, three at the workplaces of the Nuclear Research Institute(ÚJV) Řež, a.s., one at the Nuclear Engineering Faculty of Czech Technical University and nine inspections, in cooperation with the relevant Regional Centers of SÚJB, were performed at the workplaces with ionizing radiation sources. Five inspections of the total number of inspections performed were executed in emergency exercises – two at the workplace of ÚJV Řež, a.s., two at the Administration of Radioactive Waste Repositories and one at ČEZ, a.s. – Dukovany NPP. It was found that the emergency preparedness at the inspected workplaces is in compliance with the relevant provisions of Act 18/1997 Coll.

In 2003, the Office assessed and approved changes to on-site emergency plans: ČEZ, a.s. – Dukovany NPP, ČEZ, a.s. – Temelín NPP (both approvals were executed upon prior discussion of the relations to relevant off-site emergency plan), Nuclear Research Institute Řež, a.s., (both for the entire premises and for 7 workplaces of partial operations), ÚJP Praha, a.s., SÚRAO-ÚRAO Dukovany (Radioactive Waste Repository Authority - Radioactive Waste Repository), repositories Richard (2 changes) and Bratrství, the Nuclear Engineering Faculty of Czech Technical University – VR-1 training reactor, DIAMO, s. p. – workplaces of all branches, WADE a.s. – workplace at Dukovany NPP and at the Radioactive Waste Repository Dukovany, SORAD, s.r.o., Léčebné lázně Jáchymov, a.s. , and Bioster, a.s.

Based on the requirement from the Regional Directorate of Fire Rescue Brigade in České Budějovice, the Emergency Response Center assessed and processed the approach to the plan of particular activities included in the off-site emergency plan for Temelín NPP and to the proposal for the general public protection brochure. The State Office for Nuclear Safety through the KKC actively participated in all meetings and work related to updating the provisions of off-site emergency plan for the Emergency Planning Zone of Temelín NPP, to which the State Office for Nuclear Safety was invited.

5.2 Emergency Management

In connection with the termination of district offices, the problems concerning the population protection in the Emergency Planning Zone in case of radiation accident began to relate to the regional offices and to the municipal offices with extended competency, in whose territory the Emergency Planning Zone is located. Thus in January 2003 the State Office for Nuclear Safety organized for the authorities located in both emergency Planning Zones, in cooperation with the Regional Office of the South Bohemia (Czech Republic), the Regional Office of the Vysočina Region and ČEZ, a.s., meetings, on which the present representatives of territorial state administration were informed of SÚJB competence in the field of emergency preparedness, of work organization and technical assurance of activities of the Crisis Headquarters of the State Office For Nuclear Safety, of implementation of radiation protection in the Emergency Planning Zone, of assurance of emergency preparedness at both nuclear power plants and of mission and contents of on-site and off-site emergency plans of both power plants.

The KKC which, by virtue of Act No. 240/2000 Coll. as amended, serves as the crisis management workplace, assures among others the technical and organizational support to the Crisis Headquarters of the State Office for Nuclear Safety. In 2003, the workplace of Contact Point of the Czech Republic was equipped with a new system for receiving and sending messages, some program applications designed for the activity of the Crisis Headquarters of SÚJB were innovated and the workplace of the Crisis Headquarters of SÚJB was equipped with audiovisual conference Equipment. The Mobile Groups of SÚJB department were equipped with crisis mobile phones. In the course of the year, the agreed data transmissions from both nuclear power plants

were realized, and the database for data storage from Temelín NPP was audited. A direct data transmission from the Czech Hydrometeorological Institute (CHMI) continued.

In the course of 2003 the Crisis Headquarters of the State Office for Nuclear Safety participated in emergency exercises and partial drills, respectively in April to response to the exercise held at Dukovany NPP and in November to the exercise CME/CMX 2003 of the crisis management bodies of EU and NATO. The partial drills of the Crisis Headquarters were conducted according to the scenario drawn up by the KKC in order to adopt the instructions of individual members of the Crisis Headquarters and the organizational relations within the Headquarters were practiced namely. In response to the experience obtained during the above-mentioned exercises and drills, the instructions of members of the Crisis Headquarters were continuously amended. The familiarization proceeded with a new technical equipment dedicated for the needs of the Crisis Headquarters and with the relevant instructions and the individual preparation of members of the expert groups of the Crisis Headquarters commenced in order to master the program applications available in the KKC for the needs of the Crisis Headquarters.

The work on particular sections of the crisis plan of the State Office for Nuclear Safety continued, in particular the issue of the Radiation Monitoring Network (RMS) was developed and a back-up workplace of the State Office for Nuclear Safety. At the end of 2003, an updated staffing of the Crisis Headquarters was approved following the evaluation of the existing planning system and performance of shifts of the Crisis Headquarters.

The representatives of the State Office for Nuclear Safety participated in the work of the Central Crisis Headquarters, and the staff of the KKC actively participated in the work within the relevant crisis management bodies of the Czech Republic (in particular within the Civil Emergency Planning Committee and its ad hoc expert working groups as well as in the expert working groups of Ministry of Defense). The cooperation among many documents proceeded in preparation concerning crisis management of the Czech Republic. The KKC, in cooperation with the Department of Interior - General Directorate of Fire Rescue Brigade of the Czech Republic, developed a Type Plan for radiation accidents.

In compliance with the Agreement on Cooperation made between the State Office for Nuclear Safety and the Department of Interior - General Directorate of Fire Rescue Brigade of the Czech Republic on assurance of the transmission and receipt of information in case of the occurrence of extraordinary events important in terms of nuclear safety and radiation protection within the territory of the Czech Republic and abroad and on operational security of the National Warning Point of the Czech Republic by the operational and information center of the Department of Interior - General Directorate of Fire Rescue Brigade of the Czech Republic, the cooperation between both departments continued. The performance of the Agreement on Cooperation between the CHMI and the State Office for Nuclear Safety on transmission and receipt of information security in case of the occurrence of extraordinary events important in terms of nuclear safety and radiation protection within the territory of the Czech Republic and abroad was assured correspondingly. SÚJB, in cooperation with the Fire Rescue Brigade of Prague, took part in the preparation process of students, within the conceptual framework of education in the field of human protection in case of extraordinary events.

The activities also proceeded in the field of international cooperation; the representatives of SÚJB participated in both international meetings of the users of program EU RODOS and in the training of the users as well as the meetings concerning system EU ECURIE. The integration into system ENATOM (the system of the International Atomic Energy Agency designed for the transmission of information on occurrence of radiation incident or accident and on the requirements for assurance of the relevant assistance) continued.

6. ACTIVITIES OF THE COUNTRYWIDE RADIATION MONITORING NETWORK IN THE CZECH REPUBLIC

6.1 Management of the Radiation Monitoring Network

The State Office for Nuclear Safety, pursuant to the Government Decree 478/2001 Coll. adopting document ”Assurance and renewal of the countrywide radiation monitoring network“, continued in works on this renewal and assurance of activities in 2003. The General Contracts were drawn up with individual departments stipulated in Section 46 of Act 18/1997 Coll., as amended, i.e. with the Ministry of Finance,

Department of Interior, Department of Agriculture and Department of the Environment. The preliminary works were commenced to prepare contracts implementing the General Contracts, with individual specified organizations, which ensure activities of RMS components outside the SÚJB department. Concurrently with this activity, the RMS methodologies were drawn up and approved, which will be, in part, discussed and submitted to the components participating in the activities within RMS.

In April 2003, within the preparation, the emergency exercise of SÚJB mobile team was held under the coordination of the Emergency Response Center, which is the workplace that manages the activity of RMS of the Czech Republic in a normal radiation situation. In October, in cooperation with the Department of Interior – Rescue Fire Brigade Headquarters of the Czech Republic, four-day instructional-methodical employment of the mobile teams incorporated in RMS and Integrated Safety System took place. Total of 9 mobile teams participated in the exercise in April. The Crisis Staff of SÚJB managed their activities in the field. Part of this exercise was an assessment of the capabilities of members of the Crisis Staff of SÚJB in the ad hoc management of activities of the mobile teams in the field. All 14 mobile teams participated in the exercise in November (3 mobile teams from SÚJB, 5 mobile teams from the Department of Interior – Rescue Fire Brigade Headquarters of the Czech Republic, 1 mobile team from the Department of Interior – the Police of the Czech Republic and 5 mobile teams from the Ministry of Finance – GŘC). The exercise aimed to implement the monitoring in the emergency Planning Zone and in case of findings or captures of the ionizing radiation sources, and to ensure necessary related cooperation with the employees managing the activities of mobile teams in the field. SÚJB also verified the activity of the Regional Crisis Staff of SÚJB, as a body located near the affected territory and operationally managing the activities of mobile teams and continuously evaluating obtained results.

6.2 Radiation Situation in the Territory of the Czech Republic

The radiation situation in the Czech Republic is monitored in the scope of RMS assignments, the function and organization of which is confirmed in the Edict 319/2002 Coll., from June 13, 2002. RMS operates in two modes; in a normal mode, which concentrates on monitoring in a normal radiation situation and in emergency

mode, which the RMS uses during radiation emergency situation. The RMS permanent staff continuously ensures the normal mode. In the emergency mode the emergency staff works as well. During the normal radiation situation, monitoring is performed by several subsystems:

- An Early Warning System (SVZ) consisting of 54 measuring points with automated transfer of measured values (Fig. 1). Their operation is ensured by the SÚJB Regional Centers (RC), SÚRO, the Czech Institute for Hydrometeorology (ČHMÚ) and the CR Rescue Fire Brigade (HZS);
- A network of 14 permanent stations of the Army of the Czech Republic (the number is valid by the end of 2003), which performed PFDE one-shot measurements twice a day in the normal radiation situation and sent the results into a RMS central database regularly;
- A territorial network (TLD network) of 184 measuring points located in the territory of the Czech Republic operated by SÚRO and SÚJB Regional Centers;
- TLD local networks with 21 measuring points in the area surrounding Dukovany NPP and Temelín NPP operated by SÚRO and relevant SÚJB Regional Centers;
- TLD local networks with 92 measuring points in the area surrounding Dukovany NPP and Temelín NPP operated partly by the Laboratories for Environment Radiation Monitoring (LRKO) of nuclear power plants and partly by SÚRO and relevant SÚJB Regional Centers;
- A territorial network of 8 measuring points of air contamination (MMKO) operated by SÚJB Regional Centers, SÚRO and the National Authority for Nuclear, Chemical and Biological Protection (SÚCHJBO);
- MMKO local networks operated by LRKO of NPP: one station is operated in the premises of Dukovany NPP and 5 stations in the surrounding area; one station is operated in the premises of Temelín NPP and 6 stations in the surrounding area and one reserve station;
- A 9 laboratory network (laboratories in SÚJB Regional Centers, Dukovany NPP LRKO, Temelín NPP LRKO and SÚRO laboratories) most of which are equipped for both qualitative and quantitative analyses of radionuclides content in samples from the environment (aerosols, fallouts, foodstuff, drinking water, feed, etc.) using the spectrometry alpha, beta, gamma, or using the radiochemical analyses.

- The mobile team (SÚRO, RC SÚJB, the Department of Interior and the Ministry of Finance, Dukovany NPP and Temelín NPP operators) is a significant part of the Radiation Monitoring Network.

The monitoring results are submitted, as every year, in the Annual Report on the Radiation Situation on the territory of the Czech Republic and SÚRO web pages (www.suro.cz); the monitoring results for the year 2003 will be published and reproduced during the first term of the year 2004 in the same way.

6.3 Artificial Radionuclide Monitoring in the Environment

Attention is paid to the artificial radionuclides, out of which the following occur in measurable values and are monitored by the RMS: ^{137}Cs, ^{90}Sr, $^{239+240}$Pu, ^{85}Kr, ^{14}C, ^{3}H in the air, ^{137}Cs, ^{90}Sr, ^{3}H in foodstuffs and ^{137}Cs in the human body.

Air Contamination

There were no significant deviations in the artificial radionuclide content in the air during the year 2003, or in the previous period. The activity concentration of the radionuclide ^{137}Cs in aerosol, which comes mainly from the higher levels of the atmosphere and from the resuspension of the original fallout on the ground surface, remain, for several years, of μBq/m^3 at most. A part of the ^{137}Cs activity in the air is from the global fallout from nuclear weapon tests in the atmosphere and another part from the Chernobyl NPP accident.

Besides the ^{137}Cs the ^{7}Be also occurs in aerosols, which is of cosmogenic origin, and the ^{210}Pb, which is the product of the ^{222}Rn transformation. As an example, the time course of the monthly mean activity concentration of ^{137}Cs, ^{7}Be and ^{210}Pb in the air aerosol in the way it has been monitored since 1986 at MMKO SÚRO in Prague (Fig. 6.1). The long-term, currently very slow, decrease of the activity concentration of ^{137}Cs and also seasonal variation of the content of ^{7}Be during the year is apparent. The weekly mean values of the ^{137}Cs activity concentration measured at MMKO in Prague in the year 2003 are shown in Fig. 6.2.

Monitoring of ^{85}Kr has been included in the system of monitoring of the radionuclide content in the air performed by RMS in the year 1996. This element is one of the fission products and it occurs also in small amounts in the effluents from nuclear

power plants. However the main sources of ^{85}Kr are plants for nuclear fuel reprocessing and nuclear warfare tests in the past. The time course of the activity concentration of ^{85}Kr since the year 1986 is shown on Fig. 6.3

Fig.6.1. Monthly mean values of selected radionuclide activity concentration in the air aerosol - MMKO SÚRO in Prague

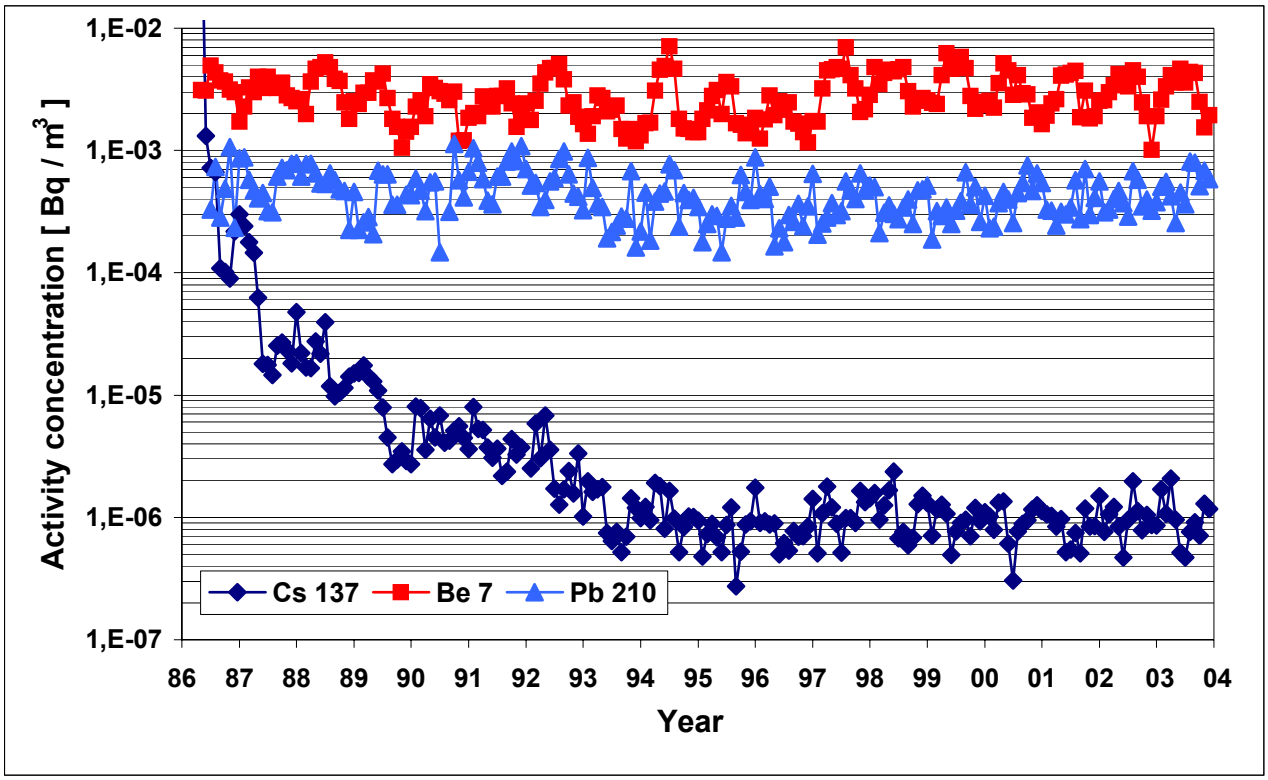


Fig.6.2. Weekly values of the activity concentration of ^{137}Cs in the air aerosol in 2003

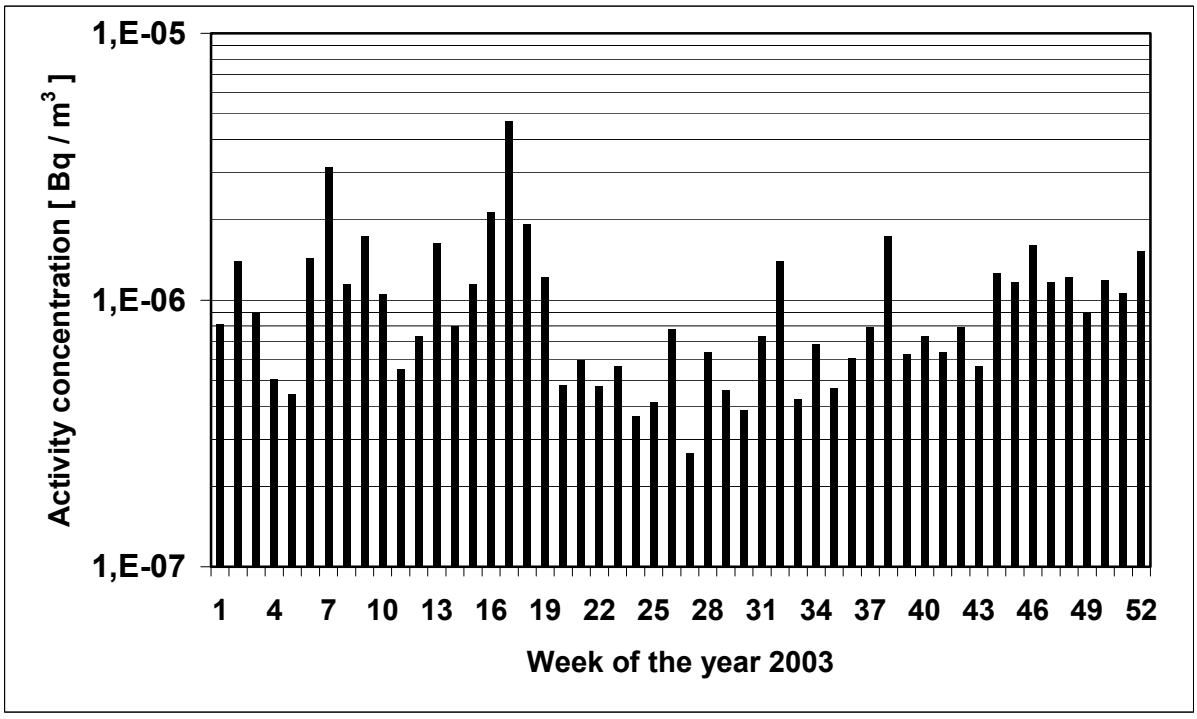
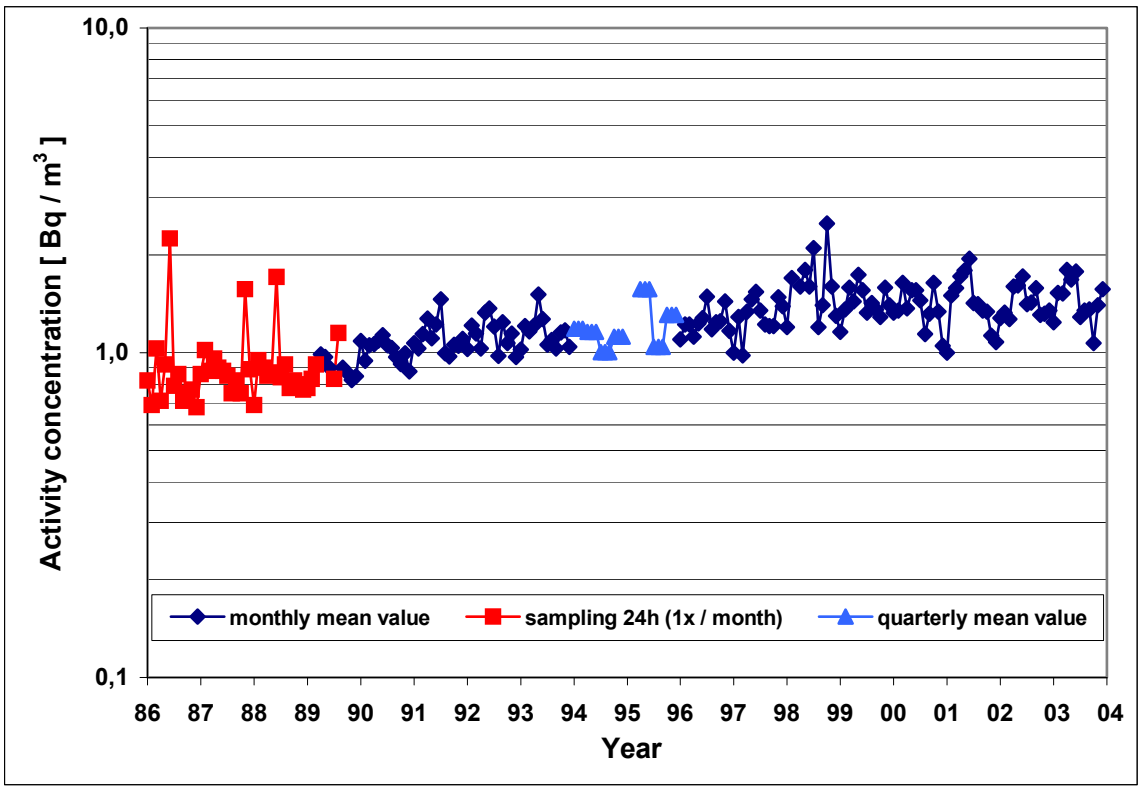


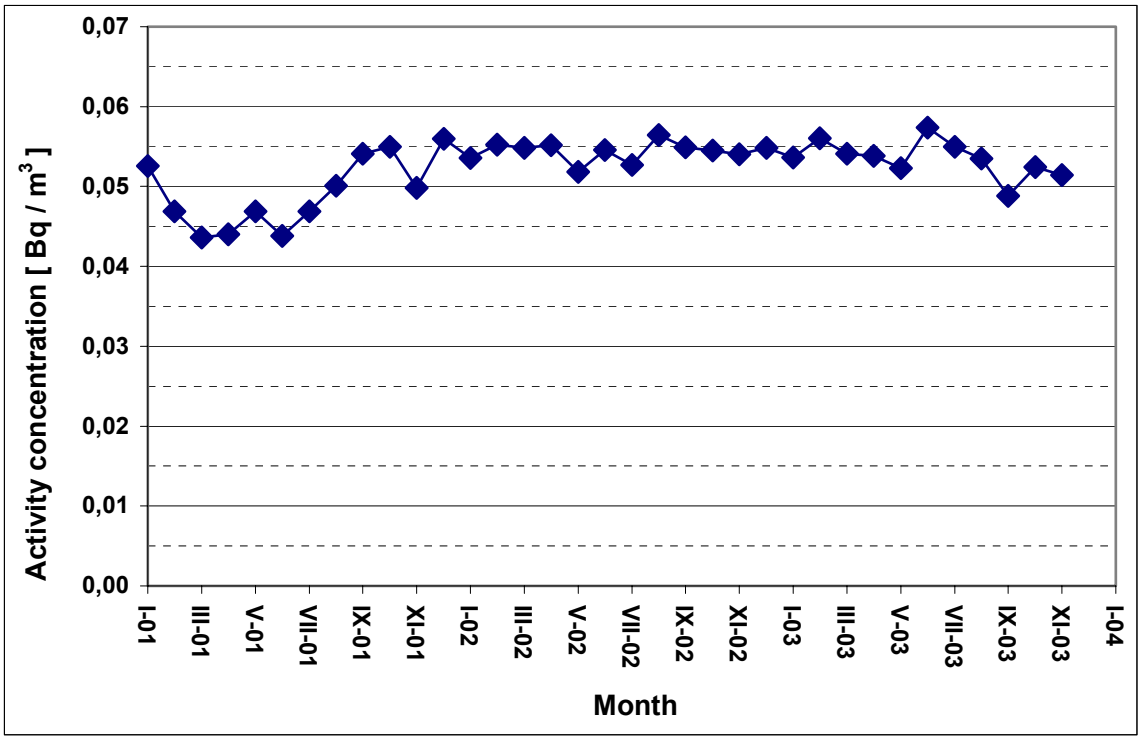
Fig. 6.3. Activity concentration of ^{85}Kr in the air, MMKO in Prague



Another radionuclide included in the air routine monitoring in 2001 is carbon 14. Its natural balanced concentration in the atmosphere, in which it is continuously generated under the action of cosmic radiation neutron component on nitrogen atmospheric, was increased by 80% due to nuclear weapon tests in the middle of 1960s. Its content was lowered primarily under the action of deposition in the ocean sediments and currently it does not exceed the natural value for more than 10%. Currently, nuclear-power facilities are primarily the sources of anthropogenic ^{14}C, where it is activated in nuclear reactors. The activity of ^{14}C in the form of CO_2 is shown on the Figure 6.4 as it has been determined since 2001 at the Radiation dosimetry department at ÚJF AV ČR. Other forms of carbon in the air are insignificant.

Foodstuff contamination with radionuclides is monitored in accordance with the long-term monitoring plan. The individual commodities are chosen in accordance with their consumption. Forasmuch as there was no emergency event in the year 2003 which would cause an increase in the radionuclide content in the environment, no increase of foodstuff contamination with such substances occurred.

Fig. 6.4. Activity concentration of ^{14}C in the air in the form of CO_2, MMKO in Prague



The activity mass or concentration of ^{137}Cs in some basic foodstuffs - milk, beef and pork - is in hundredths to tenths of Bq/kg, or of Bq/l. The activity concentrations of ^{137}Cs and ^{90}Sr in drinking water are even lower (tenths to ones of mBq/l), possibly under the detectable limit. The tritium content in drinking water is in ones of Bq/l and is systematically decreasing over the years in the long term.

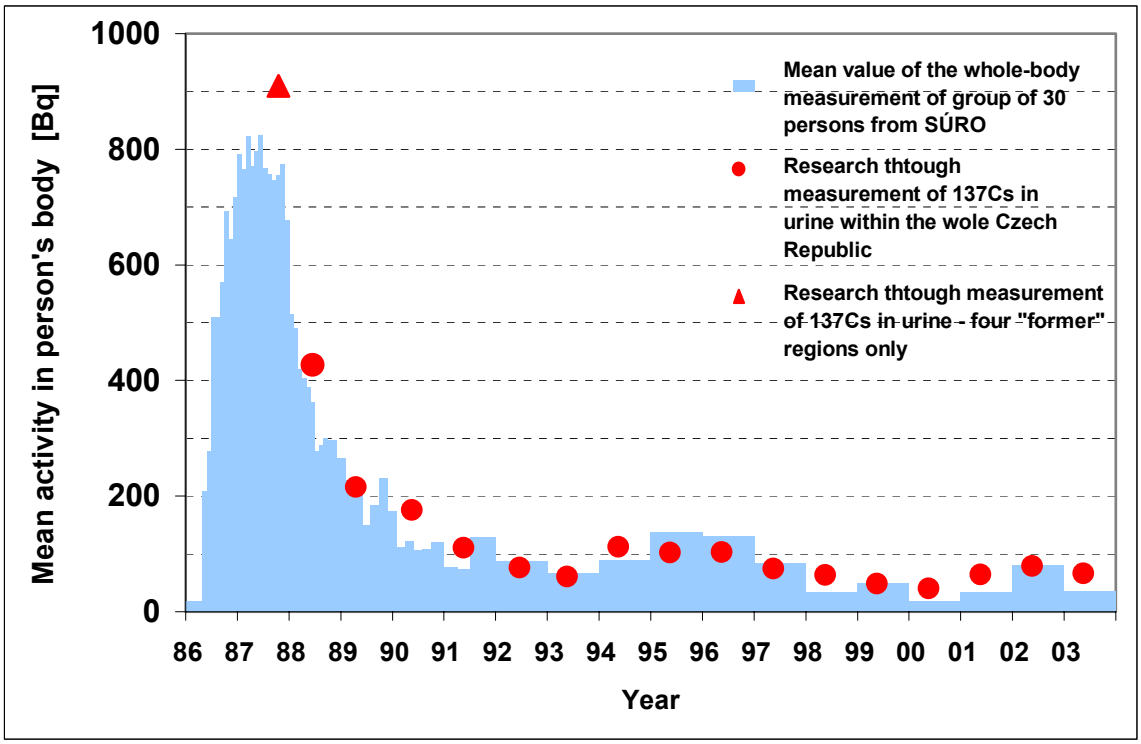
Relatively higher content of ^{137}Cs against other foodstuffs is being monitored in mushrooms, forest fruits and wild animal meat. The values of activity mass of ^{137}Cs in these products reach ones to hundredths of Bq/kg. The decrease of ^{137}Cs activity is very slow in these products; it is given by the ecosystem. With respect to relatively higher activity of these products, the contribution to the total committed effective dose from ^{137}Cs ingestion is, in spite of their low consumption, higher (in comparison to other types of foodstuffs); however in comparison to the exposure from natural resources completely insignificant (less than 0,1%).

Human Internal Contamination

As in previous years, the monitoring of ^{137}Cs internal contamination in persons' bodies continued on the SÚRO whole-body counter in Prague. The group of 30 persons (15 men, 15 women) participated in the monitoring in the year 2003, mainly

Prague inhabitants in the age between 22 and 63 years. With respect to the very low content of ^{137}Cs in the Czech population, the whole-body measurement is performed once a year only, while a long measurement period is used to reach the lowest limit of detectability. Based on these measurements, the mean activity of ^{137}Cs in the body of one person was determined 35 Bq. The statewide survey was performed as in previous years to ascertain the internal contamination of ^{137}Cs through the measurement of the ^{137}Cs activity excreted in urine in 24 hours. The samples were taken in May to June 2003 from 39 women and 32 men in total, who roughly represent the Czech population with their food habits. The mean value of the ^{137}Cs activity, excreted in urine in 24 hours, was 0,41 Bq and the recalculated mean content (retention) of ^{137}Cs activity in the body corresponding to it was 66 Bq. The measurement of ^{137}Cs activity, excreted in urine in 24 hours, has been performed on a long-term basis with the group of 17 persons (4 women, 13 men) from the North Moravia, who consume, in an increased quantity, wild animal meat and forest fruits, in particular mushrooms. The mean value of the ^{137}Cs activity, excreted in urine in 24 hours, was 4,0 Bq with this group, which corresponds to the retention 660 Bq (see Fig.6.5).

Fig. 6.5 The development of ^{137}Cs content for the Czech population after the accident in Chernobyl



Monitoring of External Exposure

Monitoring through TL dosimeters network

The results of monitoring from the TLD networks for 2003 are given in the table 1. The several-years measurements within these networks confirm their capability to record possible significant deviations from the normal situation in a given locality.

Table 1 Quarterly means of H_x [nSv/hod] photon dose equivalent rate and their standard deviations *s* [%] measured in 2003 by the TLD

Territorial TLD network				
Area Station	Prague SÚRO	Middle Bohemia SÚRO	South Bohemia SÚRO/RC Č. Budějovice	West Bohemia SÚRO/RC Plzeň
Number of MB	13	25	30	25
	$H_x \pm s$	$H_x \pm s$	$H_x \pm s$	$H_x \pm s$
I/03	119 ± 12	131 ± 29	141 ± 17	119 ± 20
II/03	111 ± 9	128 ± 27	150 ± 14	126 ± 17
III/03	125 ± 11	132 ± 27	157 ± 15	139 ± 17
IV/03	126 ± 11	136 ± 25	156 ± 14	132 ± 18
Area Station	North Bohemia SÚRO/RC Ústí nad Labem	East Bohemia SÚRO/RC Hradec Králové	South Moravia SÚRO/RC Brno	North Moravia SÚRO/RC Ostrava
Number of MB	23	21	26	21
	$H_x \pm s$	$H_x \pm s$	$H_x \pm s$	$H_x \pm s$
I/03	114 ± 29	117 ± 32	115 ± 16	100 ± 19
II/03	112 ± 29	115 ± 32	125 ± 17	118 ± 10
III/03	127 ± 25	123 ± 23	129 ± 15	113 ± 12
IV/03	120 ± 28	122 ± 20	128 ± 18	115 ± 12

Local TLD networks		
Area	Area surrounding Dukovany NPP	Area surrounding Temelín NPP
Station	SÚRO/RC Brno	SÚRO/RC Č. Budějovice
Number of MB	12	9
	$H_x \pm s$	$H_x \pm s$
I/03	115 ± 19	138 ± 9
II/03	115 ± 19	129 ± 8
III/03	129 ± 20	152 ± 8
IV/03	122 ± 19	132 ± 8

Notes: when specifying the station the SÚRO/RC items indicate that the SÚRO is performing the measurements and results evaluation, RC ensures the dosimeters distribution and transport (MB – monitoring point)

Monitoring through the Early Warning System

The measurement of dose equivalent rate runs continuously in the SVZ, mean values are measured in 10 minutes. The acquired values are put into the RMS information system central database every hour; this is done from 9 measuring points placed in RC SÚJB and in SÚRO, and from 38 measuring points on the ČHMÚ centers. If necessary the intervals for data transmission are shortened to a half-hour. Data from 7 SVZ measuring points operated by the Rescue Fire Brigade are transmitted through the GPRS mobile network operators.

Data transmitted from measuring points to the centers are continuously processed and evaluated; should the adjusted photon dose equivalent rate (PFDE) values level be exceeded, the SVZ center duty employee is immediately informed. This employee then evaluates the radiation situation and if the measured values can be justified neither by the fluctuations of the natural background, nor by the technical fault of the instrument, nor by the fault of the measuring point operator, he notifies the Crisis Staff of SÚJB of the possible emergency. Upon authorization, the data are released on SÚRO web pages and handed over abroad.

7. ACTIVITIES IN THE FIELD OF INSPECTION OF THE ADHERENCE TO THE BAN ON CHEMICAL AND BIOLOGICAL WARFARE

Since 2000 SÚJB, as the central organ of the Civil Service, has been guaranteeing assignments resulting from the Chemical Weapons Convention (hereinafter only CWC) as well as the assignment resulting from the Bacteriological and Toxin Weapons Convention (hereinafter only BTWC) since the year 2001 SÚJB.

Following the terrorist attack in New York on September 11, 2001, the significance of the Office's work in this field was increased in order to prevent possible unauthorized use of chemical and biological means by terrorist organizations. In particular, the

cooperation increased among the Department of Interior – Rescue Fire Brigade (HZS), Ministry of Defense and Ministry of Health and the specialists involved more in the Crisis Staff and their working groups. SÚJB specialists participated primarily in preparation of analytic materials; how to face potential chemical and biological threats.

A number of provisions were in 2003 assured with the State Institute for Nuclear, Chemical and Biological Protection (SÚJCHBO), which was personally and technically equipped to better fulfill primarily the assignments of fast detection of biological agents. With this view, a number of expert opinions were developed in 2003 and first long-term research tasks from the field of detection and protection were commenced, in solution of which the high Czech specialists participate.

7.1 Guaranteeing Assignments Resulting from the CWC

In 2003, activities in this field were focused on traditional assignments as a surveillance of adherence to the Act No. 19/1997 Coll., on some precautions related to the prohibition of chemical warfare and the CWC, and on assignments resulting from the 1st Assessment Conference of the Organization for Prohibition of Chemical Warfare (OPCW), from the presidency of the Czech Republic in the Executive Council of the OPCW and from a significant participation of the Czech Republic in international activities of the OPCW in 2003.

Thirty-six organizations submitted declarations of their activities for the year 2002 to SÚJB on January 31, 2003. These are organizations that work with the specified substances or they produce particular organic substances subject to CWC. In addition to these data, the data of the import and export of specified substances were included in the declaration of overall national data of past activities of the Czech Republic in 2002, according to 96 licenses granted by the License Office of the Ministry of Industry and Trade. Furthermore, the declarations of 2 plants that handle 3 substances of the List no. 3 in 3 operations, declarations of these 3 operations and declarations of 11 plants producing particular organic substances in 44 operations were included into the declarations for the Czech Republic. Data of selected chemical substances from two organizations and for three operations were included into the declaration of planned activities for 2004.

During the year the specification of data from previous declarations among OPCW, the Czech Republic and other contracting states of CWC continued. In the course of specifications and inspections carried out by the Office, it was found out that determined chemical substances of the List 2B were imported to the Czech Republic as parts of textile materials finish agents in order to reduce flammability. The foreign companies did not state in their documentation (by reason of the security of their product compositions) the fact that their products contain substances subject to the inspection of import and export according to CWC. In addition, the found differences resulted from non-uniform implementation of CWC in the field of overall national data in individual contracting states.

In 2003, the Office's employees carried out total of 43 inspections, of which 3 were unscheduled, or plants' exceptional inspections (one inspection will be completed in 2004). Except for two cases, the inspection results corresponded with the data reported by the plants in question. To prevent the cases of unmonitored imports supplementary information was processed and released on SÚJB web page in order to inform potential organizations in question and to eliminate the import of monitored chemical substances without license. Furthermore, the OPCW was requested to adopt the provisions for the producers and exporters of chemical substances and agents subject to the CWC monitoring to state in their business and technical documentation the product compositions and warning that the monitored goods is concerned. No OPCW international inspection took place in the Czech Republic in 2003.

7.2 Guaranteeing Assignments Resulting from the BTWC

To strengthen the confidence the BTWC contracting states should, on voluntary basis, send information related to implementation of this convention to UN Headquarters every year by April 15. The Czech Republic honors this commitment absolutely. The declaration for 2002 was developed in cooperation with the Ministry of Health and it was sent via MZV to UN Headquarters in New York in March 2003. This declaration included information of infectious illness occurrence on the territory of the Czech Republic, of publication activity, of the release of research results and their usage, of organized conferences, and of vaccine production equipment. To implement the Act No. 281/2001 Coll., on some provisions related to the prohibition

of bacteriological (biological) and toxin weapons and of modification in the Trades Licensing Act, the State Office for Nuclear Safety created a full group of its own specialists. Three of them passed the inspectorial examinations and the Office commenced its own inspection activity in the second half of the year. Total of 12 inspections was carried out, during which one case of the violation of Act No. 281/2002 Coll. – management of determined highly risk biological agents and toxins without a license granted by the Office was found.

8. INTERNATIONAL COOPERATION

In 2003, the concentration as well as the scope proceeded significantly in the field of international relationships. The forthcoming accession of the Czech Republic to the European Union more or less influenced most of the main international SÚJB activities.

Of course, within the framework of the international cooperation of SÚJB, the stress remained putting on fulfillment of commitments resulting for the Czech Republic from the international contracts concluded within the Office force and on maintenance and further development of bilateral agreements with the partner organizations. The State Office for Nuclear Safety proceeded in the coordination of international technical cooperation in the scope of its force, in particular in relation to IAEA, where the Office provides, in accordance with relevant provisions of the Atomic Act, expert cooperation with IAEA incorporated in the UN expert agencies system. In September 2003, SÚJB Chair was elected to a Vice-President of the Board of Governors for the Eastern European regional group for the second year of two-year mandate in this IAEA authority.

In accordance with the Government Decree the State Office for Nuclear Safety newly adopted, in the field of international relationships, an expert question for the working group of the EU Council for nuclear affairs. Following the signature of the Accession Treaty, the Office's experts have begun to participate in individual meetings under this working group with the observer statute. At the same time, the State Office for Nuclear Safety participated fully in the activities within the framework of the Western European Nuclear Regulators Association (WENRA). However, the accession to the

EU requires changes in the approach to participation of the State Office for Nuclear Safety, or the Czech Republic, in the work of international organizations, such as IAEA or OPCW, as well as in the approach to bilateral relationships. In addition, the completion of the Czech Republic position changeover is concerned, from the recipient of a technical support (IAEA projects, PHARE, bilateral support) to a position of country able to fully meet its needs and to provide, within its resources, expert and financial support to developing countries. Particularly, the right support from the Czech Republic side could currently bring significant internationally political effect for considerably low price, no matter it concerns problems related to strengthening of the international control over nonproliferation of nuclear, biological and chemical weapons, or the support to particular countries in the improvement of nuclear safety and radiation protection level.

SÚJB continued in its active participation in the implementation of the results of negotiations between the Prime Ministers of Austria and the Czech Republic, which concluded in Brussels in December 2001 with the attendance of EC commissioner, Mr. Verheugen.

Bilateral cooperation

As concerns bilateral cooperation, one of the SÚJB's important long-term priorities is cooperation with neighboring countries, i.e. with Germany, Slovakia, Austria and Poland. The Office maintains its close cooperation with Hungary and Slovenia. Another bilateral cooperation was begun in the last period with the European Union countries and states with a significant program of the peaceful utilization of nuclear energy and ionizing radiation, such as France, the United States of America, Japan or the Russian Federation and the Ukraine.

Federal Republic of Germany

An annual meeting organized in accordance with the Agreement on modification of common ground questions related to nuclear safety and protection against radiation between the CSSR government and Federal Republic of Germany government was held in Dukovany in October. In addition to usual subjects related to new legislation and to events occurring at power plant, the discussion following the previous agreement was conducted on inspection activities in nuclear facilities and on

operation safety indicators used both by the operator and by the regulators. In conclusion, German colleagues gave credit for both the state of Dukovany NPP and the level of SÚJB surveillance activity. Additional cooperation will be developed in the fields of operation safety indicators and solution of eventual non-standard situations at nuclear power plants. Within the scope of next annual bilateral meeting, the German side will demonstrate, in reciprocal way, an approach to the modernization of older units and particular methods of surveillance at nuclear facilities.

Austria

An annual meeting organized in accordance with the Intergovernmental Agreement of modification of common ground questions in the field of nuclear power usage was held in Vienna this year. Besides the usual program, the meeting included a discussion on hitherto fulfillment of conclusions resulting from negotiations of Prime Ministers of Austria and the Czech Republic in Brussels in 2001, which means fulfillment of the "Melk process". In conclusion, both delegations agreed that the main objective, which was an improvement of transparency and mutual trust, was maintained in the last year. One technical visit of the Research Center in Seibersdorf took place within the scope of the program of annual bilateral meeting. Experts from both countries made use of this visit for discussion on number of expert themes linked to decommissioning of nuclear facilities or nuclear waste disposal and storage. The Czech side highly evaluated the level of nuclear center and its expert background.

In the field of nuclear safety, radiation protection and emergency preparedness the time schedule for fulfillment of the negotiations of Prime Ministers of both governments in Brussels for 2003 contained three main items. The Czech side conducted two expert seminars for the Austrian specialists on the subject of:

- procedures for solution of emergency situations in Temelín NPP, and
- determination of seismic load of Temelín NPP.

Third subject of common activities in 2003 was to complete already commenced activities of the working group addressing primarily the questions of emergency preparedness. In conclusion of all actions, both sides stated that the main objective determined in the conclusions from the negotiations of Prime Ministers of both governments in Brussels in December 2001 was fulfilled. However, the Austrian side

reserved consideration to return to any of the themes within the scope of bilateral contacts.

During the year the negotiations on renewal of existing Intergovernmental Agreement in nuclear field proceeded.

France

In 2003, the cooperation with France continued within the scope of selected multilateral projects, in particular within the framework of PHARE program organized by EC. The most important project was the safety evaluation of VVER 440/213 reactors suppression system completed in 2003 (for details see the part describing PHARE program).

Slovakia

The cooperation between SÚJB and the Slovak Office for Nuclear Inspection continued in 2003 as well, especially on an informal basis and its focus consisted of consultations over common ground themes and submission of technical information. The regular bilateral meeting was held in Jaslovské Bohunice in October. A visit of local nuclear power plant was conducted within the scope of the bilateral meeting. The discussion within the scope of annual bilateral meeting, in addition to regular program, focused on safety aspects (consequences) of significant changes made to the organizational structure with the operator of nuclear facilities and assessment of the option of common inspections. Informal cooperation was also effective during coordination of both countries' participation in IAEA work or within the scope of PHARE projects.

The United States of America

In 2003, the cooperation with US Inspection in nuclear safety consisted primarily in the common work of experts on multilateral projects. Worth mentioning is for example common support of programs for improvement of safety of the Armenian Medzamor Nuclear Power Plant, common work of experts in user groups of calculation programs for nuclear power plants safety analyses, and last but not least, the cooperation in a new project established under IAEA and dealing with the aspects of long-term operation of nuclear power plant units. A significant event recently, in cooperation with regulators of both countries, was three-day visit of United States Nuclear Regulatory Commission (US NRC) Chairman, Mr. Diaz, in the Czech Republic. With

his collaborators he visited both Czech nuclear power plants. The visit was primarily working visit and the visit program enabled the guests from USA to evaluate the operation culture of nuclear power plants in the Czech Republic, as well as informal discussion on expert themes being currently solved by both partner organizations. The common ground is certainly the problems related to long-term operation of nuclear power plant units, monitoring the life span of important components, as well as the problems linked to market liberalization and operators' behavior in new economic conditions.

Russian Federation

The cooperation between the Czech regulators and the Russian regulators proceeds within the scope of the Intergovernmental Agreement between the Czech Republic and Russian Federation on cooperation in the field of nuclear power use. The cooperation focused, as in previous years, on working level, particularly in participation in multilateral projects both under IAEA and regulators' association of countries operating VVER reactors. Short visit of SÚJB Chairperson in the Russian Federation enabled to assess the cooperation of surveillance organizations. During this visit the SÚJB Chairperson, accompanied by the Russian regulator's chairman, visited the fabrication plant of fuel assemblies for Dukovany NPP. Both sides agreed that medium-term objective shall be intensification of bilaterally beneficial cooperation suppressed unreasonably in 1990s. Experienced specialist from the Russian regulator participates in activities of SÚJB Chairperson Advisory Board for the nuclear safety field.

Hungary

The regular bilateral meeting was held within the scope of IAEA General Conference. Besides usual questions, the course of event on the system for fuel assemblies' chemical treatment in Paks NPP was discussed at the meeting. Informal cooperation in international projects both within IAEA and PHARE was effective. The Hungarian side proposed common bilateral meetings of regulators of the Czech Republic, Hungary, Slovakia and Slovenia. This idea was generally accepted and the first meeting will be held in the Czech Republic in March 2004.

Multilateral cooperation

In addition to cooperation with international organizations such as International Atomic Energy Agency (IAEA), Organization for the Prohibition of Chemical Weapons (OPCW), Organization for Economic Cooperation and Development / Nuclear Energy Agency (OECD/NEA) and the secretariat of Organization for Comprehensive Test Ban Treaty (CTBTO) Preparatory Committee, the development of contacts with the European Commission and its consultative authorities and the participation in working groups of the EU Council come under the category of SÚJB multilateral relationships. A significant step in the multilateral field was also the completion of full involvement of SÚJB specialists in the Western European Nuclear Regulators Association (WENRA) activities commenced in 2000.

International Atomic Energy Agency (IAEA)

The expert cooperation with IAEA remains SÚJB priority within the field of multilateral international relationships. SÚJB assured the Czech representatives' participation in IAEA consultative authority activities, technical committees and expert groups meetings. In addition, it participated and still cooperates in creation of standards and recommendations, which IAEA issues for the peaceful utilization of nuclear energy and ionizing radiation. These standards and recommendations are, in most countries, the base for national regulations. SÚJB cooperates with IEAE during the inspection of non-proliferation and in the field of technical measures within the scope of fight against terrorism. SÚJB uses the biennial functional period (2002-2004), in which the Czech Republic was elected as a non-permanent member of the Board of Governors for East European group, in the cooperation with other involved departments to strengthen our position in the peaceful utilization of nuclear energy. SÚJB Chair, who was appointed to governorial function for the Czech Republic, was elected to be one of three Vice-president of the Board of Governors in September 2003. Performance of this function could not be provided without significant support of MZV and in particular of the Czech Republic Permanent Mission at international organizations in Vienna.

One of the most significant services that IAEA provides to member states is an independent appraisal of various aspects related to nuclear safety and radiation protection assurance. IAEA provides this assistance on request of the member

states, in particular by dispatch of inspection team with representative international participation. The inspection team always works according to a resolutely determined methodology and with clearly determined assessment criteria. In 2003, six different missions were carried out in the Czech Republic. In 2003, three teams operated in Temelín NPP focused on:

- assessment of probabilistic safety analyses developed for Temelín NPP (mission IPSART - International Probabilistic Safety Assessment Review Team),
- assessment of methodology for seismic risk determination for Temelín NPP and relevant documentation,
- evaluation of fulfillment of OSART mission recommendations from 2002, which assessed Temelín NPP operation safety level (Follow-up OSART - Operational Safety Review Team).

Two expert groups conducted a comprehensive assessment of LVR-15 research reactor safety in ÚJV Řež within the scope of Pre-INSARR and INSARR (Integrated Safety Assessment of Research Reactors) missions. In 2003, sixth international group of experts under IAEA assessed the fulfillment of OSART mission recommendations from 2002 in Dukovany NPP. Based on conclusions developed by members of IAEA individual missions for assessed areas, SÚJB observed significantly high correspondence with its own evaluation. In general, SÚJB considers independent peer reviews as a significant tool in the nuclear safety and radiation protection system in nuclear facilities operated in the Czech Republic. In correspondence with operators, this element will remain significant part of the above-mentioned system.

Another of the IAEA activity pillars is and organization of a Program for technical cooperation in the field of peaceful utilization of nuclear energy. In conformity to the Atomic Act, SÚJB fulfills the role of coordinator of this program in the Czech Republic. The program is divided into the national part (specific for each member country, approved usually for biennial cycles) and regional part (more countries participate, mostly planned in quadrennial cycles).

The Czech Republic in cooperation with IAEA currently organizes the following "national" projects:

- **CZR/2/003** – *Strengthening the Analytical Laboratory at the National Physics Institute* (new project) – strengthening of ÚJF AV Czech analytic laboratories including instrumental equipment, increasing analytic service effectiveness based on techniques using neutron and ion beams bundle in ÚJV Řež analytic laboratories and the implementation of new, now inaccessible, analytic methods. As a consequence of floods in 2002, the project commencement was one year delayed and its implementation was extended for the next biennial period 2005-2006;

- **CZR/4/009** – *Evaluation of Radiation Damage Attenuation in WWER Reactor Pressure Vessel and Core Internals* (enlargement of the previous project from the 2001-2002 cycle) – study of radiation damage of nuclear power reactor vessel including an expert system for evaluation of in-core constructional material properties and behavior in great fluxes. This project part was terminated and the project was enlarged for the period 2003-4 for spectrometric methods application for characterization of neutron and γ fields and pro for spectrometric finding of radionuclides emitting α-radiation in cooling water to improve the LVR-15 reactor operating reliability and safety;

- **CZR/4/010** – *Automatic Data Acquisition and Evaluation System for Research Reactor* (continuation of the previous project from the 2001-2002 cycle) – system for the automation of operating and experimental data acquisition and modification including their evaluation on academic VR-1 reactor, increasing quality and grade of training of specialists from nuclear power plants and ČVUT-FJFI students in experimental reactor physics, nuclear facilities operation and nuclear safety and radiation protection.

- **CZR/9/015** – *Enhancing Regulatory Body Assessment Capabilities* (new project) – strengthening of SÚJB capacity and possibilities for expert appraisal of safety questions, performing safety missions and training of SÚJB, Dukovany NPP and Temelín NPP personnel. All above-mentioned safety missions in both nuclear power plants, as well as LVR-15 research reactor in ÚJV Řež were conducted within the scope of the project.

At the end of 2003, the proposal for new "national" project was submitted to IAEA for the period 2005 – 2006, titled *Safety, self-reliance and sustainability of national nuclear institutions.* This project aims to contribute to the improvement of self-

sufficiency and sustainability of nuclear program in the Czech Republic. The project is focused on the support of education of younger specialists in the wide spectrum of fields, from nuclear technologies to nuclear medicine. Parts of the project are primarily scientific visits, training and scholarships of our employees conducted abroad and expert missions of foreign specialists in our country. Within the scope of the project, a training course shall be organized in the field of nuclear safety, or radiation protection and an expert seminar on quality assurance in radiation oncology, radiology and nuclear medicine.

SÚJB and other Czech institutions assisted in the organization of many international activities within the "regional" part of the Program for technical cooperation organized by IAEA during the year 2003. Six expert seminars were held in the Czech Republic in the past period focused primarily on problems related to the evaluation of nuclear facilities operation safety. More than 80 experts from the Czech Republic participated in other activities (conferences, sessions, seminars, training courses) organized within the regional part of Program for IAEA technical cooperation, focused in particular on the safety of power plants with VVER reactors, radiation protection and emergency preparedness. Questions related to the fight against terrorism and nonproliferation became a topical problem.

With the completion of necessary technical and organizational changes with nuclear facility operators and progressive consolidation of legal and surveillance framework for nuclear area, the Czech Republic was forced from the second half of 1990s to change its approach to use of technical cooperation with IAEA, as well as with the European Union and bilateral partners. In case of IAEA, SÚJB as a coordinator of technical cooperation with this organization changed gradually, in conformity to other departments involved, the cooperation individual programs so that our country acts not only as a recipient of help, but also as a country contributing to the projects of other member countries. In 2000, the Czech Republic reached the perfect contributor statute, when it provided more help than it received. Another objective is to obtain by 2005 the position of grantor for the Czech Republic within IAEA that is self-efficient in most parameters and provides technical support to member states that need this support. Nevertheless, the grantor provides this support in the structure and volume corresponding to facilities and in accordance with its foreign-political interests. A

significant stimulus for completion of the entire process is also forthcoming membership of the Czech Republic in the European Union. In SÚJB opinion, current position of the Czech Republic on the international level requires self-confident approach in the field of utilization of nuclear energy with a stress put on self-efficiency and willingness to share the experience, as appropriate. In addition, the right support from the Czech Republic side could currently bring significant internationally political effect for considerably low price.

Currently the Czech Republic contributes to technical cooperation within IAEA activities on three following levels:

- regular contribution to the fund for technical cooperation program (CZK 4.288 mil. drawn from SÚJB's budget last year),
- special financial support from the Czech Republic development aid fund for selected projects within the scope of IAEA technical cooperation program (CZK 3.399 mil. last year),
- special contributions to selected programs financed outside of IAEA basic budget (approx. CZK 0.6 mil. was concerned last year for the IAEA fight against terrorism program fund drawn from the MZV budget).

As regards the contribution from the Czech Republic development aid, the voluntary contribution was in 2003 distributed among the following projects within the scope of IAEA technical cooperation program:

- *ARM4/004- Strengthening of In-Service Inspection through Modern Non-destructive Testing Methods* aimed to improve the life span of safety significant piping systems and the overall safety of Medzamor NPP in Armenia. Financial support in the amount of CZK 1.5 mil. was extended within the scope of this project.
- *RER/9/058 - Safety Review of Research Reactor Facilities,* through which services in the amount of CZK 0.9 mil. were provided to Uzbekistan in order to improve the operational reliability and safety of experimental reactor in Tashkent.
- *RER/4/024 - Improvement of Primary Circuit Component Integrity,* in scope of which specialists from ÚJV Řež advised (on the basis of parameters

measurement) Záporoží nuclear power plant in Ukraine on how to change chemical mode and increase thus nuclear power plant life span (CZK 0.6 mil.).

- *RER/9/065 - Development of Technical Capabilities for Sustainable Radiation and Waste Safety,* through which the Czech Republic contributed Moldavia CZK 0.4 mil. to ensure radiation protection with a stress put on medical applications.

Technical and financial support through IAEA to three projects in the countries of former Soviet Union is proposed for 2004 from the Czech Republic international development aid budget. This concerns continuation in support of Medzamor NPP safety improvement program in Armenia in the amount of CZK 1.45 mil. and improvement of Záporoží NPP safety in Ukraine in the amount of CZK 0.6 mil. New aid is planned in order to assure radiation protection with a stress put on medical exposures. This aid is directed to Kazakhstan under regional project *RAW/9/008 - National Regulatory Control and Occupational Radiation Protection Programs* in the amount of CZK 0.5 mil.

Total special support provided to IAEA projects from the Czech Republic development aid budget is less for this year than it was in 2003, and the amount is CZK 2.55 mil. According to MZV information, the special support to IAEA anti-terrorist program drawn from the budget of this department will be this year on approximately same level and it will amount to CZK 1 mil. Contrary to previous years, SÚJB proposes to increase the special contribution (in addition to regular contribution to the technical cooperation fund) for selected projects of technical aid drawn from its budget in the amount of CZK 4.155 mil. The objective is, as mentioned above, to include our country to the group of grantors, which corresponds to internationally political position of the Czech Republic, in particular as a member of EU and OECD. This involves specifically the support to selected five projects. The first project is the RER/9/069 regional project aimed to acquire, digitize and systemize engineering solutions for the most important nodes of nuclear power plants. Within the scope of this project, the involved subjects will be enabled to access the knowledge base of nuclear reactors' designers within the former Soviet Union. The project is led and implemented mostly by team of specialists from the Nuclear Research Institute in Řež. The contribution in the amount of CZK 0.95 mil. is proposed for this project. The second project proposed

for the support from the Czech Republic side relates to nuclear reactors' operation with respect to prolongation of their life span and to the permit to operate the nuclear reactors at the expiration of originally planned life span. A number of regions participate in this project from the countries operating VVER reactors, as well as the United States of America, Finland and Sweden. The contribution in the amount of CZK 0.250 mil. is aimed particularly to send the signal of our interest in the above-mentioned problems. The third project (RER/9/076) was originally concerned with nuclear safety only in terms of fuel. In addition, the integrated surveillance program was included in this project. This program enables to monitor damage to the nuclear reactor pressure vessel caused by operation (temperature changes, neutron flows), using the samples in nuclear reactor pressure vessel as well as per analogism using the analyses of samples exposed in reactor under similar conditions. Regulators in the United States of America approved similar procedure. The project will support the safety of nuclear facilities in Ukraine; the samples will produce and analyze ÚJV Řež. Total support proposed for this project amounts to CZK 1.2 mil. Another program proposed for the contribution is the "IAEA special safety fund". The contribution provided in the amount of CZK 0.54 mil. will help to improve physical safety of nuclear facilities and materials. The last program but one proposed to the support is IAEA project aimed to establish radiation protection infrastructure in the countries of former Soviet Union. The amount of CZK 0.39 mil. is proposed for this project. The last portion of the total amount (CZK 4.155 mil.) is proposed for the partnership in "national" projects of the Czech Republic.

SÚJB continued, as in previous years, within multilateral technical cooperation with IAEA in the expert and organizational provision of scholarship stays and short scientific journeys for specialists from member countries, especially from Middle and East Europe countries, Asia, Africa and South America. Forty-five specialists from various fields of the peaceful utilization of nuclear energy, with prevailing orientation on nuclear safety, radiation protection, state surveillance performance and application of ionizing radiation in medicine, were trained within this cooperation with IAEA in the Czech Republic in the last year. Expert scholarships lasting from one month to one year were provided to 23 applicants, short scientific journeys lasting two weeks maximum were provide to 22 specialists. The greatest

number of scholarships was given, as in previous years, by the Agency to specialists from countries of former Soviet Union and from Middle East.

SÚJB participation in the process of accession to EU

The Czech Republic signed the Treaty on Accession to the European Union on April 16, 2003. In response to this Treaty, the institutional reform was conducted in the coordination of activities of government departments and central authorities of state administrations in order to involve their representatives in the negotiations of EU working authorities. Based on the Governmental Decree 427 dated April 28, 2003 the European Union Committee was established and the Departmental Coordination Groups were established in relevant departments.

In this stage of the preparation for the accession to EU, one of the main SÚJB's priorities was to establish and assure activities for the Departmental Coordination Group for nuclear safety and radiation protection (RKS) and to involve the Office's representatives in the EU Council working groups and to the European Commission working groups dealing with the problems that come under SÚJB.

Based on the decision made by the Office Chairperson, RKS was established in May 2003, which of members are SÚJB employees, as well as representatives of MPO, MŽP and MZV. RKS Chairman issued its Statute and Code of Procedure. In 2003, the Group had three meetings; however, its members are continuously consulted and acquainted in electronic form with the results of meetings of related EU Council and EC working groups.

Upon signature of the Accession Treaty, the Czech Republic representatives obtained the right to participate in EU authorities' meetings with the right to listen and to talk, without the right of co-decision-making. The above-mentioned Governmental Decree of the Czech Republic approved SÚJB gestion to one of the EU Council working group, namely the Working Group for Nuclear Questions (AQG). SÚJB representative participates in meetings of this Group and presents approaches of the Czech Republic approved by RKS. In 2003, total 17 meetings of this group were held with participation of the Czech Republic. The main items of the meetings were the proposals of legal regulations – EURATOM directives and regulations. In the first half of 2003, AQG approved the Directive on the control of high-activity sealed radioactive sources orphan sources (Council Directive 2003/122/Euratom from December 2003). Negotiations on new regulation for application of safeguards within EU and on

instruction for performance of this regulation proceed. However, main attention is paid to the proposal for directive stipulating basic obligations and general principles of safety of nuclear facilities and for directive of spent nuclear fuel and radioactive waste management. Both directives form the nuclear package. SÚJB drew up two written stands and two opinions on a regulation on safeguards submitted after discussion by RKS to the EU Council Secretariat.

SÚJB representatives participate in meetings of European Commission working group dealing with problems related to radioactive waste management and transport of radioactive substances and waste. In addition, relevant employees of SÚJB are acquainted with meeting of other working groups, namely for power engineering, for items designed for dual use, for science and research, for questions related to nonproliferation and for demilitarization. They also participate in meetings of relevant RKS of other departments.

In 2003, the preparation for implementation of systems required by the European Law continued – application of inspection on import/export of agricultural products contaminated with radionuclides, transmission of data on radiation situation within The Czech Republic to EURATOM system, submission of "guarantee" data to the EURATOM Guarantee Office. SÚJB representatives participated in meetings organized by relevant divisions of EC and they organized seminars with EC representatives for holders of nuclear materials. More detailed information on the above-mentioned activities are stated in the parts of this report addicted to relevant divisions.

In response to the process of the Czech and EC/EU law correspondence, SÚJB elaborated pre-notification tables for five EURATOM directives (of basic safety standards, medical exposure, external employees, transport of radioactive waste and informing in case of emergency event). Tables were submitted, through the Central Committee – Department of Compatibility with EC law, for assessment to the European Commission. SÚJB representatives participated in harmonization of bilateral contracts concluded in the field of nuclear safety, radiation protection and safeguards with third states with similar contracts concluded by EURATOM, ČS and third states. MPO is the director and coordinator for this area.

The European Commission requested, as in previous years, information on fulfillment of measures, to which the Czech Republic bound in the pre-accession period. SÚJB

drew up and submitted to EC a report on fulfillment of all recommendations (general and specific recommendations related to Temelín and Dukovany NPPs) formulated in the Council report related to nuclear safety problems. Material sent to EC in June and September 2003 stated that the recommendations were fulfilled or are fulfilled continuously. Another two pieces of information on the course of Temelín NPP trial operation in terms of state surveillance were developed and submitted to EC, besides the above-mentioned documents. The European Commission stated no comments on recommendation fulfillment in the EC Monitoring Report from November 2003 on, which evaluated preparedness of the Czech Republic for the accession to EU and which was the last report of evaluating reports.

Within the preparation for membership of the Czech Republic in EU, MZV drew up a proposal of directing the Czech Republic within EU for the period 2004 to 2013. One of the priorities of the Czech Republic was proposed and developed by SÚJB – the assurance of nuclear safety and radiation protection high level during operation of nuclear facilities and ionizing radiation sources management and security of nuclear materials.

In addition to the above-mentioned activities SÚJB participated in other activities coordinated by MZV, such as statement of observations to text proposals of the European Constitution in the course of Convention and Intergovernmental conference.

Program PHARE

In 2003 the project was completed, which summarized and finished set of PHARE projects related to safety and licensing of suppression condenser in NPP with VVER 440/213 reactors (e.g. Dukovany). SÚJB used knowledge to formulate the stands for AQG EU related to suppression unit in Dukovany NPP.

The project related to support and improvement of effectiveness of SÚJB regulatory tools for the purpose of harmonization with practice used in EU countries will be completed in 2004.

The projects of PHARE program with already-approved program and financing, and brought back in cooperation with EC, will be commenced in 2004. The

following projects are involved for which the Financial Memorandum for "nuclear safety" was signed in May 2002:

- Installation of RODOS system for early warning and emergency preparedness in the Czech Republic – the project includes assurance, installation and start of hardware, software and peripheral equipment activity in SÚJB with the emphasis on early response in case of emergency events;
- Surveillance support in the assessment of nuclear safety related to boric acid dilution and accidents at reactor low powers and outages – the object of this project is SÚJB support during evaluation of safety analysis for necessity of VVER-440/213 reactors licensing process.

Special project for removal of damages (purchase of destroyed instruments) caused by floods in August 2002 at ÚJV Řež belongs to the projects initially from the fiscal year 1999:

Projects prepared within the PHARE 2001 "nuclear safety" program listed below are now in the state of full course and they will be concluded in 2004:

- Reappraisal of the mechanical properties of reactor internal parts based on an examination of exposed samples from the dismantled reactor in Greifswald – first part of the project (for continuation – see PHARE 2003) related to specification of exposed material physical and mechanical properties from VVER reactor in Greifswald and use of acquired knowledge for evaluation of nuclear power plant safety and life.
- Evaluation and validation of computer codes for nuclear reactors' thermo hydraulic calculations based on experimental data from NPP model in Elektrogorsk (RF). The project relates to behavior of VVER-1000 reactor during temporary and emergency situations.

The following projects prepared within the PHARE 2002 "nuclear safety" program shall be commenced in the course of 2004:

- VVER reactor pressure vessel integrity evaluation. The objective of the project is to prepare and validate procedures for reactor pressure vessel integrity evaluation including epithelium made of austenitic steel also in case of the

occurrence of defects, while the emphasis lays on the practical behavior of pressure vessel epithelium during the pressure and thermal shock;

- Qualification of nondestructive testing and check of nuclear power plant key components (steam generator, primary piping heterogeneous welds). The objective of this project is a binding instruction for performance of non-destructive testing (NDT) according to ENIQ and MAAE methodologies within the scope of periodic inspections. The project includes the proposal and production of testing files, implementation of modern NDT methods, development, and the optimization of inspection procedures including practical test evaluations.

Other multilateral activities

SÚJB is a founding member of the Regulators Association of countries that operate VVER reactors. This Association was established in 1993 to support the increase of nuclear safety and radiation protection level by using common experiences, information exchange and mutual effort coordination in its assurance. In 2003, SÚJB representatives participated in the Association's annual meeting organized by Slovakia. Czech experts' working activities in the Forum working groups continued during the year (e.g. in the group for solution of fuel cycle end problems). The Forum top meeting will be held in the Czech Republic in 2004.

SÚJB international activities in application of monitoring modes

Nonproliferation Treaty

The surveillance of nuclear safety covers activities related to the fulfillment of obligations stipulated by the Nonproliferation Treaty and of international obligations resulting from monitoring modes strengthening this treaty (Group of Nuclear Suppliers, Zangger's Committee), from the Common convention on safe management of spent fuel and safe management of radioactive waste, and from the participation in IAEA program in the field of fight against terrorism.

SÚJB submits to IAEA regular declarations on nuclear materials management in nuclear facilities related to the operation of nuclear fuel cycle in the Czech Republic based on the Supplemental Protocol. In this connection, IAEA was provided with

additional information required with respect to the overview of nuclear activities' history in the Czech Republic as well as in former Czechoslovakia.

Last year, the Czech Republic as 16th state of the world took part in the system of IAEA Programs for support of safeguards. Within this system the training course of IAEA guarantee inspectors was conducted in Dukovany NPP. Such courses are arranged in cooperation with SÚJB, ČEZ, a.s. Dukovany NPP and IAEA.

Last year SÚJB proceeded with organization of expert seminars for holders of license for nuclear materials management in order to acquaint them with application of obligations resulting from the Nonproliferation Treaty within EURATOM and with new requirements resulting from the accession of the Czech Republic to the European Union. The Czech Republic became a host state of 6th regional course of physical protection for countries of Middle and East Europe and new independent states.

Seminar of representatives of nuclear facilities and some other organizations of the Czech Republic was held at SÚJB and then in Dukovany NPP in November with participation of representatives of the EURATOM Safeguards Office (ESO). This seminar was aimed to make the participants acquainted with the practical way of application of EURATOM safeguards, including the fulfillment of the Supplemental Protocol requirements, and with the actions required to assure change over from the bilateral Agreement on application of safeguards between IAEA and the Czech Republic to the trilateral Agreement among IAEA, EURATOM and member states of the European Union.

In response to resolution and follow-up reports from IAEA managing director, the Czech Republic participated in the program for fight against nuclear terrorism by strengthening physical protection of nuclear materials, nuclear facilities and transports of nuclear materials in the course of their usage, storage, and transportation within the territory of the Czech Republic.

Chemical Weapons Convention (CWC)

The field of international cooperation in terms of CWC implementation was very important for the Czech Republic in this period by reason that the Czech Republic is a member of OPCW Executive Council in 2003 - 2005 and the Chairperson of this

Council is a Czech Ambassador to Hague and permanent representative of the Czech Republic with OPCW in 2003 - 2004.

In 2003, two significant sessions of supreme authority took place in terms of CWC – the Conference of contracting states. Session of 1st Evaluating conference was held on April 28 - May 5, 2003. In accordance to CWC, this conference was held five years after its effective date in order to evaluate comprehensively all aspects of its fulfillment and to define strategic tasks for upcoming five-year period. The Political Declaration and detailed and more technical Final Evaluating Document represent the key outputs of this session. The conference assessed results reached and the benefit to collective safety and fight against global terrorism. The most important areas and problems requiring OPCW and contracting states' attention were identified at the conference in order to ensure CWC generality and fulfillment of all its objectives, including international cooperation and economic and technical development of contracting states.

A fifth International Chemical Weapons Demilitarization Conference focused on problems related to chemical weapons demilitarization was held in Prague on 20. - 23 May, 2003. This conference was organized by the Defense Science and Technology Laboratory of the Ministry of Defense of Great Britain, Porton Down. OPCW managing director Mr. Rogelio Pfirter participated in the conference, who visited on this occasion SÚJB, MZV and SÚJCHBO and got acquainted with CWC implementation in the Czech Republic.

The Chemical Weapons Civil Defense Training Course was organized in the Institute for Population Protection (IOO) in Lázně Bohdaneč on 12. – 16 May, 2003 together with OPCW Technical Secretariat (TS OPCW). This training course was intended for specialists and experts from contracting states, in particular from underdeveloped countries, and it provided basic information on protection against chemical weapons, detection and decontamination of chemical weapons agents. Total 15 experts from 14 contracting states from every regional group participated in the course. Specialists from the Czech Republic and OPCW conducted the course.

There was also a training of OPCW inspectors in Vyškov on March 28 – April 5, 2003 for investigation of supposed use of chemical weapons, which was organized in

cooperation with the Ministry of Defense. Total 31 OPCW inspectors and more than 50 persons for the Czech side participated in the organization of this training.

A second meeting of OPCW East European Group was held in Řež near Prague in the Czech Republic on June 29 – July 2, 2003 . Representatives from 21 CWC contracting states attended this meeting. The participants visited SÚJCHBO workplace in Kamenná, where they got acquainted with objectives of this institute within the scope of CWC implementation and with the concept of the Czech support according to the Article X of CWC.

The Czech Republic is currently strongly represented in OPCW authorities and commissions. A few Czech specialists are in posts elected by the Conference of Contracting States, or appointed by TS OPCW managing director (Commission of Confidentiality, Scientific Advisory Board of TS OPCW managing director, Group for Administrative and Financial Questions, Protection Network group, experts for protection against chemical weapons, analytical chemistry and legal experts). In spite of partial problems it is important that the Czech Republic has a workplace with the statute of "Designated Laboratory".

Bacteriological and Toxin Weapons Convention (BTWC)

The Office's representatives participated in the meeting of experts from BTWC member states held in Geneva in August 2003. This meeting was focused on exchange of experience in the field of national legal standards and on implementation of BTWC requirements, including measures adopted in order to maintain safety and supervision of pathogenic microorganisms and toxins. Presentation of individual delegations, including the Czech Republic, was focused on particular measures adopted on national level for fulfillment of obligations resulting from BTWC.

At the beginning of November 2003, a session of BTWC contracting states was held in Geneva, with participation of the Czech delegation. The program of this session related to national measures required for implementation of obligations stipulated by BTWC and national mechanisms stipulating and maintaining safety and supervision of pathogenic microorganisms and toxins.

Comprehensive Test Ban Treaty

In 2003, SÚJB continued in the fulfillment of the national office function in accordance with the Comprehensive Nuclear-Test-Ban Treaty. During the monitored period SÚJB representatives, together with representatives of the Czech Republic Permanent Mission at UN and other international organizations in Vienna, participated in meetings of the Contract working authorities. They ensured in cooperation with ÚFZ (Country Physics Institute) in Brno and SÚRO (State Institute for Radiation Protection) in Prague the fulfillment of obligations resulting from this Contract for the Czech Republic.

CTBTO, with Headquarters in Vienna, include the unfinished International Monitoring System (IMS) consisting of 321 monitoring stations and 16 radionuclide laboratories. Measured data from the global system of:

- 50 primary and 120 subsidiary seismologic stations for underground monitoring;
- 11 hydro-acoustic stations for underwater monitoring;
- 60 infra-acoustic stations for monitoring of atmosphere;
- and 80 radionuclide stations for detection of radioactive dust;

are gathered, archived and evaluated in the International Data Center (IDS). One of the subsidiary seismologic stations with AS026 label is placed in Vranov at Brno in the Czech Republic and is operated by ÚFZ. This station was certified successfully by experts from CTBTO in the year 2002, which is a result of the qualified and professional approach of ÚFZ. Considering an almost 100% operational reliability of this station up to now, data measured by the VRAC station are very often desired not only by the Headquarters in Vienna, but also by other applicants all over the world.

In 2004, SÚJB web pages will be, in cooperation with ÚFZ in Brno, updated with basic information and activities of the Czech Republic in relation to CTBTO.

Other multilateral activities

SÚJB is a founding member of the Regulators Association of countries that operate VVER reactors. This Association was established in 1993 to support the increase of nuclear safety and radiation protection level by using common experiences, information exchange and mutual effort coordination in its assurance. In 2003, SÚJB representatives participated in the Association's annual meeting organized by Slovakia. Czech experts' working activities in the Forum working groups continued

during the year (e.g. in the group for solution of fuel cycle end problems). The Forum top meeting will be held in the Czech Republic in 2004.

9. THE STATE INSTITUTE FOR RADIATION PROTECTION (SÚRO) ACTIVITIES

The State Institute for Radiation Protection (SÚRO) is an organizational state component established by the decision of the chairman of the State Office for Nuclear Safety on May 26, 1995, which became effective on July 1, 1995. The scope of all SÚRO activities is stipulated in detail by a statute dated November 15, 1995. The Institute's basic function is to provide special expertise, methodology, education, information and research which are related to the state administration's role in protection against ionizing radiation in the Czech Republic. SÚRO employed 121 employees on December 31, 2003.

The internal structure of the Institute is divided into four basic divisions, in compliance with the main activities:

- The Monitoring Division covers two spheres - problems of artificial radionuclides in the environment in connection to nuclear facility operations and problems of internal contamination. The division participates significantly in the radiation monitoring within the RMS in the Czech Republic.
- The Medical Exposure Division covers problems in radiodiagnostics and radiotherapy, coordinates all activities of standard X-ray laboratories in Prague and Ostrava, a thermoluminescent dosimetry (TLD) laboratory, TLD network operation within RMS in the Czech Republic, and other special laboratory and in-situ measurements of dosimetric quantities.
- The Natural Sources Division concentrates on the population exposed to natural radiation, particularly the problems of radon and other natural radionuclides, and radiation hazard evaluation.
- The Information System Division ensures data flow, RMS data station and the processing and presentation of data acquired by RMS, the Early Warning System (SVZ) operation on both the local stations (MM) level and particularly on the center level, and the operation of mobile teams for ground and air monitoring.

Furthermore the division ensures operation of a LAN network and SÚRO hardware and software.

In 2003 the Institute participated particularly in providing the following:

- Function of a permanent emergency staff ensuring a significant part of the normal and the emergency mode operation in the Czech Republic's Radiation Monitoring Network (RMS);
- Population protection by monitoring and controlling doses of exposure from natural sources, including providing the Radon Program;
- Evaluation and control of medical exposure in radiodiagnostics and radiotherapy;
- Research in the radiation protection field;
- In the educational and training field, in cooperation with SÚJB and IAEA, in providing expert parts of foreign participants of scholarships, in providing expert consultations to the employees of state authorities, private firms and public, and in providing information and educational seminars for students of FJFI ČVUT in Prague and SÚJB employees;
- Participation in tests of special qualification, check of background papers for permission of activities important in terms radiation protection (radon problems) and inspection of companies operating in the field of radon problems.

The Institute fulfilled other tasks assigned continuously by the contractor.

The detailed description of all SÚRO activities, including a results overview, is presented every year in the annual Reports of the State Institute for Radiation Protection activities and in cooperation with SÚJB, in the annual Reports on the Radiation situation on the territory of the Czech Republic, as well as in the form of contribution to the Yearbook of Department of the Environment, in the annual Report on the Radon Program fulfillment and in the Report on institutional research fulfillment and results. The Institute presents current information on its Internet pages. The representative report on Institute activities in 1998 to 2003 was published in 2003.

10. THE STATE INSTITUTE FOR NUCLEAR, CHEMICAL AND BIOLOGICAL PROTECTION (SÚJCHBO) ACTIVITIES

The main purpose of the establishment of SÚJCHBO is to monitor and evaluate nuclear, chemical and biological substance impacts on humans and the environment, including the evaluation of a protection grade for individual and collective means for human protection against these substances. Part of this activity is also research and development in this field, fulfillment of assignments in support of surveillance conducted by SÚJB inspectors, fulfillment of assignments resulting from Constitutional Act No. 110/1998 Coll., on the Czech Republic safety and the providing of training and education - all within state-wide force.

The Institute employed 64 employees (physical persons) on December 31, 2003, which was after the recalculation into full-time jobs of 57,865 employees. SÚJCHBO activity is partially covered from the state budget and partially by profits from expert activities.

The basic specialization of expert workplaces

Nuclear Protection Division

The division is aimed to measure and evaluate radon occurrence, preparation, processing and evaluating of trace detectors within the Radon Program of the Czech Republic and out of it.

Furthermore the division performs personal dosimetry and monitoring in the area surrounding the ionizing radiation sources, as well as another laboratory and in-situ radioactivity measurements. A significant part of the activity is also the calibration, verification and testing for the approval of meter types, which the division executes at the Authorized metrology center. The station also covers research activity for radon dosimetry.

Chemical Protection Division

The chemical protection division concentrates on finding the presence, type, concentration and number of chemical substances in the workplace and in the environment both in the laboratory and in the field. Furthermore it concentrates on the quality evaluation of anti-chemical and other special preventive means for persons, as well as on the elaboration of methods for their testing and participation in

their development. The division stations provide technical support for inspections performed by the SÚJB department for inspection of the adherence to the ban on chemical and biological warfare in the meaning of Act No. 19/1997 Coll., or Act No. 249/2000 Coll. The stations cooperate with the international Organization for the Prohibition of Chemical Weapons (OPCW) in Hague and with laboratories TNO Prins Maurits Laboratory, the Hague. A significant part of their activity is also the solution of research assignments as well as cooperation with other resorts and institutions, including the integration into the Integrated Safety System of the Czech Republic.

Biological protection division

The biological protection division activity is focused on detection of biological agents and toxins – this activity is used primarily in support of surveillance conducted by SÚJB inspectors according to Act No. 281/2002 Coll., as well as on human protection in extreme conditions, including the assessment of human individual protection means in terms of operationally thermal load. Both workplaces participate also in training and research activities. The workplace dealing with detection of biological agents and toxins operates also within the Integrated Safety System of the Czech Republic.

Separate division for surveillance support

This division fulfills tasks assigned by the SÚJB Regional center in Kamenná, which means in particular that it ensures inspections and local examinations, performs measurements and monitoring results processing in the former and current fields of uranium industry (presently s.p. DIAMO, Stráž p.R.), including old encumbrances and works performed in mining in the entire Czech Republic. The division also ensures the activity of the air control station within the Radiation monitoring network of the Czech Republic in Kamenná.

Results of SÚJCHBO expert activities

Most of the workplaces of nuclear, chemical and biological protection divisions are accredited by the Czech Institute for Accreditation /ČIA/. In 2003, regular inspections were performed in three workplaces, which found this station professionally qualified and capable for the accredited activity. In SÚJCHBO the Authorized Metrology Center (official sign K, registration number 113) operates, which is authorized by the Office for Standardization, Metrology and Testing for verification of given instruments

/OAR and EOAR/ in accordance with Act No. 505/1990 Coll., amended by Act No. 119/2000 Coll.

The "License for high dangerous substances treatment" was granted to SÚJCHBO in accordance with Act No. 19/1997 Coll., in valid version. All requirements of the Act No. 157/98 Coll., amended by Act No. 352/1999 Coll., for ensuring the treatment of dangerous substances and means by an authorized person were met. Authorization was given by the Department of the Environment of the Czech Republic. The inspection of division for environment and agriculture of the Regional Office was conducted in SÚJCHBO in 2003, which found that the management of dangerous chemical substances and agents, their storage, packing and labeling is in conformity to regulations in force. In 2003 SÚJCHBO was granted a permit to manage high risk and dangerous biological agents and toxins in accordance with Act No. 281/2002 Coll. In the field of ionizing radiation treatment the performed Institute works were permitted and the workplaces confirmed by relevant SÚJB decisions in accordance with Act No. 18/1997 Coll., as amended. The above-mentioned permissions were extended in 2003 for a permit to perform services related to personal dosimetry at workplaces stipulated in § 87 of Decree No. 307/2002 Coll.[1]

Contractual relationships also influence the Institute's activity. In particular the "Cooperation Contract" concluded on the basis of the "Cooperation agreement"[2] between SÚJB and MV - GŘ HZS, is significant, on the basis of which the Institute is integrated into other components of the Integrated safety system. On the international level it is the contract of cooperation with TNO PML, Hague, the Netherlands in science and research.

The main activity of the nuclear protection division, which the station of nuclear protection division concentrated on in 2003, was:

- measuring, evaluating and research of radon and its transformation products behavior, and radon metrology;
- performance of radiochemical and gamma spectrometric analyses of samples of water, sediments, soil, constructional materials, fallouts, vegetable and filters (VAJ 04 and HUNTER). Total 822 analyses were performed.

[1] except for item a) of this paragraph
[2] concluded netween SÚJB and MV – GŘ HZS

- measuring, detection and identification of substances released into the workplace or into the environment, possibly of unknown substance samples provided by the Integrated safety system departments or by other departments and institutions working on these cases.
- solution of research tasks related to institutional and specific research
- performing accredited and non-accredited tests, technical support of the surveillance performed by SÚJB inspectors,
- identification of unknown samples (in cooperation with IZS departments detected, transported and identified a few kilograms of unknown samples, including poisons) and fulfillment of special tasks (developing an expert opinion for the Czech Police on emergency escapes of chemical substance from Spolana Neratovice, joint-stock company, based on proper measurements and other available background papers,
- performing expert measurements and tests of preventive means and clothing (as complex preventive systems), as well as testing of persons during various loads in different microclimatic conditions
- detection of dangerous biological agents and toxins, including completion of laboratory for detection of biological agents and toxins, i.e. to equip it with necessary instrumentation and to extend the spectrum of investigation methods and detection procedures.

Detailed information on SÚJCHBO activities in 2003 related to the support of surveillance, as well as to proper results from research, publishing and training or educational activities are stated in SÚJCHBO annual report and could be found on web page www.sujchbo.cz.

11. INFORMATION PROVIDED IN ACCORDANCE WITH ACT NO. 106/1999 COLL., ON FREE ACCESS TO INFORMATION

Within the scope of the provision of information according to Act No. 106/1999 Coll., on free access to information, total 130 applications were submitted to the State Office for Nuclear Safety in 2003 from physical or legal entities.

Five lawsuits were recorded in 2003 by reason of violation of the above-mentioned Act from SÚJB (none of them was brought in 2003). It concerned lawsuits against non-provision of information to prosecutors – the citizens' associations Greenpeace, Calla, Within the emergency zone of Temelín NPP and the Citizens' Initiative for Environmental Protection. The judgements were pronounced for non-adherence to this act in 2003 until January 27, 2004. SÚJB decision was assessed by the court as void in two cases and in other two cases SÚJB decision was cancelled and returned for another hearing.

Information was required (and also provided) in all forms accepted by law: verbally personally, by telephone, by e-mail or in written form. The applications could be divided thematically as follows:

a) problems concerning Temelín NPP start-up and its trial operation
b) problems concerning other nuclear facilities
c) problems concerning radiation protection and radiation situation monitoring on the territory of the Czech Republic
d) legislative modifications in the Atomic Act and decrees
e) others

SÚJB's Internet page www.sujb.cz serves as a supplement to information provided in the forms mentioned above. 48,723 accesses from 5,241 computers were registered in 2003. The widest public has access through the page to recent events of SÚJB activities and to basic information of SÚJB status in the scope of civil service, organizational structure, and rule of law that SÚJB uses. The most important contact addresses are stated as well. The Internet page offers also many documents and reports from the field, on which the office concentrates. The Czech Republic's National Report could be given as an example processed for the Convention of Nuclear Safety or annual report requirements submitted to the Czech government, information for international negotiations within the scope of Melk process and accession negotiations to the European Union. The majority of information is available both in Czech and English.

SÚJB representatives, in accordance with the obligation stipulated by the Atomic Act to SÚJB, informed county council chiefs of radioactive waste treatment on the territory administrated by them and of nuclear fuel transports into Czech nuclear facilities.

SÚJB fulfills its informational obligations to the public in the form of issuing bimonthly "Nuclear energy safety" and non-periodical series "Nuclear facilities safety", where all general information related to nuclear safety and detailed requirements and instructions for its assurance is published. The applicant can obtain detailed information of both the content of periodicals and acquisition possibilities at the following address: Nuclear Information Institute, Eliška Přemyslovna street, Prague 5 - Zbraslav.

SÚJB informed ČTK service and other news media of facts that come under its force during the year. SÚJB arranged for press conference for issue of the annual report on its activities.

In addition to the above-mentioned actions in re adherence to Act No. 106/1999 Coll., SÚJB faces the following lawsuits (as to 27.1.2004):

- lawsuit brought by the association Jihočeské matky in re participation in proceedings on area specification for emergency planning of Temelín NPP,
- lawsuit brought by the association Jihočeské matky in re trial operation of Temelín NPP Unit 1,
- lawsuit brought by the citizens' association Within the emergency zone of Temelín NPP in re enlargement of emergency area,
- lawsuit brought by the association Jihočeské matky in re permission for active testing of Temelín NPP Unit 1,
- lawsuit brought by the association Jihočeské matky in re trial operation of Temelín NPP Unit 2.

Used abbreviations and acronyms

AČR	Czech Republic Army
ALARA	As Low as Reasonably Achievable
AMS	Authorized Metrology Center
ASLAB	Center for Laboratory Competence Assessment
ASŘTP	Automated Systems of Process Control
BD	(Main) Control Room
BS	Safety System
BTWC	Bacteriological & Toxin Weapons Convention
CRPO	Central Registry of Occupational Exposure
CTP	Whole-Body Counter
CWC	Chemical Weapons Convention
ČHMÚ	Czech Institute for Hydrometeorology
ČIA	Czech Institute for Accreditation
ČLS J.E.P.	Czech Medical Society of J.E. Purkyně
ČMI	Czech Metrology Institute
DG(S)	Diesel Generator Plant
DKP	Lower End Position
DPZJ	Partial Program for Quality Assurance
DRU	Diagnostic Reference Level
EDU	ČEZ, a.s., Dukovany Nuclear Power Plant (Dukovany NPP)
EK	European Commission
EOAR	Radon Effective Activity Concentration
ES	Power Start-Up
ESTRO	European Society for Therapy and Radiation Oncology
ETE	ČEZ, a.s., Temelín Nuclear Power Plant (Temelín NPP)
EZS	Electronic Safety System
F	Imbalance Coefficient of Rn & Rn Decay Products
f_p	Free EOAR Component (for EOAR see above)
FJFI ČVUT	Nuclear Engineering Faculty of Czech Technical University
FRO	Film Rotary Evaporator
FS	Physical Start-Up

GO	Overhaul
GSM	2nd Generation of Cellular Phones as Used in CR
HCČ	Primary Coolant Pump
HDR	High dose rate
HMG	Schedule
HNČ	Main Feedwater Pump
HO	Emergency Protection
HPK	Main Steam Header
HRK	Safety, Control and Shim Assemblies
HS	Hygiene Service
HÚCO ČR	Main Office of CR Civil Defense
HVB	(Main Production) Unit
IAEA	International Atomic Energy Agency
IGA	Internal Grant Agency
INES	International Nuclear Event Scale
IPV KO	Pulse Safety Valve in Pressurizer
IPVZ	Post-Graduate Education Institute
IRIS	Integrated Radiation Information System
IS RMS	Information System of Radiation Monitoring Network
IV	Institutional Research
IZ	Ionizing Radiation
JB	Nuclear Safety
JE	Nuclear Power Plant
JEZ	Nuclear-Power Facility
JZ	Nuclear Facility
KKC	Emergency Response Center
KŠ	Crisis Staff
KV	Complex test / testing
kVp-metr	High-Voltage Surge Meter
LaP	Safe Operation Limits & Conditions
LDR	Low dose rate
LEGeD	Low energy germanium detector
LET	Linear energy transfer
LCHMO	Laboratory for Chemical Monitoring & Protection
LRKO	Laboratory for Monitoring of Environment Radiation
MAAE	Czech equivalent of IAEA (for IAEA see above)

MAPE	Former uranium reprocessing plant (derived from Magnesium Perchlorate)
MBA	Material Balance Area
MEZ	Power Limiter
MF	Ministry of Finance
mFISH	Multicolor Fluorescent Hybridizing *in situ*
MMKO	Air Monitoring Point
MO	Ministry of Defense
MP	Intermediate Range
MS	Ministry of Justice
MSVP	Interim Spent Fuel Storage Facility
MV	Department of Interior
MV-GŘ HZS ČR	Department of Interior - CR Fire Brigade Headquarters
MZ	Ministry of Health
MŽP	Department of the Environment
NEA/OECD	Nuclear Energy Agency OECD
NPT	Nonproliferation Treaty
OAR	Radon Activity Concentration
OKZCHBZ	Department for Inspection of the Adherence to the Ban on Chemical and Biological Warfare
OPCW	Organization for the Prohibition of Chemical Weapons
ORZ	Open Radionuclide Source
PCO	Centralized Protection Console
PERIZ	Periodic Integral Tightness Testing
PFDE	Photon Dose Equivalent Rate
PG	Steam Generator
PKV	Pre-complex test / testing
PNČI	HRK Frequency Converter (for HRK see above)
PoZJ	Quality Assurance Procedure
PpBZ	Final Safety Analysis Report
PPS	Share in Causation
PSD	Passive Trace Detectors
PS-ZRAO	Process system - Radioactive Waste Treatment
PZJ	Quality Assurance Program
QA/QC	Quality Assurance / Quality Control
RAO	Radioactive Waste
RC	Regional Center
RČA	Fast-Acting Valve
RDPO	Registry of Permit Holders and Reporting Entities
RMS	Radiation Monitoring Network
RO	Radiation Protection
ROR	Reactor Scram
RZ	Registry of Ionizing Radiation Sources
RZV	Fast-Closing Valve

SIS	Specialized Inspection Teams
SKŘ	Instrumentation and Control, I&C system
SMS	SMS message (Short Message Service) conveyed through Global System for Mobile Communication (GSM)
SROBF ČSL	Society for Radiation Oncology, Biology and Physics
SUL, o.z.	Administration of Uranium Deposits, s.p. DIAMO Branch Office
SÚJB	State Office for Nuclear Safety
SÚJCHBO	State Institute for Nuclear, Chemical and Biological Protection
SÚRAO	Administration of Radioactive Waste Repositories
SÚRO	State Institute for Radiation Protection
SVZ	Early Warning System
TBN	Turbine Supply System
TG	Turbine Generator
TGO	Type-Related Overhaul
TLD	Thermoluminescent Dosimetry
TŘ	Design *or* Engineering Solution
TSFO	Engineered Safety Features
TÚU, o.z.	Uranium Mining and Treatment Plant, s.pl DIAMO Branch Office
UD	Uranium Mines (Comp.)
URAO	Radioactive Waste Repository
URZ	Sealed Radionuclide Sources (of radiation)
US DOE	US Department of Energy
US NRC	US Nuclear Regulatory Commission
ÚJF ČAV	Nuclear Physics Institute of Czech Academy of Sciences
ÚJV Řež, a.s.	Nuclear Research Institute Řež, a.s.
ÚNMZ	Office for Standardization, Metrology and Testing
VAO	High-Level Radioactive Waste
VHP	On-Site Emergency Plan
VK	In-Core Inspection
VKRH	Government Commission for Radiation Accidents
WEC	Westinghouse Electric Corporation
WENRA	Western European Nuclear Regulators Association
ZIZ	Ionizing Radiation Source
ŽP	(Living) Environment