Report on SÚJB Results Achieved in the Surveillance of Nuclear Facility Safety and Radiation Protection for 2004

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1. 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 chairperson 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 non-proliferation of nuclear weapons and observance of the prohibition of chemical, bacteriological and toxin weapons. The Office's sphere of authority, granted by Act No. 18/1997 Coll., on the peaceful utilization of nuclear energy and ionizing radiation (hereinafter "Atomic Act"), Act No. 19/1997 Coll., on some measures related to the prohibition of chemical weapons, and Act No. 281/2002 Coll. on some measures related to the prohibition of bacteriological (biological) and toxin weapons, 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;
- Controlling the activities of the Radiation Monitoring Network within the Czech Republic and taking care of the international exchange of data on the radiation situation;
- Operating the State System of Accounting for and Control of Nuclear Material and maintaining the State Registry of License Holders; imported and exported Trigger List items; sources of ionizing radiation and keeping track of the exposure of the public and of 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 and the environment, 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 at dealing with tasks following from the international treaties and governing acts on banning development, production, stockpiling, the use and proliferation of nuclear, chemical, bacteriological (biological) and toxin weapons and on their disposal.

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

Nuclear Safety Division

Comprised of the Nuclear Facility Assessment Department, Nuclear Facility Inspection Department (including the Local Inspectors Sections) and the Radioactive Waste and Spent Nuclear Fuel Disposal Department.

Radiation Protection Division

Comprised of the Sources Department, Exposure Management Department, Department of Radiation Protection in Fuel Cycle, and an independent Department of Assessment of Radiation Protection Activities and all regional centers (Praha, Ústí nad Labem, Hradec Králové, Plzeň, Ostrava, Brno, České Budějovice, Kamenná).

Management and Engineering Support Division

Comprised of the International Cooperation Department, Department of Nuclear Non-proliferation, Department for Control of the Prohibition of Chemical and Biological Weapons, and further the Economic Department, the Office Secretariat and the Legal Department.

The Office's chairperson 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; further the Safety Manager, the Auditor and the Euro Center.

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 2004 the SÚJB, when using the public funds, followed Act No. 457/2003 Coll., dated December 3, 2003, on the Czech State Budget for 2004 as amended, as enacted by the Chamber of Deputies of the Czech Republic. To use its competencies and to fulfil its duties over a period of years, the Office was assigned financial means in the following amounts and the following number of workforce:

SELECTED INDICATORS OF THE BALANCE SHEET OF SÚJB DEPARTMENT
IN “000” CZK

Period	on January 1, 2004	on December 31, 2004
Overall assets	889 284	964 242
itemized		
overall long-term intangible assets	74 871	83 068
overall long-term tangible assets	869 022	951 191
Overall financial assets	18 991	22 237
Overall liabilities	889 284	964 242
itemized reserve fund	9 959	7 795

DEVELOPMENT OF RECEIPTS OF CHAPTER 375 – SÚJB IN “000” CZK

Year	2000	2001	2002	2003	2004
Overall receipts	4 128	3 111	3 048	2 106	4 707

SELECTED EXPENDITURES SPENT FROM BUDGET CHAPTER 375 – SÚJB IN “000” CZK

Year	2000	2001	2002	2003	2004
Overall running expenses	215158	237573	249097	285 317	285958
itemized:					
water, fuel and energy	4 859	6 033	6 605	7 442	7 299
Services	56 503	52 508	55 918	62 092	62 998
Science and research	26 449	37 449	42 414	49 276	48 502
itemized:					
Specific	13 467	19 873	17 088	25 174	24 979
Institutional	12 982	17 576	25 326	24 102	23 523
Overall capital expenses	29 169	50 805	93 012	90 880	94 964
itemized:					
tangible assets	4 560	41 622	84 582	76 640	79 037
intangible assets	23 891	3 048	3 720	7 133	6 786
capital purchase expenses	0	0	0	7	0
investment grants, contributions and other	718	6 135	4 710	7 100	9 141

DRAWING ON THE MEANS FOR RESEARCH AND DEVELOPMENT (VAV) OF CHAPTER 375 - SÚJB IN “000” CZK

Year	2000	2001	2002	2003	2004

Institutional research and development – SÚRO	8 960	9 976	14 979	12 220	7 999
Institutional research and development – SÚJCHBO	3 992	7 600	10 250	11 750	15 420
Institutional research and development – other payments for work performed	30	0	97	132	105
Overall institutional means	12 982	17 576	25 326	24 102	23 524
Specific means	13 467	19 873	17 088	25 174	25 979
Overall research and development expenses	26 449	37 449	42 414	49 276	49 503

WORKFORCE DEVELOPMENT – SÚJB

Indicator	Category	2000	2001	2002	2003	2004
Planned workforce	Expected figure (persons)	178	190	193	197	194
Real workforce (as registered)	Actual figure (persons)	184	187	192	199	194

It is apparent that expenses in 2004 increased only slightly, as compared to the preceding two years. This relates to increasing requirements for SÚJB activities and associated expenses. Together with all necessary investments both in structures and instrumentation, the need for operating expenses increases. Another reason for the higher operating expenses, besides changes in VAT, is the increase in the prices of products and services in order to ensure the activities and operation provided by external suppliers. The number of employees dropped in accordance with requirements for decreasing the number of state administration employees without affecting the fulfillment of many tasks related to the preparation of accession of the Czech Republic into the EU or to the extension of the requirements and needs in inspections in the areas of nuclear, chemical and biological control.

Subsidies for the Program for IAEA Technical Cooperation are also granted from the SÚJB budget. The obligation to subscribe to a fund of the Technical Cooperation Program results from membership of the Czech Republic in this specialized agency of the United Nations system. In 2004 this subscription amounted to CZK 8 mil.

In the area of legislative activity, SÚJB, as in the previous period, participated in the process of review of the draft of legal regulations within the interdepartmental amendment procedures. In cooperation with SÚJB specialized departments, the Legal Department prepared approximately 500 viewpoints on legal regulations, on which SÚJB, as the place for amendment procedure, is obliged to comment according to Legislative Rules.

In connection with the preparation of and participation in the amendment procedure for draft Act on Customs Authority, SÚJB prepared a draft amendment to Act No. 18/1997 Coll. (Atomic Act) as part of the associated act to Act on Customs Authority. The above-mentioned amendment to the Atomic Act, which is included in Act No. 186/2004 Coll., enables the customs authorities to exercise supervision over the transportation of nuclear substances and radioactive waste, and ensures full registration of the import and export of such substances.

The Atomic Act was further amended by Act No. 1/2005 Coll., which amends the Act on Budget Tax Rating. This amendment was prepared pursuant to agreement with the Ministry of Finance with a view to creating a legal framework in order to issue a new implementing regulation for the area of financing the so-called radon problems.

Indisputably, the most significant was the preparation of the amendment to the Atomic Act in connection with a new Act on Work Inspection being prepared in cooperation with the Ministry of Labor and Social Affairs. Towards the end of 2004, the text was discussed on the Second Reading in the Chamber of Deputies of the Czech Republic. This amendment aims to create legal prerequisites for the establishment of operative and effective state surveillance of technical safety of a specified group of engineering facilities in the nuclear energy. At the same time, it is presumed to transfer the performance of state-governed surveillance in this field from the Institute of Technical Inspection (department of the Ministry of Labor and Social Affairs) to SÚJB. In addition to preparation of this act, works related to the preparation of implementing regulations to this amendment were started, particularly

works related to the draft decree on assuring technical safety of selected nuclear facilities.

The legislative activities of SÚJB included also the creation of decrees. Works related to the preparation of the implementing Decree on Radon Problems and further to Act No. 18/2004 Coll. (Act on Approval of Professional Qualification) of Decree, which sets the conditions for the performance of regulated activities within the competence of SÚJB for purposes of free movement of persons within EU, continued.

Works related to 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 on-site emergency plans and emergency rules were completed. This Decree was published under No. 2/2004 Coll.

In 2004, SÚJB established an interdepartmental working group, which based on the Government Decree of the Czech Republic No. 479 dated May 19, 2004 to the National Action Plan for the Fight Against Terrorism drew up a new definition of the basic threat model for nuclear facilities and nuclear materials, including the transportation of nuclear materials, in the Czech Republic. At the same time, SÚJB, in cooperation with the operators of nuclear facilities, prepared the draft amendment to Decree No. 144/1997 Coll., on engineered safety features of nuclear materials and nuclear facilities, and their categorization. The proposed draft reflects the amendment of newly defined design basic threat into the approved safety documentation and modifies some other provisions of the original decree in the field of administrative and technical measures taken in order to assure physical protection.

2. SURVEILLANCE OF NUCLEAR SAFETY

Pursuant to Act No. 18/1997 Coll., SÚJB, based on its inspections and reviews and within its competencies in performing the surveillance of nuclear safety, issued a total of 159 decisions on the permission for nuclear safety related activities. Out of this number 2 permissions were issued for the operation of nuclear facilities, 6 permissions were issued for nuclear reactor start-up after each refueling outage, 23 permissions were issued for the performance of reconstruction or other changes affecting nuclear safety, 7 permits were issued for transport of nuclear materials, 4 permits were issued to manage radioactive waste and 74 authorizations were

issued to perform the activities on nuclear facilities in the Czech Republic. Other permits were issued to manage nuclear materials and other authorizations were issued to export or import nuclear items. In addition to permits, 168 decisions were issued, which approved new or revised documents, or type-approval of radioactive material package canisters and special form of radioactive sources, or changed the conditions of decisions issued before.

2.1. Evaluation and Control of Safety on Nuclear Facilities

Evaluation activities

SÚJB's evaluation activities are focused on the review of safety documentation submitted as an attachment to the application for a permit, or for its separate approval. The extent of the safety related documentation for issuance of the permission is stipulated by the Atomic Act and its implementing regulations, or issued decision, by which SÚJB requires submission of certain documents.

All changes to be performed on nuclear facilities are subject to evaluation. The facility modifications, which are categorized according to the influence on nuclear safety into three groups, are evaluated in detail. To modifications that require permission, the analyses of their influence on nuclear safety, inter alia, are submitted. Further, all previously approved documents, which relate to the modification and must be respectively modified (for example the Limits and Conditions of the Safe Operation of a Nuclear Facility, Operation inspection programs, etc.), are submitted for review. Nuclear facility operator's quality assurance system is evaluated on a continuous basis. All submitted Quality Assurance Programs for individual safety related activities are evaluated and their real interconnection with the system, component and process documentation is checked.

SÚJB primarily monitors periodic evaluation of nuclear facilities safety when evaluating safety reports updated on an annual basis, which include all important current data on design and equipment functionality as well as safety analyses of presumed risks and project conditions. The bulk of the evaluation is currently carried out on the basis of principles of the so-called conservative approach to nuclear safety evaluation. This means that the potential risks as well as their influence on nuclear safety are always considered with reserve, which is significantly higher for a given phenomenon or chosen activity than it is or it could be in real practice. This approach

leads, in its consequences, to some “over-design” of both the requirements for nuclear safety and the measures taken in order to ensure nuclear safety. Therefore, SÚJB in accordance with the worldwide recognized and recommended practice commenced the process of progressive introduction of the so-called probabilistic safety assessment (PSA) of nuclear safety into the surveillance activity. This evaluation is based on the detailed probabilistic analyses of individual equipment, phenomena and activities, and it leads, in its consequences, to improvement of nuclear safety and efficiency of measures necessary to ensure nuclear safety.

To evaluate the operational safety of nuclear power plants and to monitor the trends on the operational level, the set of operation-safety indicators is used. This set is regularly processed on the basis of data collected in individual localities and transferred to predetermined groups. Basic groups comprise of significant events, operation of safety related systems, barrier’s leak and radiation protection. The results of such information processed in this statistical way are used when planning inspection activities and during annual meetings conducted between the SÚJB management and the representatives of nuclear facilities operators.

An area of the evaluation of nuclear power plants monitored on a long-term basis is the assessment of the residual life span of their most significant components, particularly the components which are not replaceable or are replaceable only at heavy economic costs, which is the limiting factor of the whole power plant life time. In particular, the reactor pressure vessel, main circulation pumps, steam generators, pressurizer and the main circulation lines are involved. Both Dukovany NPP and Temelín NPP are equipped with advanced technology, which make the evaluation of the lifetime based on the actual operating modes executed and the actual equipment condition possible. The SÚJB regularly receives information on drawing of the lifetime of all essential components of the primary circuit. It follows from this evaluation that the lifetime is drawn in accordance with the design and it is not necessary to envisage any decrease in the power plants lifetime. This applies in particular to Dukovany NPP, where Unit 1 is in the twentieth year of operation. As regards Temelín NPP, the analyses performed and submitted to SÚJB evidence that no significant anomaly occurred during the operation, which could cause the drawing of the lifetime beyond the scope of the design.

The safety analyses constitute a permanent part of the evaluation of nuclear safety carried out by the SÚJB. The role of the probabilistic assessment of nuclear safety through the use of probabilistic safety analysis becomes more important in this evaluation. Therefore, the working activities in this field were focused on the creation of internal SÚJB documents. These documents are drawn up on the basis of cooperation with external consultants and they shall serve as a basis for implementation of the functional system of probabilistic assessment use in SÚJB inspection activities. The issuance of guidelines, which establish the quality assurance procedures for the field of PSA use as well as the instruction for an independent check, was necessary in order to implement the system. Based on SÚJB comments, data of the INFORISK information system, which was test-installed in December 2003, was updated during the course of the year.

Problems related to the application of evaluation using the PSA were monitored and assessed by SÚJB through the evaluation of the availability of ČEZ, a.s., NPD documentation (Method of Evaluation of the Risk Level on Proposal of Changes in Execution Time for NPP equipment) and through the assessment of submitted changes in the Limits and Conditions document, which are evidenced, among others, with the probabilistic evaluation performed in ČEZ.

With respect to the extent, demanding factor and complexity of the problems related to the nuclear facilities safety, SÚJB organizes, for the needs of surveillance, an independent evaluation of quality and suitability of the computer programs (the so-called computer programs validation), which are used for the processing of safety documentation, including programs to be received from other countries. In case there are any externally recognized programs, and to purchase and obtain a license for them is not finance-intensive, the use of such programs is assessed with regard to the facilitation of intercommunication and the observance of international standards. In 2004, seven evaluation commissions worked with a view to assessing 16 submitted computer programs. Another nine submitted computer programs are under the evaluation procedure.

In accordance with the world practice, SÚJB uses in its practice the instrument of independent complex evaluation of nuclear safety on operated nuclear units. The expert support helps to gain an independent view of topical problems related to the operation of nuclear power plants and affecting the nuclear safety, as well as to

create the feedback of the nuclear safety evaluation carried out by the operator and state-governed surveillance.

Inspection activities

The inspection activities and their result evaluation proceed in defined areas according to the approved half-year Inspection Plan. If immediately required, the inspections are carried out, when any unplanned situation is investigated in the nuclear facility. Continuous monitoring of the nuclear power plant operation is ensured by monthly inspections carried out by site inspectors on a regular basis. The results of monthly inspections are used to plan the specialized inspections.

In 2004 the defined areas of inspection were modified; this modification relates to the completion of the Temelín NPP commissioning process as well as to organizational changes in the operator's internal structure. The basic defined areas of the inspection are now the following: operation, maintenance, technical and engineering support, and inspections (formerly summarized as support activities, were divided into the area of radiation protection and nuclear materials). These basic inspection areas are further divided into sub-areas so that the planned inspections cover all activities with an impact on the nuclear safety and radiation protection.

The inspections were performed in the course of unit outages to check the activities in progress and preparedness, and their results are on of the documents for granting the permission for the reactor start-up to the power state. These inspections cover all important safety systems of the power plant, their maintenance, repairs and testing of their operability. Special emphasis is placed on the check of reactor core parameters, barrier's leak tests, protection systems reliability tests and personnel readiness.

An important part of the regular inspection activities used for the evaluation of nuclear safety on the given subject are the inspections focused on the solution of occurred events accepted by the operator, and on feedback efficiency. These inspections are carried out in cooperation with the inspectors from the center and the locality.

2.2. ČEZ, A.S., DUKOVANY NUCLEAR POWER PLANT

Dukovany Nuclear Power Plant (Dukovany NPP) is equipped with four reactors VVER 440 type 213, and its Unit 1 was put into operation in 1985. In 2004 all units were operated safely as required by the Power Control Center, without any serious

anomaly from the approved Limits and Conditions. In the course of 2004 all units underwent outages related to repairs and refueling. In addition, one short outage was performed on Unit 1 in order to perform works on equipments common for Unit 1 and 2. The outage performed on Unit 2 also included periodic revision, during which all fuel had to be removed from the reactor in order to check the reactor pressure vessel.

Evaluation activities

During the year SÚJB permitted the Dukovany nuclear power plant to make in total 18 changes affecting nuclear safety. These changes related especially to replacement and modernization of systems or components (for example a replacement of the instrumentation and control systems of units or reconstruction of electrical distributors). Within an application for permission of inserting the fuel with gadolinium absorber of the type Gd1 and Gd2 used in the reactors an assessment proceeded of the safety documentation in the Office, including safety thermo-hydraulic analyses.

To perform above-mentioned changes the general operation document – Limits and Conditions of Safe Operation for the units of Dukovany NPP – was updated. For Unit 3 the change of limit condition for information systems enabling performance of the replacement of equipment within the investment project “Recovery of I&C of Dukovany NPP” was approved. The Office further approved a time-limited change of the condition for self-consumption feeding. The change enabled a better quality feeding of the steam generator and with that limitation of the temperature changes of the feed water for the period of a short-term outage of the Unit 1 of Dukovany NPP. The change of limiting condition for the system of mechanical control was approved for all units. The change enabled and clarified the operating staff activity for the case of failure of a couple of the control element assemblies as the presented analyses proved that also in such case the safety functions of the mechanical control system are kept.

The changes in the organizational structure of ČEZ, a.s. were included in the new review of the Quality Assurance Program for permitted activities of Dukovany NPP and in the change of documentation of the method of physical protection of Dukovany NPP. The Office assessed and approved these changes. Reviews of the

Quality Assurance programs, a List of selected equipment and the Program of operational inspections, which consider the modifications made of the equipment and systems and new approaches to monitoring and assessment of their condition were also approved. Also the document “Process of periodical assessment of safety of Dukovany NPP after 20 years of operation“ was also approved.

In 2004 the operation of Dukovany NPP was of a high quality. The number of reported events reached 44, from that 12 were rated INES Level 0 according to the International Nuclear Event Scale. No event rated INES Level 1 or higher occurred. In 2004 there was also no breach of Limits and Conditions and no forced transfer to regimes, of which consequence would be an unplanned outage of the reactor.

The number of the assessed events and automatic scrams of the last year compared to previous years is presented in the following table:

Dukovany NPP	2000	2001	2002	2003	2004
INES 0	21	17	12	13	12
INES 1	0	1	2	1	0
Automatic reactor scram	1	0	0	1	0

Results of the assessment of the system of operational safety indicators of Dukovany NPP for last year declare that the operator keeps the achieved state as well as the trends of the nuclear safety assurance in total on a very good level. When comparing results to previous years in the areas of assessment of following the Limits and Conditions of safe operation, limitation systems action, tightness of barriers and unplanned reductions of the output, the best results were achieved for the period of monitoring the safety indicators at Dukovany NPP. The group of indicators for operation of the safety systems shows a slight debasement of the monitored values compared to the last year however in the context of assessment of the last six years these results are favorable and above standard compared to other operators. A slight debasement shows the share of human factor influence on the reported events. The SÚJB will pay individual attention to the reasons of this situation in the following evaluation and inspection period.

In 2004 the planned outages proceeded for refueling the defined part of fuel in the nuclear reactors at all the four units at Dukovany NPP. After completion of each outage and presentation of the documentation proving preparedness of the units for further operation, the SÚJB issued permission for the reactor start-up (followed by full capacity power). Outages, including the implemented activities and inspections, proceeded in accordance with the schedule, the planned dates were met with the exception of the outage at Unit 1, where two deficiencies were found at the conclusion, of which correcting led to an extension of the outage.

The first one was the finding of a leak of the separation plane of the pressurizer inspection chamber, when the unit was cooled down to be re-sealed in accordance with the Limits and Conditions. When opening the cover a seal fell in the opened primary circuit. Finding and getting out of the seal then proceeded in accordance with the documentation and did not affect further procedure of the outage. The second deficiency that was found was performance of a replacement of the subdistribution switchboards, when after they were put into operation there were problems with signaling at the main control room, including the risk of an unwanted arrangement of fittings. The operator did not carry out a complex investigation of the event; he implemented a quick solution and continued in work related to starting of the unit in higher regimes without taking the necessary steps for correction. After finding out the situation on part of the SÚJB and consequent consultations the operator stopped the starting activities and a specialized company was ordered. After the analysis was carried out corrective measures were proposed and accepted, which secured a safe situation and enabled issuance of a positive surveillance decision for restarting the reactor on a minimal checked level.

In connection with preparation of the last phase of I&C systems replacement there was assessed a set of updated responses to the SÚJB requirements for additional information (RAI) and inspection of the safety documentation (amendments to the Safety Report, thematic reports and other background documents). Regarding the 125 RAI the SÚJB provided the operator with the list of persisting requirements and restrictions. The amended and extended responses to RAI and new inspections of the safety documentation were handed over to the Sate Office for Nuclear Safety for assessment at the end of the year.

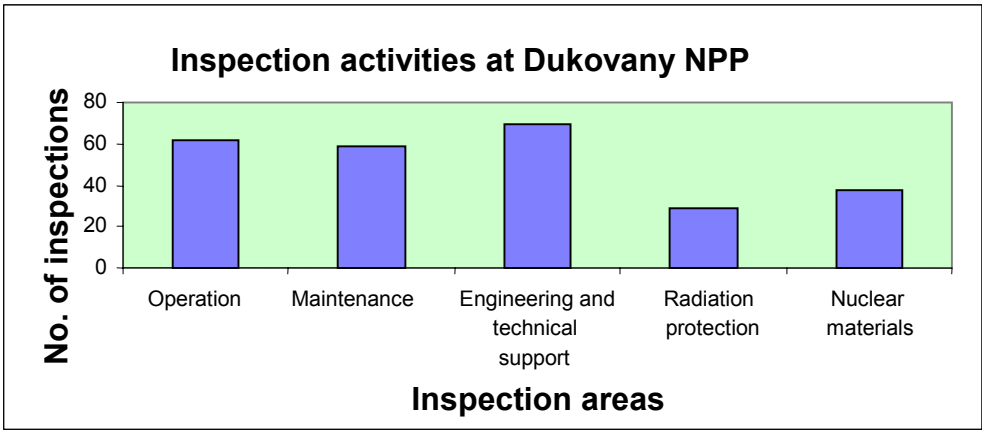
Inspectors of the SÚJB monitored and assessed the whole process of development, production, tests and installation of the facilities (HW and SW) of the recovered I&C system of Unit 3. Their participation in the audits at producers, inspection of installation work and tests during outage and restarting of the Unit 3, performance of detailed analysis of the programs and results of equipment tests performed by the producers and an assessment of the summary report on results of the tests of the recovered I&C system on a display simulator secure the necessary outline and sufficient awareness of the surveillance regarding following of the requirements for nuclear safety.

Several meetings, at which the operator presented the prepared program of tests, when starting Unit 3 with the recovered I&C system in 2005, were held during the year. The SÚJB approved a summarized program of these tests, assessed and commented the program proposals of the selected tests, being of crucial importance for demonstration of the correctness of the installation and function of the I&C system.

On the basis of results of the State Examining Committee for special qualification testing of selected personnel the SÚJB awarded the licence of activity at the nuclear power plants in the Czech Republic – Dukovany NPP - to 25 successful applicants. To assess the following of the requirements for preparedness of shift staff there were carried out four planned inspections, at which no deficiencies, which would be contrary to the Atomic Act and the consequent legal regulations, were found out.

Inspection activities

The nuclear safety inspectors carried out in total 157 inspections at Dukovany NPP. Most of them were planned in accordance with the half-year plans of inspections. The following table shows a list of the inspections carried out and appraised in individual areas.



All inspections of the SÚJB at Dukovany NPP were carried out in accordance with the requirements of the Atomic Act and the Inspection Act. The way of carrying out the inspections is possible to traditionally divide in the *routine* inspections, carried out on the daily basis by the site inspectors and mapping the actual situation of securing the nuclear safety of all activities related to operation of the nuclear power plant, the *planned* inspections, carried out in accordance with the approved plan of inspections and securing a detailed control of following the conditions of safe operation usually divided in the safety related systems and activities and the so-called *ad-hoc inspections* induced with the actual situation of the individual nuclear units and activities performed at these units.

The actual assessment of the inspection results then proceeds in three stages. The first assessment stage proceeds immediately after the inspection carried out by the inspector, respectively an inspection team. The second assessment stage is represented by the monthly appraisals carried out by an expert evaluating commission of the SÚJB appointed for this purpose and the third stage, the half-year appraisals are carried out by the same expert commission and management of the SÚJB.

On the basis of such appraised inspection activity at Dukovany NPP for the year 2004 it is possible to state that the operation of this nuclear power plant was safe in accordance with the relevant legal regulations and requirements of the state surveillance. No serious deficiencies affecting the nuclear safety were found by the inspection activities. Small nature deficiencies were declared in the quality assurance system. These deficiencies can be mostly attributed to in the long-term proceeding and not always well-directed reorganization at the license holder – ČEZ, a.s.

2.3. ČEZ, A.S., TEMELÍN NUCLEAR POWER PLANT

Two units with the VVER 1000 reactors of the type 320 were put into operation at Temelín NPP. For the first three quarters of the 2004 year both units were operated in testing operation. In October 2004 both units finished the testing operation regime and on the basis of permission of the SÚJB within the meaning of the Atomic Act they were put into operation. The units were operated mostly in nominal power in accordance with the requirements of the Power Control Center. During the year the Unit 1 was shut down once by the limitation system action, the Unit 2 three times in total by the protection system action (in one case from the non-power state) and once by the limitation system action. One planned complete outage for refueling proceeded at each unit. Other outages were caused due to the necessity of repairs of the secondary circuit equipment.

Evaluation activities

An administrative procedure, during which ČEZ, a.s. gradually submitted many prescribed and required documents for issue of the permission to operate the Unit 1 and 2 of Temelín NPP, was completed in October 2004. In the decisions on the permission to operate, the SÚJB defined several conditions with permanent validity, of which performance is the assumption for obtaining the surveillance of the sufficient, in some cases also above standard, appraisal of assuring the nuclear safety requirements. This is the question especially of a periodical assessment of operational safety, regular presentation of Safety Report up-dates, update of emergency procedures and a permanent probabilistic safety assessment and update of the study of Probabilistic Safety Assessment (PSA). Prior issuing these permissions the SÚJB performed the final inspection of the safety reviews results for both units of Temelín NPP within the assessment of the presented Pre-operation Safety Report.

In connection with the planned transfer of Temelín NPP into operation, ČEZ, a.s. submitted new revisions of the documents “Limits and Conditions of Safety Operation of Temelín NPP“ for Unit 1 and 2 to the SÚJB, which were processed in form to meet the conditions of the SÚJB when issuing agreements on transfer between the individual phases of commissioning. ČEZ, a.s. should assess the experience from the testing operation of both units in relation to performance of the Limits and Conditions and include these in their changes. Since it resulted from the assessment of the

reviews of both documents that the proposals will contribute especially to clearer interpretation of the requirements defined in the Limits and Conditions, the SÚJB approved the submitted reviews.

At the end of 2004 the SÚJB approved the time-limited change of the limiting conditions for safety systems performance of Units 1 and 2 of Temelín NPP. Approval of this change is based on the proof of higher reliability of the safety systems reasoned with the analysis of the risk of expected events. Unlike the original implemented situation it is related to an increase of nuclear safety.

During the year the SÚJB permitted implementation of a total five changes affecting nuclear safety, which except the replacement and modernization of equipment respond to findings during the testing operation. The SÚJB approved the review of the Quality Assurance Program for the permitted activities considering changes in the organization structure of ČEZ, a.s., the change of the List of Selected Equipment for Unit 2 and the change of the Program of Operation Inspections, which consider the performed modifications of equipment and systems and new approaches to monitoring and appraising their condition.

During the year the operator reported in total 329 events, of which 41 were assessed with the INES Level 0 and three events with the INES Level 1. Other events were unimportant in terms of nuclear safety. An event at Unit 1, which occurred in August 2004, after failure of the voltage distribution plant and which was connected with an unplanned start of safety systems, was rated the INES Level 1. In March, after completing an outage, during heating Unit 2 and when changing among the operation regimes, hydro-accumulators were non-operative and in June a leakage at the aftercooling pump delivery was found out at the shut down unit after the failure of a power transformer, liquid leaked into a chamber. Both of these events were also rated the INES Level 1. The number of assessed events and automatic scrams in the last year compared to previous years is presented in the following table:

Temelín NPP	2000	2001	2002	2003	2004
INES0	20	10	26	36	41
INES1	1	2	2	2	3
Automatic reactor scram	3	3	2	2	2

There was no reactor scram (ROR) at Unit 1. At Unit 2 there were two automatic and one manual reactor scrams. The first automatic scram was caused by a failure of the unit transformer device. The unit automatics worked in accordance with the design. The event was accompanied with a minimal oil leakage from the transformer in litres. The oil was entrapped at the place with a sorbent without any other consequences. The staff activity was assessed correct and in accordance with the operating procedures. The second automatic scram occurred due to the failure of communication of the required values of the turbo-feeding pumps revolutions and the consequent signal of a low level in the steam generator. The event was solved by the operator in accordance with the operating regulations. The last shut down of the Unit 2 was in December during power ascension after an outage. During the planned testing of the control elements failure the unit was manually shut down following an inaccurate low position drop of 10 control elements. All events were duly assessed and solved by the surveillance as well as the operator. Many verifying tests were carried out. The SÚJB additionally ordered another review of the results and their analyses and SÚJB will monitor the additionally made analyses individually.

In 2004 there were two breaches of the Limits and Conditions at Temelín NPP. The first of them consisted in not following the requirements for the period of the duration of the exceptions from measures against infiltration of pure condensate into the reactor during the outage of Unit 2 in February 2004. This breach was found out by the site inspectors of the SÚJB. The breach was significantly caused by inconsistent following of the valid control documentation by the shift staff. The license holder on its basis performed modifications in the operating and control documentation, with which the requirements for recording the exceptions from the presented measure were tightened up. The second breach of the Limits and Conditions was caused by unsuitable handling of the pressure measuring system in the pressurizer. Within the event investigation modifications were implemented in the operating documentation, where is detailed procedure in situations similar to the one, which preceded the faulty manipulation. The staff was duly trained and tested from the amended documents.

The year 2004 was only the second year, when the processing of the operational-safety indicators for Temelín NPP proceeded. For that reason it is still not possible to carry out a similar statistical comparison like for Dukovany NPP. In the area of important events recording a slight increase of the Safety important events was

registered, however with a decrease in the share of human factor influence. An important reduction of the number of limitation system action is worth mentioning.

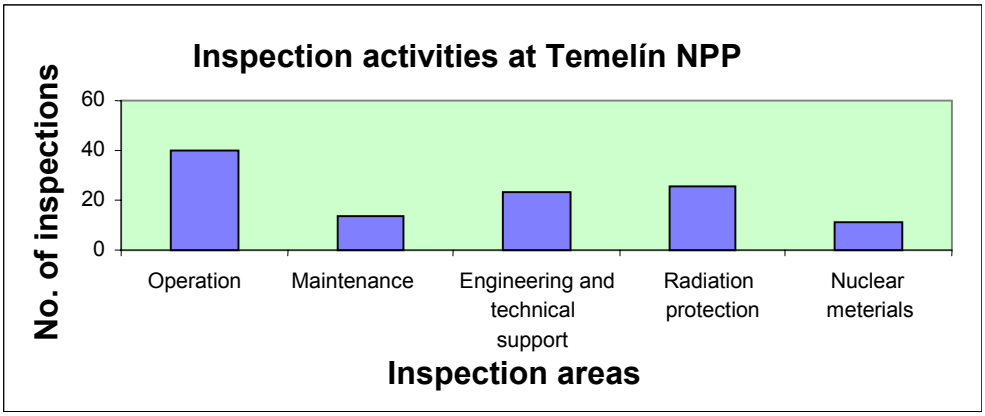
Outages for refueling proceeded at both units; at Unit 1 it was performed an outage including a complete recovery of the core and inspection of the reactor pressure vessel. After completion of each outage and presentation of the documentation proving preparedness of the units for further operation, the SÚJB issued the permission for the reactor start-up to the minimal checked condition and further operation. A number of modifications of various equipment were done during both outages. Suitability of their performance resulted from the existing assessment of the testing operation of both units. Among the important changes it is possible to present the control system algorithm arrangements, which the operational behavior of the units optimized. Inspections of the outages did not find deficiencies in the technical conditions of the equipment and in the performance of the prescribed inspections, however partial deficiencies were found in the way of documentation of preparedness of the units after outages and also in the organizational securing of some activities? On the basis of requirements of the SÚJB the license holder corrected the observed deficiencies and accepted measures against repeating these deficiencies, which, however, were not effective in some cases.

Complex inspections of the physical protection of nuclear materials and nuclear facilities at Temelín NPP proved that the operator permanently fulfils the approved method of the physical protection. The performed cooperative training with the Czech Police proved a good preparedness of all bodies for the physical protection of Temelín NPP. The measures accepted on the basis of recommendations of the IPPAS mission (mission organized by IAEA) dated 2002 were continuously implemented as well as the recommendations of the inspectors to arrange the inspections of objects brought into the nuclear power plant and the way of keeping the security service documentation.

On the basis of the results of the State Examining Committee for verification of special qualification of selected personnel, the SÚJB awarded the licence of activity at Temelín NPP to 35 successful applicants. To assess following of the requirements for preparedness of shift staff two planned inspections were carried out, at which no deficiencies were found.

Inspection activities

The nuclear safety inspectors carried out 85 inspections in total at Temelín NPP, most of them in accordance with the half-year plans. The following table presents an outline of the assessed inspections in individual areas.



In this connection it is necessary to point out that the numbers of inspections carried out at Temelín NPP are related to the number of the operated units and therefore they necessarily differ from the values presented for the inspection activities at Dukovany NPP.

After putting both units into operation, the same regime as at Dukovany NPP for the inspection system of the SÚJB was accepted. That means, as mentioned above, the same types of inspections focused on the same areas of the safety-important activities and systems. Also the SÚJB staff constitution of the Temelín site was stabilized to the system of a manager plus an inspector per each unit.

From the inspections that were carried out and their assessment it is possible to state that the approach to and focus of the operator on nuclear safety when operating and maintaining the units has an increasing trend. Small deficiencies found during the inspections were adequately solved. A certain problem requiring the attention of the operator and the surveillance are the small deficiencies found in the system of feedback and assessment of events. As well as at Dukovany NPP, here also the inspections identified partial problems in the quality assurance system mainly caused by the proceeding reorganization of ČEZ, a.s. Unlike at Dukovany NPP here were in two cases of identified problems with following regulations in the area of radiation control.

Despite the above-presented findings, it is possible to assess the operation of Temelín NPP to be safe and in accordance with the requirements laid at the nuclear safety. The increased number of outages and a reduction of the output may be put to the account of the reduced reliability caused by the continuing tuning of systems necessary for the operation of turbines and electric generators.

2.4. NUCLEAR RESEARCH INSTITUTE ŘEŽ A.S.

Evaluation activities

In 2004, an assessment of results of the mission IAEA INSARR at LVR-15 was carried out and its proposals and recommendations, which will lead to increase of the nuclear safety level of this reactor. Also, the safety documentation was assessed in connection with the change of some parts of the Limits and Conditions of LVR-15 and with permission of the critical experiment at LR-0. In connection with the permitted reconstruction of the high-level radioactive wastes storage a program of Pre-complex testing and Complex testing for added elements of the technical system of the store physical protection was approved.

During operation at LVR-15 there was no breach of the Limits and Conditions and no event assessed according to the INES scale. During the year 2004 there were 5 unplanned scrams of LVR-15 by reason of failure of the external electric network. This problem has been solved within the proposals and recommendations for increased level of nuclear safety. The outage proceeded in accordance with the Limits and Conditions of LVR-15. During operation of the reactor LR-0 there was no breach of the Limits and Conditions and no event rated according to INES.

Between the Nuclear Research Institute Řež and the SÚJB was signed an agreement on the range and way of providing information on selected events related to the safety operation of the reactor LVR-15 and LR-0.

On the basis of the test results the successful applicants were awarded a licence for activity at the nuclear facilities in the Czech Republic – the Nuclear Research Institute eight licenses.

Inspection activities

In 2004, eight inspections were carried out, focused especially on meeting the conditions of the resolution and conclusions of the inspection protocols, conclusions of the mission IAEA INSARR, following the Limits and Conditions and the operating documentation, at LVR-15 and LR-0 and two planned inspections of physical protection of nuclear materials and nuclear facilities, including the stores of fresh fuel and high-level radioactive wastes. No deficiencies were found with the inspection activity.

2.5. NUCLEAR ENGINEERING FACULTY OF CZECH TECHNICAL UNIVERSITY (ČVUT FJFI) – VR1 TRAINING REACTOR

Evaluation activities

By reason of the control system change there was reviewed the Safety documentation – the change of Limits and Conditions. Operation of the reactor was assessed failure free without breaching the approved Limits and Conditions. No events rated according to the IAEA INES scale occurred.

Between the ČVUT FJFI – KRJ and the SÚJB an agreement was signed on the range and way of providing information on selected events related to the safe operation of the reactor VR-1.

On the basis of the test results the successful applicants were awarded a licence for activity at the nuclear facilities in the Czech Republic – FJFI five licenses for activity at the nuclear facilities.

Inspection activities

In 2004, three inspections were carried out, focused on the quality system documentation of the reactor VR-1, critical experiment VR-1 and on the inspection of the operating documentation and the core of VR-1 documentation and one complex inspection of physical protection at the research reactor VR-1. No serious deficiencies were found with the inspection activity.

2.6. TRANSPORT OF NUCLEAR MATERIALS AND RADIOACTIVE SUBSTANCES

After reviewing and positive assessment of the safety documentation processed in accordance with the Atomic Act requirements and the relevant codes of practice the SÚJB issued five permits for the transport of nuclear materials and two permits for

transport under special conditions. On the basis of an application the Office approved three changes of conditions of the already issued permits for transport and with one resolution the emergency code for transport of nuclear materials was approved. Together with the issue of the permit for transports the method of physical protection of nuclear materials transportation was also approved.

The SÚJB issued 23 decisions in total on type of the transport packages, from that 14 of Czech production and nine for foreign. For five construction types the decision was issued repeatedly by request of the producers whereas the validity of the previous decisions of the SÚJB already expired, the remaining 18 were newly approved. After a positive assessment of the submitted documentation 16 constructive types of radioactive materials of special form were approved and they were assigned a new identification number in accordance with the recommendation of the safety instructions of IAEA ST-1.

The type approval of spent fuel assembly casks is worth mentioning – “Cask for spent fuel of the reactor (VPVR)” and CASTOR 440/84M. Within the international project RRRFR (Russian Research Reactor Fuel Return) focused on the transport of spent fuel of the Russian (Soviet) origin from research reactors, the process of the type approval of the transport and storage package “Cask for spent fuel of the reactor (VPVR)” B(U)F type, finished in the first half of 2004. The package is intended for road and railway transport and for storage of the fuel assemblies, stainless steel containers with fuel assemblies or with fuel rods from the fuel assemblies and it will be used for transport of the spent fuel occurred during operation of the reactors from the premises of ÚJV Řež a. s. to the Russian Federation. The administrative procedure regarding the type approval of the package CASTOR 440/84M was suspended by reason of the requirement for processing and delivery of independent assessment of the selected parts of the safety documentation and for submission of the amended documentation. Several meetings consequently proceeded with representatives of the applicant for type approval – the company GNS GmbH, within which were discussed the questions related especially to the structure and objective purpose of the safety documentation inspection.

A total of 50 transports were carried out on the basis of the SÚJB permission, from that five were combined of air and road international transports of fresh fuel from the Russian Federation to ČEZ, a. s., Dukovany NPP, one combined sea and railway

international transport of fresh fuel from the USA to ČEZ, a.s., Temelín NPP, two combined air and road international transports of highly enriched fresh fuel from the Russian Federation to ÚJV Řež a. s. and highly enriched uranium from ÚJV Řež a.s. to the Russian Federation. Also six internal transports were carried out of spent fuel in ČEZ, a.s., Dukovany NPP. At the nuclear facilities internal transports were performed of fresh fuel, six in ČEZ, a.s., Temelín NPP and four in ÚJV Řež a. s. In 2004 also ten transports of uranium concentrate from the plants DIAMO, s. p. abroad were performed. Besides oxides of natural uranium were transported internally from the factory UJP Praha, a.s. to various glass factories. In the monitored period there also proceeded two transports of nuclear materials and radioactive materials under special conditions.

In the area of inspection of the nuclear materials and radioactive materials transports the SÚJB carried out in total 12 inspections. On the basis of results of the carried out inspections it is possible to state that in the area of the transports of nuclear materials and set radioactive sources the requirements of the Atomic Act related to nuclear safety, radiation protection and physical protection were fulfilled as well as the conditions of relevant decisions issued by the SÚJB.

2.7. RADIOACTIVE WASTE AND DECOMMISSIONING

The Radioactive Waste Repository (ÚRAO) in Dukovany is used to store the low-level and intermediate-level waste, which is generated in nuclear power plants operated by the ČEZ, a. s. company. The total capacity of this repository is approximately 55,000 m^3 (about 180,000 barrels); approximately 2,830 m^3 of canisters containing the radioactive waste are housed in this repository. The State Administration of Radioactive Waste Repositories (SÚRAO), as the repository operator, ensures constant monitoring of the environmental impact of the repository. Subsurface-water samples are taken and analyzed on a regular basis. This monitoring started before the beginning of the repository operation.

The Radioactive Waste Repository Richard has been used since 1964 to store the institutional radioactive waste. More than 24 thousand canisters are housed in this repository. The environmental impact of this repository is monitored by the operator on a regular basis.

In 2004 two inspections were performed in order to verify the physical protection of nuclear facilities of the State Administration of Radioactive Waste Repositories, namely the Dukovany and Richard Radioactive Waste Repositories. The inspection verified that the physical protection of the Dukovany Radioactive Waste Repository is fully assured in accordance with the contract signed between Dukovany NPP and the State Administration of Radioactive Waste Repositories within the assurance of the physical protection of Dukovany NPP on the level of requirements set for the 3rd category from the physical protection point of view. The physical protection of the Richard Radioactive Waste Repository is assured on the same level through the autonomous safety system connected to the Centralized Protection Console of the Czech Police.

The Bratrství Radioactive Waste Repository was put into operation in 1974 and it is designed solely for storing the institutional radioactive waste containing natural radionuclides. More than 2,100 canisters are housed in this repository. The environmental impact of this repository is monitored by the operator on a regular basis. The inspections performed by SÚJB inspectors in 2004 found no breach of requirements for safe management of radioactive waste set in the Limits and Conditions for safe management of radioactive waste in Bratrství Radioactive Waste Repository.

2.8. Interim Spent Fuel Storage Facility in Dukovany NPP

The Interim Spent Fuel Storage Facility is used for the long-term storage of spent fuel from the reactors operated on the premises of Dukovany NPP. The operator continuously monitors the fundamental physical quantities, such as the pressure between the primary and secondary cover of each of the CASTOR 440/84 storage casks, the dose equivalent rate in connection with the radiation situation mapping in the interim storage facility and its vicinity, and the surface temperature of all housed casks. The measured values do not exceed the values approved by SÚJB in the Limits and Conditions for permanent operation of the Interim Spent Fuel Storage Facility. In 2004 the measures began to be implemented in order to ensure the long-term safe handling of casks throughout the use of the interim storage facility. At the end of 2004 the interim storage facility housed 54 CASTOR 440/84 casks accommodating 4,644 fuel assemblies altogether.

2.9. HIGH-LEVEL WASTE STORAGE FACILITY AT ÚJV ŘEŽ A. S.

The High-Level Waste Storage Facility (VAO) is continuously used for wet and dry storage of the spent nuclear fuel generated during the operation of the VVR-S (the LVR-15 reactor before its reconstruction) and the LVR-15 research reactors. The reconstruction works related to installation of the hot chamber for repackaging of 190 pieces of storage units containing the spent EK-10 nuclear fuel into sealed capsules proceeded in 2004. This project is the 22nd part of the complex public contract for execution of redevelopment works in order to eliminate old environmental loads in ÚJV Řež a. s. funded by the National Property Fund. At the end of 2003 the SÚJB granted the permission for redevelopment or other changes affecting the nuclear safety, radiation protection, physical protection and emergency preparedness of the nuclear facility with workplace of the 3rd or 4th category in accordance with Section 9 paragraph 1 letter f) of Act No. 18/1997 Coll.. It includes construction works, construction of the hot chamber and repackaging of the EK-10 fuel. The High-Level Waste Storage Facility housed 240 pieces of IRT-M fuel assemblies and 16 pieces of the EK-10 fuel assemblies in a wet way on December 31, 2004. The storage facility houses 190 pieces of storage units containing the spent EK-10 nuclear fuel in a dry way.

2.10. OTHER MONITORED SUBJECTS

The licensees, UJP Praha, a.s., DIAMO, s.p., Stráž pod Ralskem, DIAMO, s.p., the GEAM branch office in Dolní Rožínka and ČMI-IIZ – Praha, permanently pay adequate attention to the physical protection of nuclear materials, or nuclear facilities classified as 3rd category in terms of physical protection, adherence to the requirements of relevant legal regulations and the approved method of physical protection.

The Office gave new temporary decisions on the permit to manage the radioactive waste in Dukovany and Temelín nuclear power plants in the range of collecting, sorting, processing, conditioning and storing. The Office's decisions permitted a similar range of activities for ÚJV Řež, a. s. and the ALLDECO.CZ, a. s. company, which ensures some activities related to the management of radioactive waste for

Temelín NPP. Together with the permits issued, the Limits and Conditions for safe management of radioactive waste were approved for these nuclear facilities.

The SÚJB's inspection activities carried out at the above-mentioned organizations verified that the licensees fulfil the approved administrative and technical measures taken in order to ensure the physical protection of nuclear materials, and that the connection of the safety system to the Centralized Protection Console of the Czech Police is provided.

The inspections related to the management of radioactive waste performed at ALLDECO.CZ, a. s., and WADE, a. s., found no breach of requirements stipulated by the relevant legal regulations for the management of radioactive waste.

3. STATE SURVEILLANCE OF RADIATION PROTECTION

3.1. NUMBER OF IONIZING RADIATION SOURCES AND RESPECTIVE ASSOCIATED WORKPLACES

The State Office for Nuclear Safety performs a number of activities in the field of health and environmental protection against the adverse effects of ionizing radiation. The scope and demanding character of work associated with the performance of the state administration and supervision in this field may be presented by data on the number of the ionizing radiation sources and workplaces with such sources. Pursuant to Act No. 18/1997 Coll., 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 most potentially 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 process equipment (detailed in the second section of the report), particularly four operated power reactors in Dukovany NPP and two power reactors in Temelín NPP, 2 research reactors in ÚJV Řež, a.s. and one training reactor at the Nuclear Engineering Faculty of Czech Technical University in Prague;
- The Interim Spent Nuclear Fuel Storage Facility and the Radioactive Waste Repository 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.;
- 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 Bytíška a.s.

The workplaces producing and distributing, or 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., the Czech Metrology Institute, the workplaces of ÚJV Řež a.s. and the Nuclear Physics Institute of Czech Academy of Sciences Řež, and the workplace of the VF, a.s. company in Zbraslav, are among important workplaces of the 3rd category.

The summary of important and simple ionizing radiation sources as of December 31, 2004 is outlined in tables No. 3.1 through 3.3 by type of ionizing radiation sources.

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. in linkage to workplace equipment and to activities carried out at one place all at once, or to the

form of processed substances and other criteria. The number of workplaces of 1st and 2nd category changed against last year, as some of the workplaces were consolidated and other workplaces are categorized as workplaces with minor ionizing radiation sources subject to the reporting duty.

Table No. 3.1. Workplaces with open radionuclide sources

	3rd category	1st and 2nd category
Health service and veterinary applications	3	98
Industry and other applications	7	69
Total	10	167

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 a piece character; except for calibrating sources they are not applied directly, but are fitted into respective devices (e.g. crack detection or logging sets, measuring instruments). 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). The table even lists sealed radionuclide sources, which are housed in the working storage facility or which are intended for liquidation.

Table No. 3.2. Sealed radionuclide sources (URZ)

	URZ in facilities with important ionizing radiation sources	URZ in facilities with simple ionizing radiation sources
Health service	700	42
Industry and other applications	1257	4445
Total	1957	4487

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 No. 18/1997 Coll.) deemed only such facilities whose operation results in radiation of power exceeding 5 keV. If (such as 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	2542	4586
Industry	5	301
Other applications (research etc.)	6	148
Total	2553	5035

Pursuant to Act No. 18/1997 Coll., the use of the minor sources does not require any permit, however their operator is obliged to report to the State Office for Nuclear Safety. 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.

3.2. EMERGENCY CASES

In 2004 a total of 90 cases were reported[1)], which were investigated by the radiation protection division (outside of the area of nuclear facilities) and related to ionizing radiation source management or activities resulting in exposure:

- **38** vehicle captures (railway wagons, trucks) transporting iron scrap; the vehicles were captured by measuring equipment at the entries into metallurgical works, when:
  - in **14** cases it involved the capture of materials contaminated with natural radionuclides (in particular Ra-226),
  - in **4** cases it involved the capture of materials contaminated with artificial radionuclides (Co-60, Sr - 90),
  - in **19** cases the load contaminated with radionuclides was return to the carrier outward,
  - in **1** case it involved the unspecified, however, not important contamination of material,

[1] The summary does not include the cases recorded by measuring systems at frontier crossings, which were not investigated by the SÚJB inspection. The General Customs Directorate executed measurement using the stationary measuring systems at frontier crossings (Mosty u Jablunkova, Bumbálka, Bartultovice, Horní Lideč – Střelná, Horní Lideč - Sidonie, Bylnice, Sudoměřice, Velká nad Veličkou, Rozvadov). With respect to the accession of the Czech Republic into the European Union and to changed practice at the state frontiers of the Czech Republic, only random inspections were performed since May 1, 2004.

- **30** captures of collective wagons with municipal waste at the entry into waste incinerating plants or trash disposal sites, of which:
  - in **8** cases of medical stores (diapers, etc.) contaminated with radionuclides used in therapy and diagnostics at nuclear medicine workplaces (Tc-99^{m}) were isolated,
  - in **21** cases objects (dials, compasses) or materials (uranium ore, debris, ash, etc.) were isolated containing natural radionuclides (Ra-226),
  - in **1** case the material (metal strip) contaminated with the artificial radionuclide (Sr-90) was isolated.
- In **2** cases it involved the capture of building material contaminated with natural radionuclides at the entry to the premises of Dukovany NPP; the investigation found no inadmissible release to the environment.
- In **6** cases the finding of an object was reported with the suspicion that it involves the ionizing radiation source, when:
  - in **1** case it involved the finding of radiation source equipment (Am – 241),
  - in **1** case it involved the Sr-90 irradiator found in the former military reservation Milovice,
  - in **2** cases it involved the ionizing fire detectors (6 pieces were found in the metal scrap collecting station and 1 piece was found by a private person and secured by Fire Rescue Brigade),
  - in **2** cases it involved false positive cases (empty container, decomposed radionuclide irradiators).
- In **2** cases the unauthorized sale of ionizing radiation sources was detected (it involved the dental X-ray apparatus and ionizing fire detectors).
- **5** cases related to workplaces with ionizing radiation sources (damage to a crack-detection probe, exposure of personnel, activity increase in the wastewater, tube post damage).
- In **1** case a passenger carrying minerals contaminated with natural radionuclides was detained at the Ruzyně Airport.
- **2** cases related to the transport of radioactive substances (car accident, damage to a consignment in air transport); no radioactivity escaped.
- In **2** cases it was suspected of an occurrence of radioactive material in the environment (the material intended for export at the Customs Office in Uhříněves, and in a private residence.
- **2** cases related to the capture of nuclear materials were submitted to the Department of Nuclear Non-proliferation to be solved.

In cases where the presence of contaminated materials (substances, objects) was confirmed, such materials were, based on SÚJB decision, found, isolated, safely stored or housed, or escaped to the environment.

Particular attention was paid to the following cases:

- During the crack-detection works on the site at Lány, the truck caused damage to the Troxler crack-detection probe containing sealed radionuclide source; the cover of the sealed radionuclide source was not damaged and thus neither exposure to persons nor escape to the environment occurred.
- The I-131 activity increased in the waste water in the nuclear medicine ward at the FNsP Ostrava; it was caused by the error in design (some of the wash-basins were not connected to the special sewerage, which was removed without delay; estimated activities released to the waste water drained from the facility did not exceed the values requiring regulatory measures.
- Clothes of six employees of ŠKODA JS, a. s., Plzeň, who executed specialized measurements at the nuclear power plant in Armenia, were found contaminated (it was caused by deficiencies in the regime measures at the foreign client). The whole-body measurement of employees carried out by the State Institute for Radiation Protection just after their return from abroad in September 2004 did not confirm any internal contamination.
- The State Office for Nuclear Safety was warned of the sale of ionizing detectors; the inspection found that the sale was not permitted. The decision was issued on the preliminary measures to preclude from sale – the case is still monitored by the SÚJB inspection.
- The State Office for Nuclear Safety found that a dental X-ray apparatus is exposed for sale in the second-hand shop without permission. The decision was issued on the preliminary measures to preclude from sale – the case was investigated by the Czech Police and handed over to the SÚJB inspection in order to be solved.
- A device containing the radiation source (Am – 241) was found in the leased garage (owner is the GREHA s.r.o. company); the irradiator was handed over to the ÚJV Řež, a.s. company for liquidation – the case is still monitored by the SÚJB inspection and the Czech Police.

- The exposure of the operator of the cabin X-ray apparatus used in the industry at the workplace of the Nemak Europe, s.r.o. company in Most, was involved due to damage to this apparatus; estimated dose of 1 μSv.

The radiation protection inspection monitored **26** cases at the ČEZ, a.s. nuclear power plants – Dukovany and Temelín NPP, which did not have the nature of an emergency event, however, they related to observance of the requirements of the radiation protection or to the operability of the equipment designed for monitoring or transfer of data from monitoring (**17** of these cases were rated INES Level "0" according to the International Nuclear Event Scale (INES) – i.e. non-significant cases; the rest was evaluated outside the International Nuclear Event Scale). This involved the contamination of employees, working areas (in principle, due to found leakage of technological equipment), escapes to the environment, short-term non-functionality of the monitoring equipment, data transfers, violation of working procedures or deficiencies in the operational documentation. The annual authorized limits for the exposure of persons, outlets or escapes to the environment were exceeded in none of the above-given cases.

The SÚJB paid increased attention to the following cases:

- During inspection and repair works, unimportant surface contamination of 6 employees occurred (on the level of maximum tens of Bq/cm^2); no internal contamination was found; the external exposure did not exceed 2 mSv.
- In two cases the radionuclides escaped to the environment. The first case involved the escape of tritium through the pump seal of the drainage fitting to the OTKA82 drainage well and to the storm sewer, and then to the retention tank Býšov and to the atmosphere through the expander of the condensate header tank. The design deficiency was determined as the root cause and measures were taken to eliminate the repetitive occurrence of a similar event. The second case was recorded when the retention tanks were drained and the standing operating procedure was not followed. The intervention level for single-shot release of the tritium activity was exceeded according to the monitoring program for the outlets because more than 7/365 of the annual authorized limit was released.
- In 6 cases the point irradiators (dose rate from photons maximum tens of mSv/h) were detected in the NPP controlled areas by the NPP dosimeters due to

technological operations performed during the outage, or a periodic check of the workplace. It involved the corrosive products of the equipment and technologies checked or repaired during the outage. The irradiators were detected during the periodic monitoring of the workplace, or during the monitoring after work completion, and they were liquidated in accordance with the operating procedures.

3.3. 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 No. 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 2004, in association with the execution of state administration, the section of radiation protection issued a total of 2,876 decisions; of this number 2,550 decisions were issued by regional centers. A comparison of the total number of decisions issued in 2004 with previous years (3,467 decisions in 2003; 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 No. 18/1997 Coll., effective from July 1, 2002 the situation returns to a routine state.

3.4. Inspection Activities

In 2004, inspection activities were carried out through the combination of regional (inspections carried out by the Regional Centers of the SÚJB) and specialized (specific types of ionizing radiation sources in the whole territory of the Czech Republic) inspection system. In the field of natural sources, the inspection activities are carried out by the Exposure Management Department.

The activity of Specialized Inspection Teams is focused on ionizing radiation sources and their workplaces where it is required to reach a 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 categories, radiotherapy workplaces, nuclear-power facilities, 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 categories.

The four-degree evaluation system is used in order to evaluate the inspection activities, This system was put into practice in 2003 (the Internal Regulation VDS 043 "Planning, preparation, execution and evaluation of inspections in radiation protection"). This system unified the practice of execution and evaluation of inspections within the whole Office as much as possible. Based on the experience and the most frequent failures, the following criteria were determined:

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.

The inspection activities of the Regional Centers of the SÚJB are executed on the basis of the approved half-year plans drawn up in the individual Regional Centers, and are based on the following principles:

- At least once in two years carry out inspection at all workplaces with significant sources used in the industry,
- Give preference of the inspection of significant ionizing radiation sources to inspections of single sources in a planned way, particularly in the field of health service,

- In the group of single sources, give priority to inspections at “problem” workplaces, where deficiencies may be expected,
- In the group of natural sources, focus on the water suppliers assuring public water supply, and on the manufacturer of building materials.

In the field of radiation protection, a total of 1,411 inspections were carried out in 2004, of which seven inspections were executed at the manufacturer of the glass stained with uranium. Table No. 3.4. shows the evaluation results of the inspections.

Table No. 3.4. Evaluation results of inspections in the field of management of ionizing radiation sources in 2004

Type of ionizing radiation source	Number of inspections evaluated with degree (%)			
	1 or 2	3	N	Total
Artificial	1,075 (96.7)	22 (2.0)	15 (1.3)	1,112
Natural	284 (94.9)	13 (4.4)	2 (0.7)	299
Total	1,359 (96.3)	35 (2.5)	17 (1.2)	1,411

The prevailing cause of degree 3 evaluation with checked persons managing ionizing radiation sources is the absence of the permit issued pursuant to Section 9 of the Atomic Act; or the permit is issued to an entity which over the course of time changed form or was transformed into another entity; or the deficiencies detected by the inspections are not removed within the prescribed time.

A comparison with the 2003 results in the field of artificial ionizing radiation sources shows an improvement of the radiation protection level with the inspected entities – in 2003, 93.9% of the inspected entities were evaluated with degrees 1 or 2 in comparison with 96.7% in 2004.

In the field of natural ionizing radiation sources, the situation is a little worse than in 2003, as regards the inspection evaluation, because the inspections executed in 2004 purposely focused more on problem areas.

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 Section 6 Paragraph 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 SÚJB.

3.5. PERSONNEL EXPOSURE CONTROL

Personnel exposure at workplaces with ionizing radiation sources in 2004 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 Dukovany and Temelín NPPs, 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 the uranium-mining industry (Diamo, s.p.). The license was also issued to the Dosimetry Institute of The Czech Academy of Sciences for the execution of dose calculations for 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 SÚJB. The preliminary evaluation of doses for 2004 shows the following:

- In Dukovany NPP in 2004 in total 1,953 employees were monitored using dosimeters (of this number 592 employees were the skeleton personnel of Dukovany NPP and 1,361 supplier employees), the cumulative collective effective dose was 673.79 mSv (including all doses exceeding 0.05 mSv) and an average personal effective dose 0.50 mSv, the highest yearly individual effective dose was 5.37 mSv (detected with an employee of a supplier organization).
- In Temelín NPP in 2004 in total 1,758 employees were monitored using dosimeters (of this number 499 employees were the skeleton personnel of Temelín NPP and 1,259 supplier employees), the cumulative collective effective dose was 468.34 mSv (including all doses exceeding 0.05 mSv) and an average personal effective dose 0.35 mSv. The highest yearly individual effective dose was 8.93 mSv (detected with an employee of a supplier organization).
- In the uranium-mining industry, a total of 344 employees were monitored at the underground workplaces of GEAM Dolní Rožínka. The cumulative collective effective dose was 3.1 Sv; the average individual effective dose was 8.99 mSv. The highest individual effective dose in 2004 was 27.73 mSv (underground); a

total of 550 employees in the uranium-mining industry were monitored with a cumulative collective dose of 3.9 Sv.

- With other industrial applications, about 2,300 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 (1.2 mSv) and logging work (4.5mSv).
- 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, the remaining employees showed an average yearly individual effective dose of 1.1 mSv; with certain professions the average yearly individual effective dose is higher as usual, e.g. with doctors – cardiologists ranged about 3.5 mSv.
- Personnel of specialized professions, such as service and inspections at the sources, personnel of approximately 960, achieved an average yearly individual effective dose of about 0.5 mSv.

The collective effective dose in 2004 was estimated at 13.5 Sv. The average yearly individual effective dose per single monitored employee was estimated at 0.62 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 took 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 88 license holders, the Office issued 2,680 of the radiation ID cards.

In 2004 three cases of single-shot exposure of personal dosimeters with doses exceeding 20 mSv were examined (for the relevant inspection period). Two cases of exposure of finger dosimeters with doses exceeding 150 mSv were investigated. Dosimetric services reported four 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 2003 (the Central Registry processes annual data only in the second quarter of the following year) 36 cases were detected in which the values of personal doses exceeded 20 mSv. Of this number 16 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. Eighteen cases in the health service field were re-examined; found data were reduced to attenuation with a protective apron. One case of the total number involves the field of crack detection – 23 mSv. In general, crack detection ranks among the activities where personnel exposure is relatively high (an average dose is about 1.5 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, continued in 2003 and is confirmed by the results from the Central Registry for 2004.

Another group of employees with doses higher than the reported averages are doctors – cardiologists. In October 2004, the SÚJB organized a seminar on the subject of “Radiation protection during intervention examinations”, which was aimed to show the doctors the possibility of optimization when performing their activities and to present international recommendations in this field. Positive response to this action indicated possibilities of further cooperation between the Office and the Expert Medical Corporations.

In relation to personnel exposure management at the workplaces with higher exposure from the natural sources, the inspection activities continued for the second year at the workplaces where the NORM materials or TENORM (Technologically Enhanced Normally Occurring Radioactive Materials) are managed, which are stipulated by the Decree No. 307/2002 Coll. The legislation related to workplaces with increased risk of natural exposure is based on, besides the experiences in natural radioactivity on the territory of the Czech Republic, the studies and recommendations published within the EU. The inspection activities at such workplaces are also used to specify the information on the use of materials with increased content of natural radionuclides, on their origin and method of processing, and on the rate of potential exposure of personnel. The commencement of the inspection activities related to the establishment of entities with permits to perform services of personal dosimetry at determined workplaces.

3.6. CONTROL OF POPULATION EXPOSURE

Great effort, which was made in the 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.

Medical Exposure

Another significant part of the population exposure, on reduction of which SÚJB focused its effort, was the medical exposure. This concerns the radiation, to which the persons, who undergo as patients medical examinations with the use of ionizing radiation sources, are exposed. The technique of monitoring and evaluating population exposure from sources applied in medicine is dealt with, as in previous years, mostly in cooperation 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 performed using ionizing radiation sources. Based on this data the Office carries out statistical evaluations that serve to manage the exposure from the medical use of ionizing radiation sources. The SÚJB objective also was to identify health facilities that show such actions. This valuable information may be used to connect this database to the source registry – which is important for the evaluation of doses in radio-diagnostics, as well as to support the inspection activities in the field of the management of medical exposures. With respect to the Act on Protection of Personal Data, the Office had to obtain approval of the health facilities in question. For this purpose, an extensive questionnaire survey was carried out. The majority of the addressed facilities gave their consent. In September 2004 the required data for 2002 was submitted to the SÚJB.

Within the scope of data processing, the cooperation with the Nuclear Medicine Clinic of the Palacký University in Olomouc, which particularly provides the methodology of dose calculation for the field of nuclear medicine, continued. In 2002, the cooperation focused on the processing of the proposal of new reference levels for the nuclear-medical examinations, analysis and check of data prepared for the United Nations

Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) and on the processing of the pilot study in the field of the evaluation of doses of medical personnel depending on the examinations performed was commenced. The study will be completed in 2005.

In the field of X-ray diagnostics, the task is solved aimed at gauging the parameters of the representative samples of the apparatuses, workplaces and examinations. The Office provided a summary of these workplaces together with the types of sources used in order to allow their significant selection, and the frequencies of performed examinations will be provided as needed.

In 2003/2004, the attention was also paid to the analysis of possibilities for acquiring information in the field of radiotherapy. The data of the General Health Insurance Company are analyzed as well as the data, which can be provided directly by the workplaces. In 2004, the questionnaire survey took place directly at the workplaces, which will be evaluated in 2005.

As part of the harmonization of the law of the Czech Republic with the law of the European Union in the field of medical exposure, a number of meetings were held with the Ministry of Health on implementation of the provisions of the Council Directive No. 97/43/EURATOM into the regulations on health service personnel education (Act No. 95/2004 Coll., Act No. 96/2004 Coll. and implementing decrees). High attention was paid to the assessment of the teaching and practical training and placement of radiological physicists that shall be, from January 1, 2007, assured in a higher number not only for the radiotherapy and nuclear medicine departments, but also for radio-diagnostic departments. On request of the Ministry of Health of the Czech Republic the program of studies at schools for the instruction of other radiological medical fields were continuously reviewed. In connection with the SÚJB gestion for the implementation of the Council Directive No. 97/43/EURATOM, repeated meetings were held between 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 representatives of the SÚJB participated in the workshops called by the Ministry of Health of the Czech Republic in order to coordinate the task

“Radiation protection when providing health service". As part of this task four grants of the Ministry of Health of the Czech Republic were discussed, which are focused on the elaboration and implementation of medical exposure standards, including the methods of determination and evaluation of patients’ doses and the introduction of verification of these procedures by the clinical auditors.

The issue of medical exposure was discussed with the representatives of the health service branch at several expert workshops and special meetings, of which the most important was the meeting of the SÚJB’s Chairperson with the Secretary of Health Service, which was held on June 7, 2004 and which recovered the system of selected employees of both institutes for specified cooperation spheres.

Employees of the State Office for Nuclear Safety are members of expert commissions of the Czech Ministry of Health and the Czech Medical Society of J.E. Purkyně, of which it is necessary to name the Commission for breast tumors screening, the Commission for allocation assessment of select sanitary engineering instruments and the Commission for the assessment of occupational diseases.

Exposure from Natural Sources

The control of population exposure from natural sources is focused in the long term especially on the problem of radon exposure and other natural radionuclides in buildings. The SÚJB department performed in this area the duties defined on the basis of the resolution of the Czech Government Decree No. 970 dated October 7, 2002 on the Czech Radon Program:

- to proceed in cooperation with assigned employees of regional offices and employees of the State Institute for Radiation Protection in the target search for inhabitants residing in exceptionally high radon risk areas (the search statistics are always prepared for the entire previous calendar year), the coordination meeting regarding this cooperation was held on January 17, 2004,
- to use the database of the results of the target search procedure, which enables, in addition to the usual outputs also processing the results in the form of a map of the level of particular municipalities with the possibility to forecast the estimated rates of radon risk in the municipal housing stock,
- to continuously report through regional offices the results of measurements carried out in houses and apartments to the house owners and, in case of

increased risk, to notify these owners that they may apply for an allowance from the state budget for radon curative measures,

- in the granting process assured radon curative measures for house owners, besides opinions to the right to apply for a grant (in total 43 opinions), also opinions to adequate effectiveness of implemented curative measures, before the payment of a grant (32 positive opinions),
- to participate in the process of the payment of grants for water supply systems supplying drinking water intended for public delivery by processing the opinions for regional offices. In 2004, four applications of the municipalities were positively appraised already before the promise of payment after successful implementation of the measures,
- in cooperation with other departments to set new development and operational tasks necessary for solving the Czech Radon Program and to secure assessment of their performance, related especially to the development of anti-radon curative measures in the buildings and continuing in covering the territory of the Czech Republic with maps of the land's radon index.

A part of the control of natural exposure is the control activity of the SÚJB carried out at the producers and importers of construction materials and packed water and the suppliers of water intended for drinking water public supply that are obliged to secure a systematic measuring and assessment of the natural radionuclides content and to optimize the radiation protection in the set way.

The control of the natural radionuclides content in drinking water shall be included in the regulation of the Council No. 98/83/EU. In connection with the proceeding negotiation a questionnaire was processed for the needs of WEKNOW (Web-based European Knowledge Network on Water) by request of Kiw Water Research from Holland and ENDWARE (European Network of Drinking Water Regulators). During its processing the results of systematic measuring of the content of natural radionuclides in the supplied water were used.

3.7. MEDICAL ASPECTS OF RADIATION PROTECTION

In 2004 the Office in cooperation with the State Institute for Radiation Protection assessed a total of 79 suspect cases of occupational disease, of which:

- With uranium mine personnel this concerned 57 cases of lung cancer and 17 cases of other diseases (seven times skin cancer, three times malignant lymphoma, once chronic lymphatic leukemia, once acute myeloid leukemia, twice prostate cancer, once larynx cancer, twice pharynx cancer). With 16 cases of lung cancer and two cases of skin cancer, the probability of causality between the disease and work in underground uranium mines was evaluated as predominant; with two cases of lung cancer, one case of pharynx cancer, one case of skin cancer and one case of acute myeloid leukemia 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 professions this concerned a total of five cases of evaluated diseases – four cases of lung cancer (three employees of uranium mine and one employee working with open irradiators) and one case of basal cell epithelioma with an X-ray laboratory technician. Causality between the work in an ionizing radiation risk area and the disease was not proved in any case.

In 2004 the cooperation with the representatives of the Society of Occupational Medicine, the Society of Occupational Diseases of the Czech Medical Society of J.E. Purkyně and other experts in the field of assessment of suspect of occupational disease continued. In 2004, the representative of the SÚJB participated in the work of the Standing Committee on Evaluation and Control of Occupational Risks, Labor-Medical Care and Rehabilitation at the Government Council for the Occupational Health and Safety.

The dose estimate to the fetus as a result of diagnostic examination of the mother was measured in a total of 42 cases. In two cases this concerned examination within nuclear medicine examination, and other examinations were radio-diagnostic. With no patient the dose estimated was higher than 20.0 mSv; in ten cases the dose ranged from 5.0 to 10.0 mSv and in other cases (32) it did not reach 5.0 mSv. The result was submitted – mostly within 24 hours – to the applicants, mostly the radio-diagnostic workplaces that performed the examination, and in some cases to the genetic consultation clinic.

Previous cooperation with the Czech Ministry of Health in providing 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 led to establishment of four “Special Health Care Centers”, whose establishment was announced in the Czech Ministry of Health Bulletin No. 12/2003. The discussion with the Czech Ministry of Health on the method of iodine prevention for the territory of the Czech Republic outside the area of emergency planning continued. However, it must be stated that the cooperation in this field is not too good.

3.8. CENTRAL REGISTERS AND DATABASES FORMED IN RADIATION PROTECTION

Over the course of 1997 – 2004 the State Office for Nuclear Safety developed management tools for the state records systems as stipulated by Act No. 18/1997 Coll. 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 by the State Office for Nuclear Safety. 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 the way that corresponds to the 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 (RZ)

Since 2000 this application has routinely operated and 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. and SÚJB 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 Office 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 Fire Rescue Brigade. In 2003, data on workplaces with open ionizing radiation sources were added to the records.

Registry of License Holders and Reporting Entities (RDPO)

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, which was fully put into operation in 2004.

In 2004, the presentation of data of the above-mentioned registers was prepared on the SÚJB Internet pages. In 2005, the license holders will be enabled, through the controlled access, to check the details on them kept in the SÚJB databases to the maximum possible extent.

Central Database of Medical Exposures

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 the year 2002. The data are anonymous as per persons and workplaces.

4. EMERGENCY PREPAREDNESS

4.1. STATE SURVEILLANCE OF EMERGENCY PREPAREDNESS

In 2004, 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 70 cases of exercise at Dukovany NPP and in 58 cases of exercise at Temelín NPP. The exercises reached the success rate of 99.7% at Dukovany NPP and 99,6% at Temelín NPP. In 2004, any emergency events occurred at neither Dukovany NPP nor Temelín NPP.

According to the year plan of ČEZ, a.s. NPD emergency exercises, a total of eight exercises were planned for 2004, of which four at Dukovany NPP and four at Temelín NPP. These exercises were carried out in the planned range. The “Horizon 2004” emergency exercise was carried out on June 23, 2004 at Dukovany NPP, which was followed up by the exercise of external authorities and organizations with a view to practicing the Off-site Emergency Plan of Dukovany NPP. The cooperation emergency exercise named “Occurrence of emergency event of 3rd degree” was carried out on September 23, 2004 at Temelín NPP, which was followed up by the exercise of the Regional Office of the South Bohemia named „Autumn 2004“, during which the parts of the Off-site Emergency Plan of Temelín NPP were practiced. The exercise objectives were fulfilled in all cases and found deficiencies were handled in a standard way, i.e. their removal by the competent divisions.

In May 2004, the antidotes (potassium iodide) for iodine prevention were renewed in both Emergency Planning Zones. In cooperation with the mayors of the villages in the Emergency Planning Zone (140 villages in the Emergency Planning Zone of Dukovany NPP, 32 villages in the Emergency Planning Zone of Temelín NPP), all inhabitants living in the Emergency Planning Zone were provided with the antidotes. At the same time, the antidotes were renewed with the ČEZ, a.s.-NPD employees, with the contractors at the nuclear power plants and at both Regional Offices coordinating the Emergency Planning Zones, or at places appointed by the Regional Offices.

Both nuclear power plants conducted check of technical resources' functionality, as well as verification of emergency preparedness in compliance with the requirements

of Decree No. 318/2002 Coll., as amended. In 2004, the training on emergency preparedness stipulated by Decree No. 318/2002 Coll. was held at NPPs, 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 SÚJB inspectors performed a total of 17 inspections in 2004; one of them was conducted at Dukovany NPP, two at Temelín NPP, two with the contractors at the nuclear power plants, one at the workplaces of the Radioactive Waste Repository Authority, two at the workplaces of the Nuclear Research Institute (ÚJV) Řež, a.s. two at the workplaces of the DIAMO s.p. and seven inspections, in cooperation with the relevant Regional Centers of SÚJB, were performed at the workplaces with ionizing radiation sources. It was found that the emergency preparedness at the inspected workplaces is in compliance with the relevant provisions of Act 18/1997 Coll., with the exception of one workplace of the contractor, where the requirements for the verification of emergency preparedness were not fulfilled.

In the field of emergency preparedness assurance, a new revision of the on-site emergency plan of Dukovany NPP was assessed and approved in 2004, upon prior discussion of the relations to relevant off-site emergency plan.

4.2. EMERGENCY MANAGEMENT

In the beginning of 2004, the State Office for Nuclear Safety organized for the regional authorities and regional directorates of Fire Rescue Brigade located in both Emergency Planning Zones meetings, on which the present representatives of territorial state administration were informed of SÚJB competence in the field of emergency preparedness, of implementation of radiation protection in the Emergency Planning Zone and of work organization and technical assurance of activities of the Crisis Headquarters of the SÚJB; part of the meeting was to get acquainted with technical equipment designed for the activities of the Crisis Headquarters of SÚJB.

In the course of 2004, some program applications were innovated and new means were developed designed for the activities of pro the Crisis Headquarters of SÚJB at the workplace of the Emergency Response Center, which, by virtue of Act No.

240/2000 Coll. as amended, serves as the crisis management workplace, and assures among others the technical and organizational support to the Crisis Headquarters of the State Office for Nuclear Safety. New audiovisual conference equipment was installed, which enables connection with the OPIS of the Department of Interior – the General Directorate of Fire Rescue Brigade and the local workplaces of SÚJB at both NPPs.

In the course of the year, the agreed data transmissions from both nuclear power plants were realized, and continuous trial transmission of data has been realized since September. The build-up of the system of servers enabling data acceptance from both NPPs and from all providers of data from the Radiation Monitoring Network (RMS) designed for the activities of pro the Crisis Headquarters of SÚJB at both the central and the back-up workplace was completed. Within this system the replication of given databases and registries is, among others, realized.

In the course of 2004 the Emergency Response Center organized the participation of the Crisis Headquarters of the SÚJB in emergency exercises and partial drills. The Crisis Headquarters of the SÚJB participated, among others, in emergency exercises arranged by other persons, i.e. the EU/NATO “CME/CMX 2004” exercise, the “Horizon 2004” exercise of Dukovany NPP, the exercise of Temelín NPP, the exercise of Paks NPP, the “Convex 1a” exercises organized by IAEA in January and July 2004, the “Convex 2a” in April and October 2004, the “Convex 2b” in August, the “Convex 2c” in February 2004 and the EU – Ecurie Level 3 and EUDREx exercises organized in October 2004.

In 2004 the emergency exercise of SÚJB mobile teams operating within the Radiation Monitoring Network was held. Total of 17 mobile teams participated in the exercise (15 teams from the Regional Centers of the SÚJB and two team from the national Radiation Protection Institute). The exercise aimed at training for the work with innovated instrumentation and software, and performing specified practical activities. The mobile teams carried out the exercise tasks and the processed data was transmitted to the Information System of the Radiation Monitoring Network.

In 2004 four drills of the individual shifts of the Crisis Headquarters of the SÚJB were carried out according to the scenarios prepared for the *este* code.

In the field of emergency management, the work on particular sections of the crisis plan of the SÚJB was completed, and the plan was approved and issued on November 12, 2004. At the end of 2004, 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 SÚJB participated in the work of the Central Crisis Headquarters and they 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.

In connection with the accession of the Czech Republic to the European Union, the SÚJB participated in the preparation of relevant update of the Agreement on Cooperation made between the SÚJB and the Department of Interior – the Headquarters of Fire Rescue Brigade of the Czech Republic on assurance of the transmission and receipt of information in case of the occurrence of extraordinary event 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 – the General Directorate of Fire Rescue Brigade of the Czech Republic; new agreement was signed in April 2004.

Also in 2004 SÚJB, together with 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.

4.3. MANAGEMENT OF THE RADIATION MONITORING NETWORK IN THE CZECH REPUBLIC

The State Office for Nuclear Safety, pursuant to the Government Resolution No. 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 2004.

Pursuant to the so-called Framing Contracts made with individual departments stipulated in Section 46 of Act No. 18/1997 Coll., as amended, i.e. with the Ministry of

Finance, Ministry of Defense, Department of Interior, Department of Agriculture and Department of the Environment, the implementing contracts were concluded with individual specified organizations, which ensure activities of RMS components outside the SÚJB department. This involves the contracts between the SÚJB and the Hydrometeorological Institute (the Early Warning System, measuring points of air contamination, measuring points of water contamination and meteorological service), the T.G.Masaryk Water Research Institute (measuring points of water contamination), the Customs General Headquarters (mobile teams and measuring points at the frontier crossings), the General Directorate of Fire Rescue Brigade of the Czech Republic (mobile teams), the Police of the Czech Republic (mobile teams), the State Veterinary Institute in Prague (measuring points of foodstuff contamination), the Czech Agricultural and Food Inspection Authority (measuring points of foodstuff contamination), the Central Institute for Supervising and Testing in Agriculture (measuring points of foodstuff contamination) and the Forestry and Game Management Research Institute (measuring points of foodstuff contamination). In the course of the year, the individual methodologies for the activities within the RMN were drawn up in cooperation with the State Institute for Radiation Protection and approved by the SÚJB.

In connection with the accession of the Czech Republic to the European Union, the radiation monitoring data was transferred to the “REM” database of the European Union. The transfer was made in two phases – at first, the data provided by 2002 and at the end of 2004 the data for 2003.

4.4. Radiation Monitoring – Radiation Monitoring Network in the Czech Republic

Monitoring Through the Early Warning Network (EWN)

The measurement of dose equivalent rate runs continuously in the EWN, mean values are measured in intervals of 10 minutes. The values are put into the RMN Information System central database at central workplaces of the RMN in the National Radiation Protection Institute and at the Emergency Response Centers of the SÚJB; this is done from 8 measuring points placed in RC SÚJB and in SÚRO through the WAN SÚJB network and from 7 measuring points of the Early Warning Network operated by the Fire Rescue Brigade through the GPRS mobile network

operators every 10 minutes, from 38 measuring points on the ČHMÚ centers through the Hydrometeorological Institute communication network to the ČHMÚ central computer and through dedicated data circuit to the IS RMN central workplace every hour. If necessary the intervals for data transmission are shortened to a half-hour.

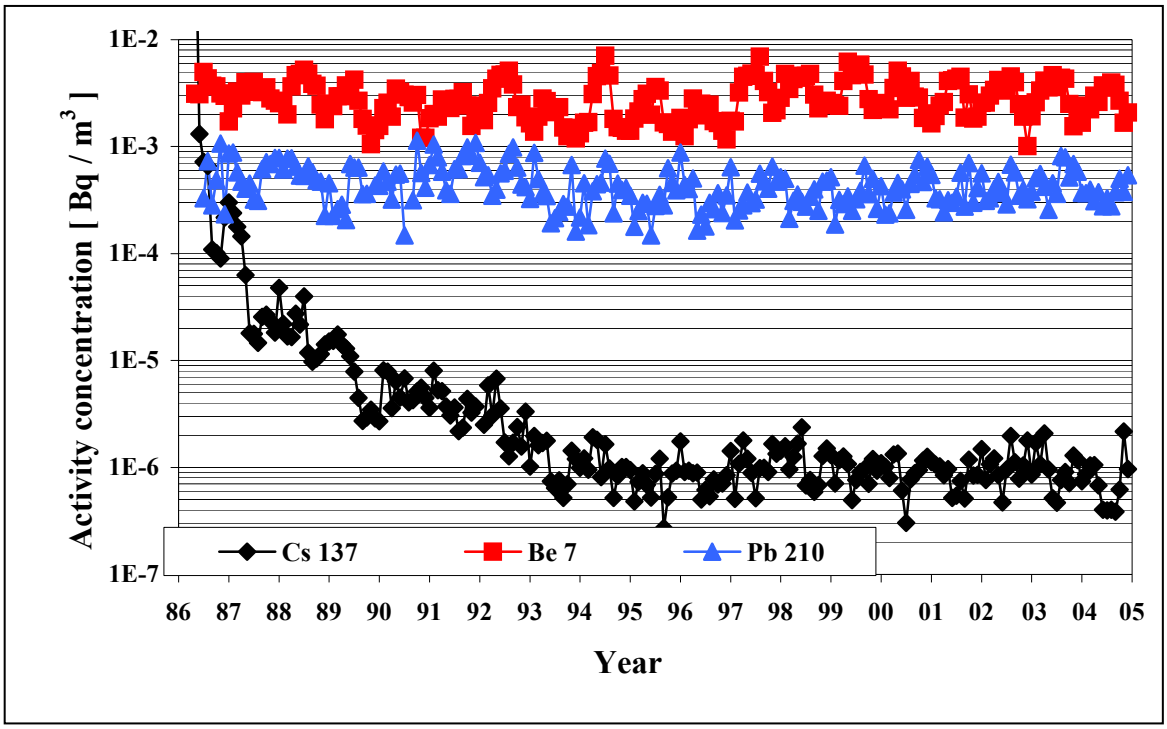
Artificial Radionuclide Monitoring in the Environment

The purpose of the monitoring is to monitor the distribution of radionuclide activities and ionizing radiation doses on the territory of the state in the area and time, particularly with the goal to acquire the long-term time trends and to find the deviation from them on time. 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 the 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 2004, 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. All given radionuclides are determined in aerosols by the semiconductor gamma-ray spectrometry. 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.



Note: The year corresponds to the beginning of the given year

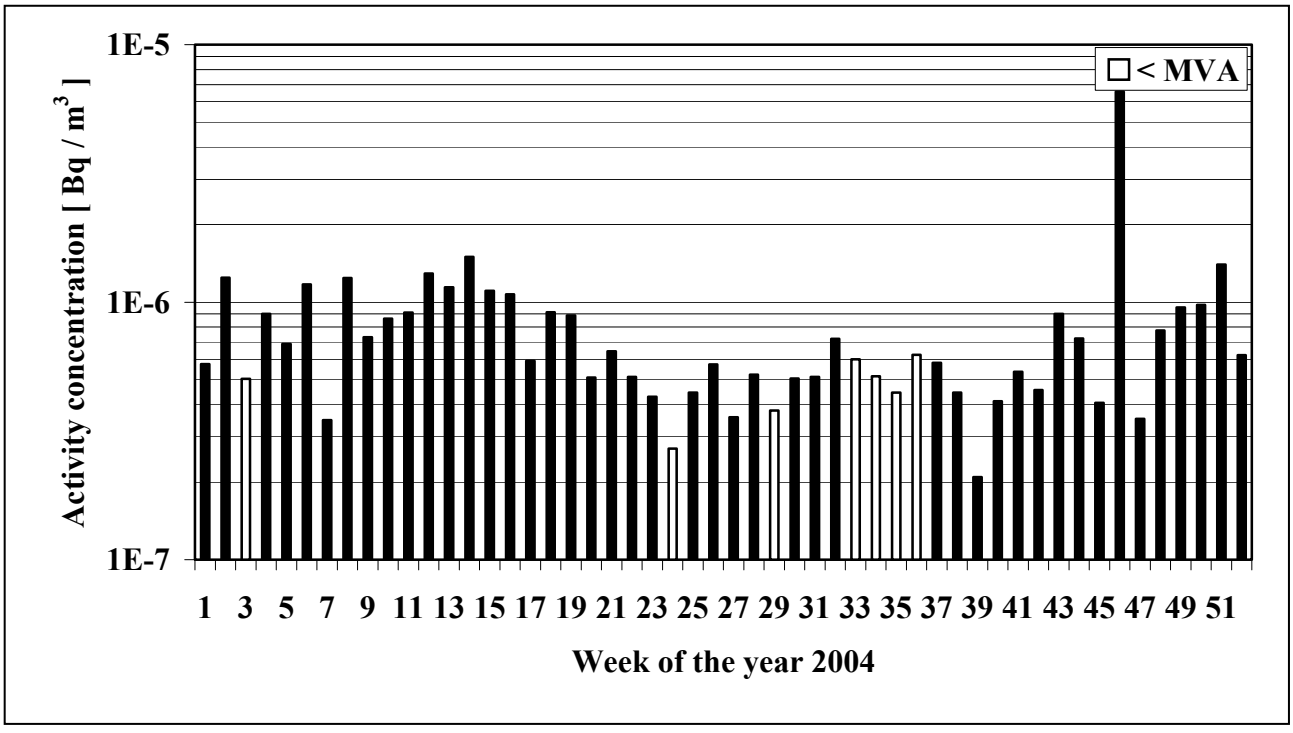
The long-term, currently very slow, decrease of the activity concentration of ^{137}Cs and also seasonal variation of the content of ^{7}Be during the year is apparent.

The following table shows the yearly mean values of selected radionuclide activity concentration in the air aerosol measured at the measuring point of air contamination at SÚRO in Prague.

Year	^{137}Cs	^{7}Be	^{210}Pb
	Bq/m^3		
1986	2,7E-2	3,6E-3	5,2E-4
1987	8,9E-5	3,1E-3	5,9E-4
1988	2,1E-5	3,5E-3	5,9E-4
1989	9,2E-6	2,6E-3	4,1E-4
1990	5,3E-6	2,4E-3	5,0E-4
1991	4,0E-6	2,3E-3	7,3E-4
1992	3,1E-6	3,3E-3	5,8E-4
1993	1,2E-6	1,9E-3	3,7E-4
1994	1,1E-6	2,9E-3	4,3E-4
1995	7,4E-7	2,2E-3	3,3E-4
1996	8,4E-7	1,9E-3	3,6E-4
1997	1,1E-6	3,6E-3	4,1E-4
1998	1,2E-6	3,7E-3	3,7E-4
1999	9,6E-7	3,8E-3	3,7E-4
2000	9,6E-7	3,1E-3	4,4E-4
2001	8,5E-7	2,9E-3	3,9E-4
2002	1,0E-6	3,1E-3	4,2E-4
2003	1,0E-6	3,2E-3	5,3E-4
2004	8,1E-7	2,8E-3	3,7E-4

Note: in 1986 the mean values for the period from May 12, 1986 till the end of the year are involved

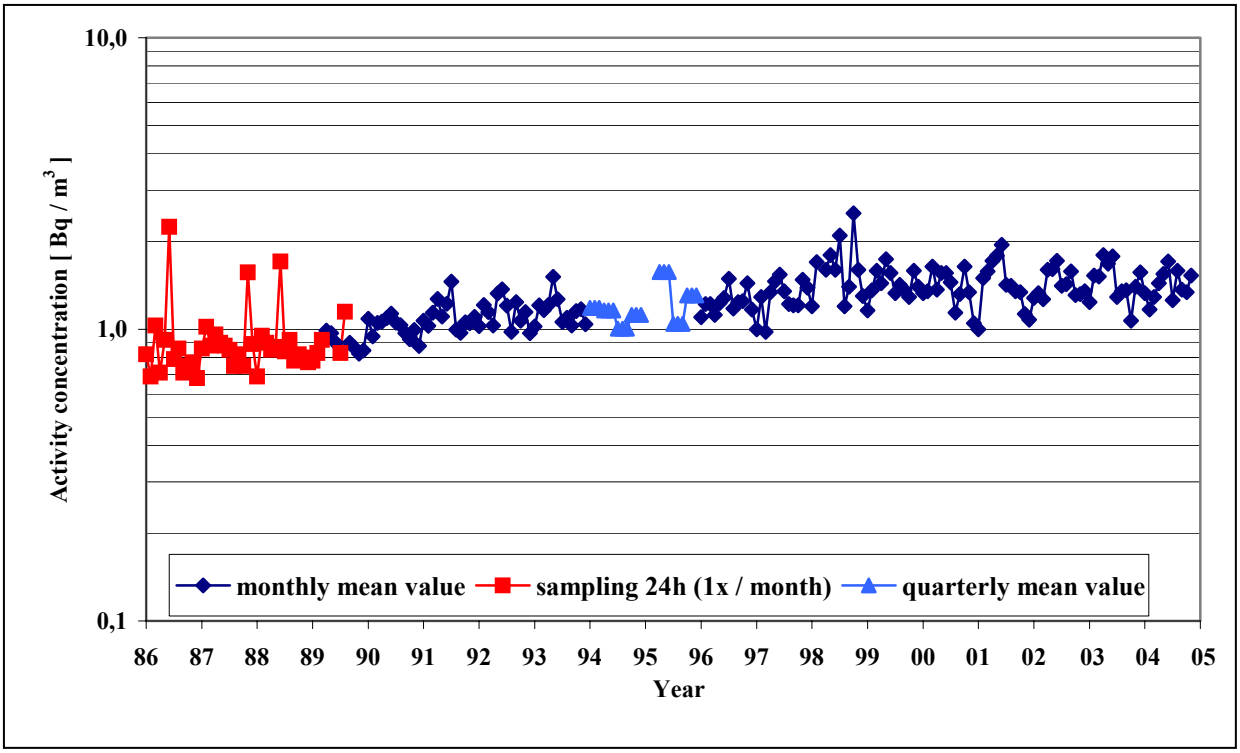
The weekly mean values of the ^{137}Cs activity concentration in the air aerosol also measured at MMKO SÚRO in Prague in the year 2004.



Note: MVA stands for minimum significant activity

In some weeks the activity value was below the value of minimum significant activity (MVA), because the alternate bleeding equipment with lower flow was temporarily used due to the failure of more powerful equipment. A higher activity of ^{137}Cs in the 46th week is caused by seasonal influences. No significant values indicative of air contamination were recorded at the surrounding measuring points covering the territory of the Czech Republic.

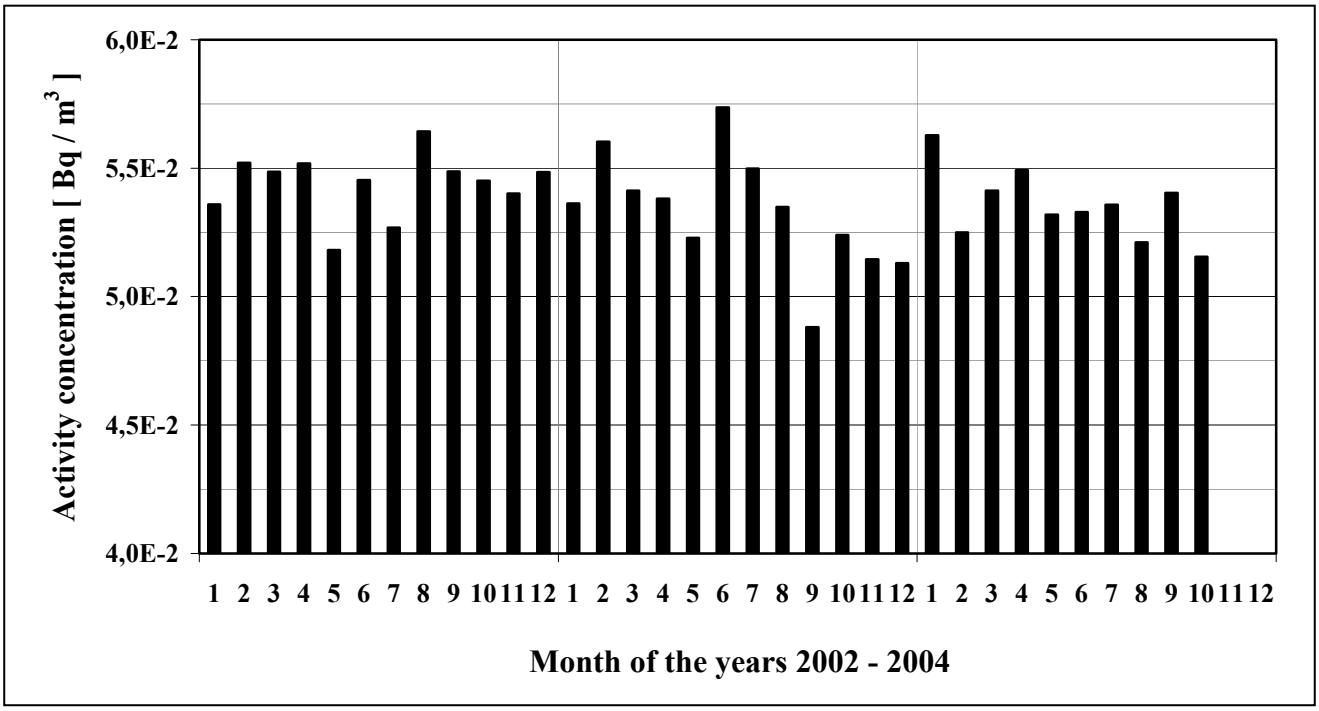
Monitoring of ^{85}Kr has been included in the system of monitoring of the radionuclide content in the air performed by RMS in the year 1996. This element is the fission product and it occurs also in small amounts in the effluents from nuclear power plants. However the main sources of ^{85}Kr are plants for nuclear fuel reprocessing and nuclear warfare tests in the past. The measuring of ^{85}Kr activity concentration followed the monitoring performed by the Radiation dosimetry department at the Czech Academy of Science. The measuring is still performed in the same place on the premises of present Radiation dosimetry department of the Nuclear Physics Institute of Czech Academy of Science in Prague 8. The time course of the activity concentration of ^{85}Kr since the year 1986 is shown on the following figure.



Note: The year corresponds to the beginning of the given year

Another radionuclide included in the air routine monitoring during 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 in the period of 2002 – 2004 is shown on the following figure as it has been determined at the Radiation dosimetry department at ÚJF AV ČR.



Foodstuff Contamination

Foodstuff contamination with radionuclides is monitored on a long-term basis and the individual commodities are chosen in accordance with their consumption. Forasmuch as there was no emergency event in the year 2004 which would cause an increase in the radionuclide content in the environment, no increase of foodstuff contamination with such substances occurred.

The activity mass or concentration of ^{137}Cs in some basic foodstuffs – milk, beef and pork – is mostly 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.

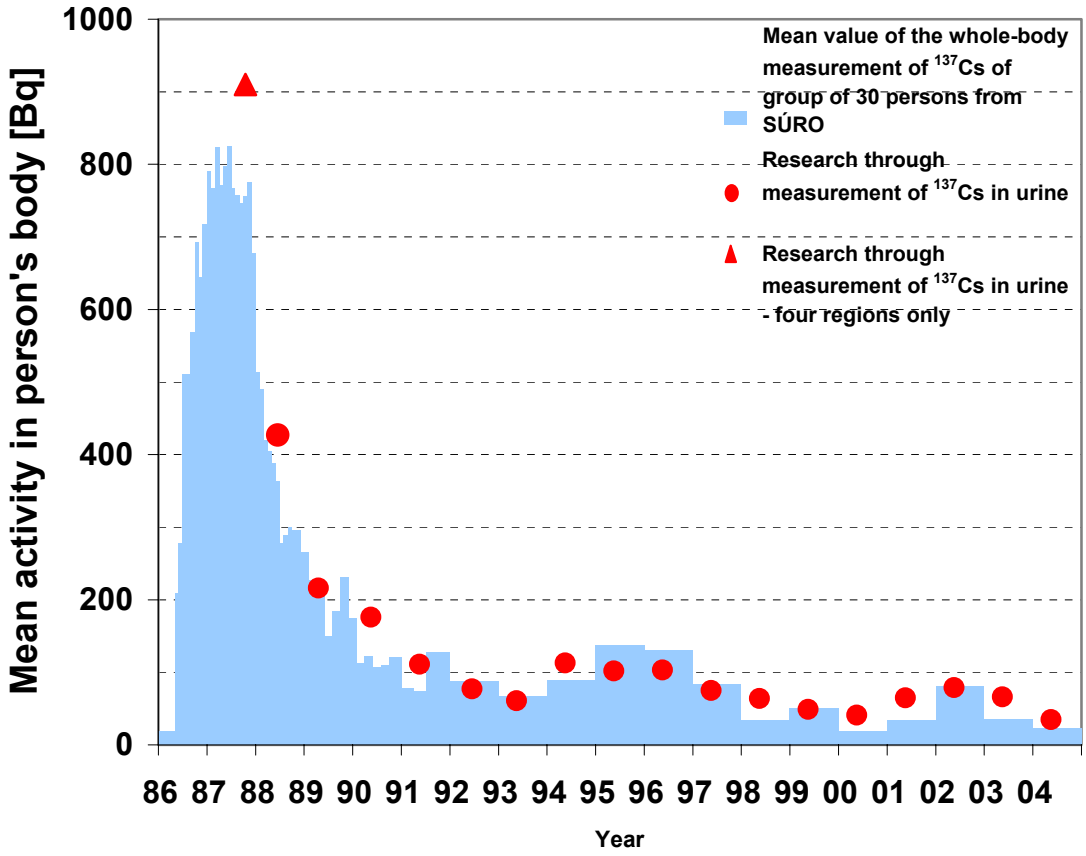
Relatively higher content of ^{137}Cs against other foodstuffs is being monitored in mushrooms, forest fruits and wild animal meat. The values of activity mass of ^{137}Cs in these products reach ones to hundredths of Bq/kg. The decrease of ^{137}Cs activity is very slow in these products; it is given 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 2004, mainly Prague inhabitants in the age between 22 and 64 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 22 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 2004 from 42 women and 30 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 0.21 Bq and the recalculated mean content (retention) of ^{137}Cs activity in the body corresponding to it was 35 Bq. Through the measurement of ^{137}Cs activity, excreted in urine in 24 hours the group of 12 persons (3 women, 9 men) from the North Moravia is monitored on a long-term basis, 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 5.2 Bq with this group, which corresponds to the retention 860 Bq.

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



Monitoring of External Exposure

Monitoring through the thermoluminescent dosimeters network (TLD)

Quarterly means of H_x [nSv/hod] photon dose equivalent rate and their standard deviations *s* [nSv/hod] measured in 2004 by the TLD networks operated by the SÚRO and RC SÚJB for 2004 are shown in the following table. The several-years measurements within these networks confirm their capability to record possible significant deviations from the normal situation in a given locality.

Territorial TLD network				
Area	Prague	Middle Bohemia	South Bohemia	West Bohemia
Station	SÚRO	SÚRO	SÚRO/RC Č. Budějovice	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/04	122 ± 15	131 ± 35	145 ± 28	123 ± 24
II/04	121 ± 13	130 ± 37	164 ± 22	133 ± 22
III/04	124 ± 15	136 ± 37	162 ± 21	126 ± 23
IV/04	117 ±12	129 ± 36	156 ± 25	136 ± 30
Area	North Bohemia	East Bohemia	South Moravia	North Moravia
Station	SÚRO/RC Ústí nad Labem	SÚRO/RC Hradec Králové	SÚRO/RC Brno	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/04	118 ± 34	112 ± 44	116 ± 21	101 ± 18
II/04	122 ± 27	114 ± 58	134 ± 23	119 ± 13
III/04	115 ± 26	125 ± 25	132 ± 21	119 ± 18
IV/04	110 ± 27	120 ± 22	128 ± 22	123 ± 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/04	119 ± 23	141 ± 12
II/04	129 ± 24	138 ± 11
III/04	133 ± 24	155 ± 13
IV/04	123 ± 20	132 ± 14

Note: 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 of Effluents from Nuclear Power Plants

Continuous attention was paid to monitoring of radionuclides in gaseous and liquid effluents from nuclear power plants to the environment and to evaluation of the exposure of the critical group of population in consequence of these effluents. In 2004, the gaseous effluents with both power plants were lower than 1% of authorized limit, which is equal to 40 microSv at both power plants. Due to effluents to streams the authorized limit of 6 microSv was drawn approximately from one fourth at Dukovany NPP, and the authorized limit of 0.4 microSv was drawn approximately from one half at Temelín NPP.

5. ACTIVITIES IN THE FIELD OF INSPECTION OF THE ADHERENCE TO THE BAN ON NUCLEAR, CHEMICAL AND BIOLOGICAL WARFARE

The issue of control of the ban on nuclear, chemical, bacteriological and toxin weapons remained one of the priorities of the SÚJB activity also in 2004. The target is to contribute to the reduction of the risk of their abuse, including prevention to possible terrorist attacks.

The SÚJB carries out the function of state surveillance over following some measures related to the ban on the presented categories of the weapons of mass destruction in accordance with:

- the Act No. 18/1997 Coll. on the peaceful utilization of nuclear energy and ionizing radiation,
- the Act No. 19/1997Sb., Coll. on some measures related to the ban on chemical weapons,
- the Act No. 281/2002 Coll. on some measures related to the ban on bacteriological (biological) and toxin weapons.

Also in the past period securing of meeting the obligations resulting from the international conventions, which the Czech Republic proceeded (the Non-Proliferation Treaty – NPT, the Treaties on EUROATOM, the Comprehensive Test Ban Treaty – CTBT, the Chemical Weapons Convention – CWC, the Bacteriological (Biological) and Toxin Weapons Convention – BTWC) remained an integral part of the state surveillance activity in this area. It involves in particular the following:

- Transposition of the requirements resulting from the membership in these conventions to the Czech legal system,
- Cooperation when performing international inspections,
- Active participation in the work of organizations entrusted with the coordination of the international effort to control the ban on individual categories of weapons of mass destruction (IAEA, EC, PV OZJZ, OZCHZ).

To this issue is also related participation of SÚJB experts in the activity of international control regimes (Group of Nuclear Suppliers, Zangger's Committee, Australian Group), which do not bring any internationally legal obligations for the Czech Republic. However they perform an important role for securing a rigorous

fulfillment of the measures related to the prevention of the proliferation of weapons of mass destruction.

All SÚJB activities in the area of the ban on nuclear, biological and chemical weapons is co-ordinated with the activities of other departments in this area (the Department of Interior, the Department of Commerce, the Department of Agriculture, the Department of Health and the Department of Foreign Affairs) and respects the principles of the European Union Strategy against the proliferation of nuclear, biological and chemical weapons, which the Czech Republic accepted.

5.1. NUCLEAR WEAPONS

In 2004, the SÚJB activities in the area of control of the non-proliferation of nuclear weapons and when performing the state surveillance of nuclear items responded to meeting the requirements of the UN Security Council Resolution No. 1540/2004, which in the nuclear area imposes liabilities upon the United Nations member states to accept transparent measures to strengthen the inspection activities with the target to stop the illicit trafficking of nuclear materials and other nuclear items suitable for development and production of nuclear weapons and herewith to effectively prevent the risk of the occurrence of nuclear terrorism. The SÚJB inspection activity focused on the verification of nuclear materials situated at the nuclear facilities in the Czech Republic and at selected holders of the permit to manage nuclear materials in locations outside facilities (LOFs) and to control the information provided to the IAEA in the Initial Declaration according to the Additional Protocol to the Agreement between the Czech Republic and the IAEA for the application of safeguards in Connection with the Treaty on the Non-proliferation of Nuclear Weapons (Safeguards Agreement).

There were 106 inspections carried out in total, of which 62 common inspections with SÚJB and IAEA and 18 common inspections with SÚJB and the European Commission.

From the inspections carried out it is necessary to point out the ones performed according to the Additional Protocol, which empowers the IAEA to carry out the inspections with 24, or 2-hour notification duty (the so-called unannounced inspections) and the possibility to accept penal actions without previous resolutions of

the UN Security Council. In 2004 the IAEA, together with the SÚJB, carried out inspections according to the Additional Protocol in UJP Praha, a. s., ČVUT FJFI – School reactor VR–1 and in ŠKODA JS, a. s. During the inspections in UJP Praha, a. s. and ČVUT FJFI – School reactor VR–1 the IAEA inspectors took analytical samples from the environment with the target to verify if any undeclared nuclear activities, which would be abhorrent to the international commitments of the Czech Republic, were performed at the adequate nuclear facilities.

Special attention was paid both on the part of the SÚJB and also on the part of the IAEA and the European Commission to a control of fresh nuclear fuel shipment from ÚJV Řež, a. s. to the Russian Federation at the end of 2004, including the shipment of highly enriched uranium held in the Czech Republic in 1993 (it involves the largest amount of highly enriched uranium held within the control of illicit trafficking of nuclear materials), which was performed in accordance with the fulfillment of the requirements of the resolution of the UN Security Council No. 1540/2004 for repatriation of the highly enriched uranium to the country of origin. The general target of this repatriation is to reduce the risk of possible abuse of the highly enriched uranium by terrorist groups.

Above the scope of regular activities in the area of inspections of nuclear items exports and by request of a competent authority of the Netherlands, the SÚJB investigated the suspicion of an illegal export to a risk territory by a Czech enterprise entity. The investigation proved the export of an item not being the subject of any of the control regimes and the export was performed fully in accordance with the valid legal regulations.

A special attention on the part of the SÚJB was paid to the application of the Customs General Headquarters of the Czech Republic to investigate a suspicion of an unauthorized management of nuclear materials and not following other provisions of the Atomic Act at seven enterprise entities in the Czech Republic. To investigate the objected suspicion, SÚJB carried out 14 inspections in total. The complete results of the inspections proved the raised suspicions were not substantiated. Two of the inspected business entities are holders of the SÚJB permit to manage nuclear materials for the purpose of production of glass stained with uranium (uranium glass) and management of nuclear materials at these business entities is fully in accordance with the valid legislation. On the basis of the investigation it was stated

that the amount of uranium being added to the uranium glass intended for further processing in production of glass artificial jewelry made of uranium glass is in terms of radiation protection negligible and therefore it is not the case of adding radioactive substances into consumer products. The remaining five enterprise entities do not manage nuclear materials; they deal with the production of glass artificial jewelry made of uranium glass, with which they are supplied from domestic producers.

Results of the inspection activities of the SÚJB, IAEA and EC in the area of State System of accounting for and control of Nuclear Materials (SSAC) being kept within the Czech Republic jurisdiction proved a full compliance of the SÚJB data with the data of the international safeguards system of IAEA and also proved that in the Czech Republic, in the monitored period, there was no diversion of nuclear materials and controlled items from the nuclear area for undeclared purposes or for their abuse for non-peaceful purposes. It was stated that the Czech Republic fully meets its international commitments resulting from the Non-proliferation Treaty and from the control regimes strengthening this Treaty.

Within meeting the commitments resulting from the Safeguards Agreement a total of 32 permissions last year, of which 23 permission were on the management of nuclear materials and 9 permissions were on canceling the permit to manage nuclear materials. According to the list kept in the SSAC, a total of 203 holders of the permit to manage nuclear materials were registered, included for the recording purposes in 15 material balance areas (MBA) in the Czech Republic as of December 31, 2004. From this number 189 permit holders that manage nuclear materials in LOFs, are included in the MBA CZ-Z, in which the SÚJB is fully responsible for keeping the records of nuclear materials. The amount of nuclear materials registered at the end of 2004 in SSAC achieved the value of 1,338 SQ, where 1 SQ is safeguard-significant quantity of nuclear material sufficient for production of a nuclear weapon or a nuclear explosive device.

In 2004 the SÚJB activities, when meeting the commitments resulting from the Additional Protocol, focused on the preparation of regular quarterly declarations related to exports and imports of selected items in the nuclear area, on the regular annual update of data of the Initial Declaration provided to the IAEA according to the Additional Protocol in 2002 and on the processing of additional information on the history of the nuclear fuel cycle in the Czech Republic, or Czechoslovakia since

1945, required by the IAEA. Especially obtaining of relevant background documentation related to the history of fuel cycle required certain effort. It involved information being subject of a high level of confidentiality in former Czechoslovak Socialistic Republic and searching for historical connections was problematic regarding the necessity to analyze the activities from a deep history. Despite the mentioned difficulties the SÚJB answered all questions raised by the IAEA and therefore it is possible to expect that in 2005 the RG IAEA will approve the conclusion of the Czech Republic among the states with the so-called integrated safeguards system. This step will definitely confirm the fact that in the area of control of non-proliferation of nuclear weapons the Czech Republic belongs, according to the IAEA appraisal, permanently among the best member states of the IAEA.

In 2004 the SÚJB continued in its activities linked to the Czech Republic entering the IAEA Member States Support Programs. The SÚJB, in accordance with this program and in cooperation with the IAEA, organized the seventh training course of IAEA safeguards inspectors at Dukovany NPP, facilitated participation of the Central analytical laboratory of ÚJV Řež, a. s. in the process of assessment and control of quality of services provided for IAEA networks of world laboratories in the area of nuclear materials analyses, participation of Dukovany NPP in the program of testing new IAEA surveillance systems developed for verification of nuclear materials in the interim spent fuel storage facilities and intensively participated in the development of the new IAEA safeguards system for final disposals of spent fuel. An important step within the IAEA Member States Support Programs was a positive response of the Czech Republic to the invitation of the IAEA DG for support of the IAEA Safeguards Information System Re-engineering Project (IRP), which has currently had the highest priority. A part of the support of this project is both the financial support and the commitment of consequent testing of new IAEA verification systems. It is important to state that the Czech Republic was the third state (after the USA and Great Britain) and the first non-nuclear state, which committed to provide support to this project.

In the field of international control regimes strengthening the Non-proliferation Treaty (Zangger Committee and the Nuclear Suppliers Group) the SÚJB was active in the assertion of requirements of the Resolution of the UN Security Council No. 1540/2004 in the activity of these regimes. Within meeting the commitments resulting

from these control regimes the SÚJB issued in total 95 permits for the import/export of nuclear materials, and selected items (Trigger List) and nuclear related dual use items in 2004. From this number 9/10 permits were issued for import/export of nuclear materials, two permits for the export and return import of nuclear materials, 5/11 permits for import/export of selected items in the nuclear area and 47/11 permits for import/export of dual use items in the nuclear area.

In the area of new commitments resulting from the Czech Republic membership in the European Union, the SÚJB activities focused on the preparation of Basic Technical Characteristics of all facilities in the Czech Republic, where it manages nuclear materials, which were delivered to the European Commission in advance already in April 2004 and on the preparation of the initial inventory of nuclear materials under the jurisdiction of the Czech Republic, which it was necessary to hand over to the European Commission by 15 days after the accession of the Czech Republic to the European Union. From May 1, 2004 there also started the duty for permit holders to manage nuclear materials in the Czech Republic to provide regular monthly reports on every change of inventory of nuclear materials to the European Commission. Whereas the European Commission did not meet its commitments towards new member states related to equipment of individual MBA with HW and SW necessary for sending inventory reports to the European Commission, the Office was forced to process and send these monthly reports from all 15 MBA both to the IAEA and to the European Commission. It is necessary to mention that this “emergency situation” has been persisting as the European Commission has not met its commitment so far, despite the fact that the original date for the installation of the adequate HW and SW was “no longer than 6 months” before the entry of new states in the European Union.

5.2. CHEMICAL WEAPONS

The priorities in the field of control of the ban on chemical weapons in 2004 was in particular a consistent carrying out of controls on the national level and development of tools intended for securing this control, especially with use of specialized projects of science and research. Also in the last year the obvious priority of the Office activity was securing commitments, which result for the Czech Republic from the Chemical Weapons Convention.

In 2004 the SÚJB inspectors carried out a total of 31 inspections in the territory of the Czech Republic. During these inspections no breach of law was found and therefore it was not necessary to propose any penalties. The control of management of List 1 materials (the highest risk) was carried out at 12 organizations. Besides the planned controls of the disposal of the List 2 and 3 chemical materials, the partial problems were continuously solved, for example in the area of the import of the means for the fireproof finish of textile materials. In addition to the above mentioned controls, preventive searching for other organizations proceeded, whose activities could be subject to the national control regime in the area of the disposal of chemical materials of the List 2 and 3 (the rubber and plastic industry, graphical-arts industry, paper industry, cosmetics and domestic chemistry) or when producing certain organic chemical substances, especially of the PSF type (for the production of detergents, soaps, ecological oil). In 2004 no inspection of inspectors of the Organization for the Prohibition of Chemical Weapons (OPCW) was carried out in the territory of the Czech Republic

In the past period SÚJB employees participated in many interdepartmental activities, for example in the update of the Action plan of the fight against terrorism, control of the import and export of set chemical substances (Licence Administration of the Department of Trade and Industry, the Customs General Headquarters) and the issue of crisis management (the Department of the Interior – the Czech Republic Fire Brigade Headquarters).

Every year, in accordance with the relevant provisions of the CWC, the SÚJB processes declarations of selected activities in the previous period and the planned activities for the next year. These are then handed over to the OPCW generally for the Czech Republic every year. Last year 36 organizations reported information related to past activities, of which 13 were included into the declaration. Information on the actual import and export of the defined materials on the basis of 79 licenses granted for these chemical substances by the Licence Administration of the Department of Trade and Industry were further incorporated in the summarized national information on past activities. Data on the estimated production of the List 3 chemical substances in two companies (3 plants) were included in the declaration of the planned activities in 2005. In the course of 2004 the specification of some data from previous declarations concurrently continued both between the OPCW and the

Czech Republic and other contracting countries of the OPCW. Together with the declarations for 2004, the national programs of the Czech Republic related to protective purposes were notified.

In the years 2003 - 2005 the Czech Republic has been a member of the Executive Council of the OPCW. An extended professional support for the Czech Republic Embassy in Hague on the part of the SÚJB required Mr. Kubernát, the Chairman of the OPCW Executive Council, to operate there for one year. In connection with meeting the commitments resulting for the Czech Republic from the membership in the CWC two International Conventions were prepared last year – the bilateral Convention between the OPCW and the Government of the Czech Republic on providing a support according to article X of CWC (SÚJB cooperation with the departments of the Department of Foreign Affairs, the Department of the Interior, the Department of Defense, the Department of Trade and Industry) and the Convention on privileges and immunities (prepared by the Department of the Foreign Affairs of the Czech Republic in cooperation with SÚJB). During the 38th meeting of the OPCW Executive Council the contribution of the Czech Republic in the area of protection against chemical weapons was awarded several times and especially Greece thanked the Czech Republic for training its specialists who participated in the protection of the Olympic Games.

In 2004 the SÚJB experts participated in many international activities. The course "Chemical Weapons Civil Defense Training Course", which was held in the Institute for Population Protection in Lázně Bohdaneč, can be mentioned as the most important event in the territory of the Czech Republic. From the foreign events it is possible to mention the May meeting in Vienna focused on the implementation of article X of CWC and on the performance of inspections at call or the conference regarding the issue of protection against chemical and biological weapons in Swiss Göteborg.

The Czech Republic currently has a rather strong representation in the bodies and commissions of the OPCW; in the Commission of Confidentiality, in the network of administration experts of OPCW, in the consultative body for administrative issues, in the team of experts of OPCW "Protection Network". The Czech Republic representative has been currently executing the office of the Chairman of the Scientific Advisory Board of the OPCW Technical Secretariat Managing Director. Two

specialists from the Czech Republic have been operating in the committee for the assessment of specters of chemical substances relevant to the CWC.

The SÚJB, in cooperation with the Department of Foreign Affairs, issued a brochure "The Czech Republic and Organization for the Prohibition of Chemical Weapons" with the subtitle "Implementation of the Convention on Banning Development, Production, Stockpiling and Use of Chemical Warfare and on Its Disposal on the National Level and Activity of the Czech Republic within the Organization for the Prohibition of Chemical Weapons". This material informs on experience in implementation of the CWC in the Czech Republic and on an excellent cooperation with the Technical Secretariat of the OPCW, which highly appreciated the General Director of the Technical Secretariat of OPCW, Rogelio Pfirter, in his introductory work on this brochure. The brochure was provided for use to all the OPCW contracting countries on the occasion of performance the 9th Conference of CWC contracting countries in Hague.

5.3. BACTERIOLOGICAL AND TOXIN WEAPONS

In 2004 the SÚJB performed the tasks resulting from its function of the national office for the control of the prohibition of biological weapons. The Office inspected the organizations in question and elaborated a voluntary declaration of the Czech Republic, which was, in accordance with the provisions of the BTWC, sent to UN Headquarters in New York. The declaration contained data on research centers and laboratories, on national research and development programs for the biological defense, on the occurrence of unusual diseases and similar events caused by toxins, on published results in the field of biological research, on contact of employees in the field of peaceful biological programs, on legislation development, on regulations of import or export, and on enterprises producing vaccines for human use.

Within the performance of state administration and surveillance of following the provisions of Act No. 281/2002 Coll., 22 decisions were issued on the permit to manage highly risk agents and toxins (VRAT). Based on the application for change a 13 new applications, and eight entities were registered that manage risk agents and toxins (RAT). A total of 79 entities are currently subject to the inspection regime. From this number ten entities manage only risk agents and toxins and herewith are subject to the notification duty. Some of the remaining 69 permit holders manage

both the highly risk agents and toxins and the risk agents and toxins. Furthermore, a total of 51 inspections were carried out at the entities in question.

In relation to facts that were found the methodical activities were performed in the form of lectures and personal consultations. The lectures were carried out in cooperation with the Organized Crime Detection Department of the Criminal Police and Investigation Service of the Czech Police at the statewide seminar, the Customs General Directorate and with the University of Masaryk in Brno at the seminar of representatives of universities and institutes of the Academy of Sciences residing in the region of South Moravia. The seminar on the subject of “Detection of selected agents using the electrochemical luminescence” was organized with the participation of other state organizations (State Health Institute, Directorate General of Fire Rescue Brigade, State Institute for Nuclear, Chemical and Biological Protection, Ministry of Health, Ministry of Defense). In cooperation with the Department of the Interior and the Headquarters of Fire Rescue Brigade the seminar on the subject of “Chemical and biological terrorism” was organized.

Together with the Department of Agriculture the draft interdepartmental contract was drawn up on the utilization of reference veterinary laboratories for the support of inspection activities, together with the Ministry of Defense the preparation of draft agreement is in progress on the utilization of reference laboratories of the Ministry of Defense, and together with the Ministry of Health on the utilization of reference laboratories of the Ministry of Health and national reference laboratories of the State Health Institute.

In the field of the control of biological weapons, the Verification Protocol of the Convention has not been signed yet, and therefore the international cooperation is focused on, for example, the membership in the Australian group. The SÚJB representatives took part in the expert meeting of the BTWC contracting states held in July 2004 in Geneva and in the second annual session of the BTWC contracting states held in December 2004, also in Geneva.

6. INTERNATIONAL COOPERATION

6.1. BILATERAL COOPERATION

Federal Republic of Germany

An annual bilateral meeting organized in accordance with the Intergovernmental Agreement on Issues of Common Interest in the Field of Nuclear Safety and Radiation Protection was held in November 2004 at Grafenrheinfeld NPP in Germany. The agenda of the meeting related to a traditional theme on the subject of legislative changes, experiences in the surveillance of nuclear facilities, including information on the solution of important operational events that occurred at nuclear power plants, or current news in the field of radiation protection. The subject of the discussion was also progressive scientific-technical cooperation between both sides. Part of the bilateral meeting was a visit to a local nuclear power plant, during which the Czech delegation was acquainted with equipment operational data and details of the design, including its various modifications, as well as with the problems related to the management of radioactive waste, particularly the issue of interim spent fuel storage facility.

A common seminar on the expert level was held at the end of the year in Prague organized by the SÚJB and the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, which was focused on the analytical support of building-up the emergency preparedness system and the solution of beyond design basis accidents. This action was a pilot action for the cooperation of both countries in the nuclear field after the accession of the Czech Republic to the European Union.

Austria

The activities of the SÚJB towards the Austrian Republic focused on, besides routine work, the fulfillment of obligations related to Temelín NPP and arising from conclusions of the “Melk process” and Follow-up (the so-called “Brussels protocol”) taken by the Prime Ministers of both countries in November 2001.

In 2004 the SÚJB organized two thematic seminars for the Austrian side within the scope of the fulfillment of the “Brussels protocol”. The first one focused on the problems related to reactor pressure vessel integrity and potential influence of pressure-thermal shock was held in May 2004 and the second one focused on the problems related to non-destructive inspections of primary loop components was held in October 2004. The working group for comparison of the calculations of radiological consequences of the beyond design basis accidents, which was established in 2002,

discontinued its activities in July 2004 by publishing the Common Final Report. One of the work outputs of this working group is the agreement made between the SÚJB and the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management on the mutual transmission of data in the case of a radiation emergency and on the performance of training transmissions of data and information. These training transmissions are performed in accordance with the agreement every month.

An annual bilateral meeting organized in accordance with the Intergovernmental Agreement Regarding Questions of Common Interest in Connection with Nuclear safety and Radiation protection was held in Dolní Dunajovice in South Moravia at the end of November, 2004. The agenda included a regular exchange of information on the current situation in both countries in the field in question. Among other things, the Austrian side was acquainted in detail with the approach to management of radioactive waste in the Czech Republic, with the stress put on the issue of deep geological repository and with the status of both our nuclear power plants. The Czech delegation was, on the contrary, provided with detailed information on procedure performed during decommissioning of the ASTRA research reactor in Seibersdorf.

The essential part of the annual bilateral meeting addressed the evaluation of the results of the fulfillment of conclusions resulting from the “Brussels protocol” in the elapsed time. Besides the brief information on fulfillment of measures according to Annex II, which relate to the environmental impact assessment of Temelín NPP, both sides paid particular attention to the final evaluation of expert discussion on safety aspects of Temelín NPP, which took place according to the pre-approved plan (the so-called “road map”) in 2002 to 2004. The comparison of approaches among the experts with different practice and expert background enabled systematic reassessment of the fulfillment of selected safety targets set for Temelín NPP and in some cases pointed at the various methods of solutions leading to the same result. According to Czech side opinion, this situation is reflected in the reports drawn up by the Austrian experts, which summarize the discussion from their point of view. Of course, there are still differing views among experts of both countries on the partial technical solutions. However, this is not a unique situation for the experts participating in these seminars. This is a routine situation, which can occur when discussing such complicated and hard-to-measure problems. Very comprehensive documentation of seven thematic seminars and the final report drawn up by the

working group for comparison of the calculations of consequences of the radiological accidents give integrated and detailed description of all measures taken to ensure corresponding levels of nuclear safety that are formulated in Annex I to the “Brussels protocol”.

In conclusion of the evaluation of discussion, both sides emphasized the change of the atmosphere of the meeting as well as the establishment of significantly higher trust among experts of both countries, which certainly are the best deposits in the future cooperation.

The United States of America

A significant event was the SÚJB Chairperson visit of the Nuclear Regulatory Commission (NRC) Headquarters in Washington. During the visit the SÚJB Chairperson met the Nuclear Regulatory Commission Chairman and one of two executive commissioners. Problems related to the operation of nuclear facilities and emergency preparedness were discussed, even in connection with the threat of potential terrorist attacks. The visit also included visitation of the NRC Operations Center and excursion to Three Mile Island NPP in Pennsylvania.

The Czech Republic accepted its participation in the USA project focused on the safe disposal of highly enriched fuel from research reactors, which can be abused by terrorists, and its replacement for medium enriched fuel. (For description see the multilateral cooperation with IAEA.)

The cooperation in two fields of simulating situations of nuclear reactors successfully continues. It involves large-scale thermal hydraulic codes for stable condition and transient phenomena, and the so-called beyond design basis accident.

Slovakia

The cooperation between SÚJB and the Slovak Office for Nuclear Inspection continues especially on an informal basis and is based on consultations over common ground themes and submission of technical information. The last regular bilateral meeting was held in Prague in November 2004. The meeting included discussions over legislative changes in both countries (new Atomic Act of the Slovakian Republic and amendment to Atomic Act of the Czech Republic), implementation of EU regulations and the mutual exchange of information and experiences in surveillance of operation of nuclear facilities. Informal cooperation was

also effective during coordination of both countries' participation in IAEA work or within the scope of PHARE projects.

6.2. CENTRAL EUROPE

By mutual agreement, the common meetings of regulators of the Czech Republic, Hungary, Slovakia and Slovenia were commenced. The first meeting was held in Slavkov near Brno in March 2004. Another, informal, quadrilateral meeting was held on the occasion of the annual session of the 48th General Conference of the IAEA in Vienna in September 2004. The current common ground questions in the field of law and state surveillance of nuclear facility safety are discussed at the meetings. The subject also includes current questions and proposals discussed on the international level (e.g. management of spent fuel), or taking an integrated stand on the presented problems.

6.3. MULTILATERAL COOPERATION

International Atomic Energy Agency (IAEA)

The expert cooperation with IAEA remains SÚJB priority within the field of multilateral international relationships.

The SÚJB participated and still cooperates in development of IAEA standards and recommendations in the field of peaceful utilization of nuclear energy. These standards and recommendations are, in most countries, the base for national regulations. Questions related to the fight against terrorism and non-proliferation remain a topical problem. In this connection the Czech Republic supports the common initiative of the USA, Russian Federation and IAEA towards repatriation of highly enriched nuclear materials to the country of origin. The main target of this initiative is to reduce the risk of potential abuse of these materials. In order to help to fulfil the targets of this initiative, the Czech Republic, at the end of 2004, disposed a certain amount of nuclear materials stored hitherto at the Nuclear Research Institute in Řež near Prague to the Russian Federation.

In September 2004 the two-year non-permanent membership of the Czech Republic in the Board of Governors for East European group and one-year functioning of SÚJB Chairperson, who was appointed to governor function for the Czech Republic,

in the function of Vice-president of the Board of Governors, discontinued. The Czech Republic used this two-year period to strengthen its position within the IAEA. For example, it successfully introduced an assertion of change in the rules for providing contributions to the fund for technical cooperation or formulation of the Rules for Ensuring Research Reactors Safety, or the Rules for Safe Management of Radioactive Sources that were, after the being discussed at the Board of Governors, approved by the General Assembly of the General Conference of IAEA member states.

One of the most significant services that IAEA provides to member states on request is an independent inspection mission performed by the international expert teams. In 2004, on request of the Radioactive Waste Repository Authority, the WATRP mission was carried out in the Czech Republic through SÚJB, which was focused on the technical appraisal and complex evaluation in the field of management of radioactive waste.

In 2004 three “national”* projects within the Technical Cooperation Program were completed, which were focused on further improvement of nuclear safety level in the Czech Republic.

SÚJB and other Czech institutions assisted in the organization of many international activities within the "regional" part of the IAEA technical cooperation program. The Czech Republic organizes regional training courses on a regular basis focused on the issues of radiation protection and expert seminars, particularly in the field of nuclear safety. In the past period 44 foreign specialists were trained in the Czech Republic from various fields of peaceful utilization of nuclear energy mostly oriented on nuclear safety, radiation protection, performance of state-governed surveillance, application of ionizing radiation in medicine and management of radioactive waste. Expert fellowships were provided to 20 applicants, short scientific visits were provided to 24 specialists. Within the Program for Technical Cooperation almost 120 specialists from the Czech Republic participated in other activities (conferences, sessions, seminars, training courses) focused on the safety of power plants with

* The National Project is developed and implemented in the Czech Republic and it mostly relates to introduction of new technology, while in the “Regional” Projects up to twenty states participate and they are focused on the seminars and trainings.

VVER reactors, problems related to nuclear fuel, nuclear materials, management of radioactive waste, radiation protection and nuclear medicine.

The SÚJB took part in activities of the European ALARA Group – EAN (European Alara Network) and in the IAEA project for establishment of parallel ALARA Group for Countries of Central and Eastern Europe – CEEAN.

In 2004 the Office is already for the third year engaged in the activity of the IAEA committee – RASSC (Radiation Safety Standard Committee) for preparation of standards in radiation protection.

In addition to extensive “national” and “regional” projects 34 small scientific projects proceeded in the fields of nuclear energy, applications of ionizing radiation and management of radioactive waste.

The Czech Republic membership in the IAEA is related to financial means to IAEA budget. These financial means are covered from the budget of the Ministry of Foreign Affairs (contribution to regular budget) and SÚJB. In case of the Office this particularly involves the contributions to the fund for technical cooperation or to the so-called “special funds”, such as the Nuclear Security Fund. All contributions are made in accordance with the rules adopted for financing the activities of agencies within the UN structure. In accordance with the development of international-political position of the Czech Republic, the foreign cooperation program is transformed not only in the nuclear field. This is also reflected in progressive change of the nature of the expert cooperation between the Czech Republic and IAEA. The Czech Republic applies the results of fifteen-year intensive cooperation with this organization and with many of its member states, and in compliance with the foreign-political interests, starts to extend the support to less developed member states of IAEA. The Czech Republic's contributions to the funds of technical cooperation are the main instrument of this support and it is necessary to point out that the contributions are positively assessed not only by the member states that accept the support, but also by the other developed countries that provide this support on a long-term basis. Experiences show that relatively small financial means may have a significant international-political impact in the field of peaceful utilization of nuclear energy and, in particular, non-proliferation of weapons of mass destruction.

In 2004 the contributions of the Czech Republic within the cooperation with IAEA were divided as follows:

- Regular contribution to the **IAEA technical cooperation fund** (CZK 3. 844 mil. drawn from SÚJB's budget)
- Supplementary contribution to the **Program of IAEA Technical Cooperation** (CZK 2.55 mil. drawn from the Czech Republic development aid fund), which aimed at strengthening of nuclear safety and radiation protection in the countries of former Soviet Union. The support was provided to Armenia for monitoring and prediction of flow-accelerated corrosion on Medzamor NPP; to Ukraine for completion of analysis of influence of chemical water regimes in secondary circuit on the life-time of Záporožská NPP steam generators and to Kazakhstan for ensuring radiation protection with a stress put on medical applications.
- Special contribution to selected **programs financed outside of IAEA basic budget** (CZK 0.79 mil. drawn from SÚJB's budget, CZK 1 mil. drawn from Ministry of Foreign Affairs´s budget) was partially directed to the Nuclear Security Fund, specifically to strengthen the engineered safety features of Medzamor NPP in Armenia and Chernobyl NPP in Ukraine, and partially to IAEA extrabudgetary program focused on safety aspects of long-term operation of nuclear-power water-moderated reactors.
- Special contribution to the **IAEA Technical Cooperation Program** (CZK 2.825 mil. drawn from SÚJB's budget, approved by the Czech Republic Government Decision No. 803 dated August 25, 2004), which was distributed among projects focused on improvement of nuclear safety and strengthening of radiation protection in the countries of Central and Eastern Europe. Within the support of SÚJB, in Ukraine the reactor pressure vessel integrated surveillance program was applied, the knowledge base of emergency core cooling systems of VVER reactors was created for the whole region and protective shielding tools and equipment to control the quality at diagnostic workplaces in Serbia and Montenegro were purchased.

Utilization of financial means extraordinarily contributed by the Czech Republic to the IAEA technical cooperation fund is, where appropriate, related to participation of Czech organizations or individual experts. Therefore, the Czech entities participated

in more than 70% of projects last year, which were funded from the special contribution to the fund of IAEA technical cooperation. In some cases the financial means provided by the Czech Republic were combined with special contributions of other countries, e.g. in case of Armenia with funds from the USA.

In connection with the above-mentioned positive international-political response to the Czech support of the IAEA Technical Cooperation Program, the Office reserved in its 2005 budget financial means in the amount of CZK 3,823,303 for the supplementary contribution to the fund for technical cooperation. The objective is, if the Czech Government approves the goal in accordance with the law, to support selected projects focused in particular on the improvement of nuclear safety and radiation protection level in our region. The fields of support as well as the target countries were chosen based on consultation with the Ministry of Foreign Affairs. The following projects are involved:

- **Ukrainian "national" project UKR/4/013 "Action Plans for Nuclear Power Plant Lifetime Management", part "Action Plan for Nuclear Power Plant Lifetime Management in Ukraine"**

  The project aims to improve operational safety of nuclear power plants in Ukraine in relation to their life-time extension. A part of this project is complete evaluation of condition of individual components of nuclear facilities.

  The contribution of the Czech Republic, in the amount of CZK 1.5 million, is proposed for implementation of the pilot study for safety evaluation system of the so-called high-energy pipeline (steam and feed water pipelines between turbine and stem generator) on the basis of similarity between Temelín NPP (where similar measures were already taken) and Khmelnitsky NPP.

- **Armenian "national" project ARM/9/016 "Improvement of Design Safety of the Armenian Nuclear Power Plant", part "Improvement of Design Safety of Medzamor NPP in Armenia"**

  This project is directed towards improvement of operational safety of the only nuclear power plant in Armenia by introducing erosive-corrosive analyses of main components of the facility, including pipeline systems, which represent an important part of ageing management of the nuclear power plant.

The contribution of the Czech Republic, in the amount of approximately CZK 0.7 million, would enable completion of ultrasonic inspection of primary pipeline welds. The welds on pressurizer and main pump pipelines will be subject to inspection.

- **"National" project of the Czech Republic CZR/0/005 "Safety, Self-reliance and Sustainability of National Nuclear Institutions", part "Safety, Self-reliance and Sustainability of Czech Institutes in the Nuclear Field"**

  This project, which is focused on the support of education of younger specialists in the wide spectrum of fields, from nuclear technologies to nuclear medicine, aims to contribute to the improvement of self-reliance and sustainability of nuclear program in the Czech Republic.

  The contribution of the Czech Republic, in the amount of CZK 0.49 million, would be used to implement selected scientific visits, training and scholarships of our employees at specialized institutes abroad (and expert missions of foreign specialists in our country). Within the scope of the project, a training course will 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. Furthermore, the financial means will be used for the purchase of equipment necessary to immobilize patients during radiotherapy on linear accelerator that was installed in the University Hospital Bulovka last year.

- **Tajikistan –"regional" project RER/9/079 "Upgrading Radiation Protection Infrastructure in Eastern Europe and Central Asia", part "Support of Surveillance Activities in Developing Countries"**

  This project aims to strengthen regulatory infrastructure in the field of radiation protection according to basic international safety standards, in particular with a stress put on medical exposures.

  The contribution of the Czech Republic, in the amount of CZK 0.62 million, is proposed to cover the costs of training the expert personnel in the field of regulations when handling ionizing radiation sources in medicine and to purchase protective shielding tools, or single measuring instruments used for quality control at radio-diagnostic workplaces in Tajikistan.

- **The Czech Republic Support Program SGIT-001 "IAEA Safeguards Information System (ISIS)"**

  The project is focused on reconstruction of the IAEA Safeguards Information System in accordance with the fulfillment of commitment resulting from the Non-proliferation Treaty. Starting with the year of 2005, the Czech Republic promised to consider the possibility of contribution in the amount of Czech crown equivalent to USD 20,000 to support this significant activity.

  The contribution of the Czech Republic, in the amount of approximately CZK 0.473 million, should support the implementation of new computer system used for monitoring of nuclear materials.

- **Task SPA-01 "SPRICS 2.0 Database"**

  The contribution of the Czech Republic in the amount of approximately CZK 40,000 should be used to introduce upgraded software enabling on-line access to information concerning safeguards system. The total amount for contributions of the Czech Republic to the fund for IAEA technical cooperation reserved in the 2005 budget of SÚJB is CZK 7.4 mil. This amount includes regular contribution in the amount of CZK 3,096,458.06 (amount calculated according to UN methodology), contribution in the amount of CZK 480,239.65 intended for cost-sharing of "national" projects of the Czech Republic (the so-called National Participation Costs – NPC) and the above-described supplementary contribution.

Nuclear Energy Agency OECD (OECD/NEA)

In 2004 the participation of SÚJB in OECD/NEA/CRPPH activities continued. The employees of radiation protection department participated in sessions of CRPPH Committee and in activities of its working groups – ISOE (International System on Occupational Exposure) for evaluation of exposures in nuclear facilities and special working group established for monitoring and evaluation of the development of prepared new recommendation of the ICRP.

In the Committee on Nuclear Regulatory Activities working within the OECD/NEA, the Office's employees participated in particular in activities of the Working Group on Inspection Practices, in which the activities focused last year on the problems related to inspections of nuclear power plants being close to the end of their design lifetime,

surveillance of organizational aspects of operation and approach to inspections in terms of risk assessment. Furthermore, the Office's representatives participated in the Working Group focused on problems related to regulatory decision-making processes and the Working Group on Public Communication.

Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO)

The CTBT Treaty was ratified by the Czech Government on September 11, 1997. The SÚJB (as the national office), together with representatives of the Czech Republic Permanent Mission at UN at Vienna, the Institute of Physics of the Earth (ÚFZ) of the Masaryk University in Brno and National Radiation Protection Institute ensured the fulfillment of all commitments resulting from this Treaty. It includes in particular providing of activities of the subsidiary seismologic station AS026 (VRAC) of the International Monitoring System (IMS) in Vranov near Brno operated by the ÚFZ. The operational reliability of the VRAC station is almost 100%. In 2004 the ÚFZ prepared itself for participation in the first complex system test of the IMS, which will take place in 2005. In order to ensure the operation of monitoring devices in the territory of the Czech Republic, the Czech Government, together with the CTBTO Preparatory Committee, entered into agreement, which became effective after completion of ratification process on January 29, 2004.

Western European Nuclear Regulators Association (WENRA)

The Western European Nuclear Regulators´ Association associates the regulators of all member countries of the EU with operated nuclear power plants and Switzerland. One of the current crucial targets of the Association is to harmonize, as much as possible, approaches to the assurance of nuclear safety and the management of high-level radioactive waste and spent fuel in all member countries by 2010. During 2004, the SÚJB experts took part in activities of two expert groups established by the members of the Association in order to solve the above-given tasks. In case of Working Group for problems related to management of radioactive waste, the SÚJB expert was appointed to a free post of Chairman at the end of 2004.

Forum of the State Nuclear Safety Authorities of the Countries Operating WWER Type Reactors (WWER Forum)

In June 2004 the meeting of the members of the Forum of countries that operate VVER reactors was held in the Czech Republic se v ČR. During the meeting, the member states exchanged their information on the most important events that occurred at nuclear facilities as well as on activities of individual regulators, including possible organizational or legislative changes. Among other things, the results of activity of two working groups were presented at the meeting, which were established by the Forum participants in the past for the field of the use of operational experiences to improve the safety of nuclear power plants and for the field of probabilistic safety assessment of nuclear power plants. It was decided at the meeting to establish a new working group, which would deal with the problems related to probabilistic assessment of digital I&C systems of technological processes. The Forum participants also adopted a resolution on delivery of common position in relation to the evaluation of safety level of VVER nuclear reactors.

Network of Regulators of Countries with Small Nuclear Programs (NERS)

The SÚJB is a founding member of the Network of Regulators of Countries with Small Nuclear Programs (NERS), whose members are also the regulators of Argentine, Belgium, Finland, South Africa, Hungary, Netherlands, Slovakia, Slovenia, Switzerland and Pakistan. The common interest questions in the field of utilization of nuclear energy, and in particular the nuclear power plant safety, are discussed at the annual meetings of the member states. The last, seventh, meeting was held in Vienna in September 2004.

6.4. MEMBERSHIP IN THE EUROPEAN UNION

On May 1, 2004 the Czech Republic became a member of the European Union and its representatives in the working authorities of the EU Council and the European Commission acquired the right to participate in co-decision-making. Therefore, the SÚJB's priority in the field in question was regular representation in the institutions that deal with the problems falling within the competence of the Office and preparation of standpoints for the meetings. The SÚJB is the director and coordinator for the representation of the Czech Republic in the EU Council Working Party on

Atomic Questions (AQG) and the co-director and co-coordinator for the Working Party on Dual-use goods. In 2004 a total of 17 meetings of the AQG were held. The main items of the meetings were the proposals of EURATOM directives and regulations. In the first half of 2004, the discussions towards 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, which form the so-called nuclear package, continued. The majority of the Member States refused the proposals for directives and Council Conclusions were adopted to the problems in questions. The elaboration of these Conclusions was the subject of the AQG meeting held in the second half of 2004. Another questionable item of the meeting was the adoption of the new EC regulation on application of safeguards within the EU and the guidance for implementation of this regulation. Even though the EC regulation was formally approved on April 29, 2004, it has not become effective, as all its language mutations and thus the publication in the EU Official Journal have not been prepared yet.

The stands submitted to the documents discussed by the AQG, or the instructions for the meetings of the Czech Republic representatives as well as other working groups dealing with problems within the competence of the Office, are approved by the Departmental Coordination Group for Nuclear Safety and Radiation Protection (RKS). In the course of 2004, this group had three meetings; however, its members are continuously consulted and acquainted in electronic form with the results of meetings of related Council and EC working groups.

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 and Council Working Party on Dual-Use goods. In addition, the employees of SÚJB are acquainted with meeting of other working parties on energy, science and research, non-proliferation and disarmament. They also participate in meetings of relevant RKS of other departments.

Another activities of the SÚJB followed from the membership of the Czech Republic in the EU and the obligation to participate in the Community systems build in response to exclusive or shared competence of the Euratom are the following:

a. Implementation of Euratom “safeguards” system (change in submission of “safeguards information”, inspections carried out by EC inspectors) – ensured by the *Department of Nuclear Non-proliferation*,
b. Submission of data on radiation situation in the territory of the Czech Republic (EURDEP and REM) and exchange of data in case of occurrence of radiation accident (ECURIE) – ensured by the Emergency Response Center.

The SÚJB representatives participated in meetings organized by relevant divisions of the EC and they ensured implementation of systems within the SÚJB, or the Czech Republic. More detailed information on the above-mentioned activities is stated in the parts of this report addicted to relevant divisions.

In addition to the above-mentioned activities SÚJB participated in other activities coordinated by the Ministry of Foreign Affairs and the Office’s representative participated in meetings of the Committee for European Union, as required.

Program PHARE

In 2004 three projects of the PHARE program were completed, which concerned the following:

- Support and improvement of effectiveness of the Czech Republic regulatory tools in the field of utilization of nuclear energy and ionizing radiation,
- Specification of exposed material physical and mechanical properties from dismantled VVER reactor in Greifswald and use of acquired results for evaluation of nuclear power plant safety and life span,
- Validation/verification of computer programs used in safety assessment of transition states and emergency situations of nuclear power plant units with the VVER-1000 reactor.

At the same time, three projects with already-approved program and financing, which were brought back in cooperation with EC, were commenced last year. The projects are focused on the following:

- Installation of the RODOS system designed for the emergency preparedness system,
- Safety assessment of nuclear power plant units with the VVER-440/213 reactor during low-power and outage conditions,

- Assistance to Nuclear Research Institute Řež when removing damages caused by floods in August 2002.

Other European Union Projects

Since April 2004 the SÚJB participates in the implementation of the EURANOS project, which is handled within the Euratom Sixth Framework Program aimed to harmonize the practice and responses to potential radiation emergencies within the European Union. Since 2004 the SÚJB became main coordinator of the "ESOREX2005" project, assigned by the EC – DG TREN (it is planned by the year of 2006). All current information on the project, including workshop program and presentations may be found on www.esorex.cz.

7. SCIENCE AND RESEARCH

In 2004 two fundamental conceptual materials were elaborated in the field of science and research for the needs of SÚJB as the state surveillance and state administration body.

In accordance with the provision of Section 5 Paragraph 2 of Act No. 130/2002 Coll., on support for the research and development from public funds and on amendment of some associated acts (Act on Support for Research and Development), the proposal for *Program "Research and Development for the needs of the State Office for Nuclear Safety as the State Surveillance and State Administration Body in the Fields of Nuclear Safety, Radiation Protection and Control of Adherence to the Ban On Chemical and Biological Weapons"* was elaborated. This program was approved by the Czech Government Decree No. 1010 dated October 20, 2004.

The main objective of the program is to acquire knowledge, objective materials and tools for conceptual, methodical, decision-making and surveillance activities and the performance of state administration ensured by the SÚJB in such way to allow their performance on a high expert level and their correspondence to the current condition of the knowledge. The program includes all fields falling within the competence of the Office, i.e. the surveillance of nuclear facility safety, radiation protection, engineered safety features of nuclear facilities and nuclear materials, emergency preparedness,

surveillance of nuclear items and prohibition of chemical, bacteriological (biological) and toxin weapons.

The program objectives correspond with the trends in the field in question set in the EU, fulfillment of the relevant international recommendations formulated in the IAEA and OECD/NEA documents and other requirements resulting from the treaties for the Czech Republic – Non-proliferation Treaty, Nuclear Safety Convention, Common Convention On Safety when Managing Spent Nuclear Fuel and Radioactive Waste, Chemical Weapons Convention and Bacteriological (Biological) and Toxin Weapons Convention.

The program implementation will be commenced by preliminary announcement of public contracts to be placed in 2006 in accordance with Act No. 40/2004 Coll. Duration of the program is by 2014. The principle of design control is to be applied in implementation of the program. The use of this principle presumes that there are projects elaborated with certain dates, outputs, costs and inspection and evaluation method for each of the set program objectives. The fulfillment of such projects is checked on a continuous basis.

Another conceptual material elaborated in this field in 2004 was the *Conception of Research and Development in the Field of SÚJB competence*, which was submitted according to item II.1. of the Czech Government Decree No. 5 dated January 7, 2004 on the National Policy for the Research and Development of the Czech Republic for 2004 – 2008 to the MŠMT. The document is based on Medium-term Conception of Research and Development of the SÚJB department for 2002 – 2005 with a forecast till 2010 and on the above-mentioned Program “Research and Development for the needs of the State Office for Nuclear Safety as the State Surveillance and State Administration Body in the Fields of Nuclear Safety, Radiation Protection and Control of Adherence to the Ban On Chemical and Biological Weapons”. The document also includes the requirements set in documents approved by the Czech Government Decree No. 513 dated May 26, 2004 on access of the Czech Republic to the material “Invest in Research: Action Plan for Europe” and to other EU documents for the field of research and development, and by the Decree No. 644 dated June 23, 2004 on evaluation of research and development and their results.

The SÚJB, as surveillance and control body of the state administration, does not directly participate in the fulfillment of the National Program of Research and

Development, because the Office, within its competence, is not responsible for the fulfillment of thematic and cross-section programs. It may be presumed that this condition will be kept even after approval of the NPV II. Therefore, the SÚJB presumes to place rather short-term or medium-term projects in the future that fall within the category of applied research. The main priorities when implementing the tasks of the research and development in the field of SÚJB competence are the following: maintenance of high level of surveillance and administrative activities, maintenance of level of the performance of activities comparable on the international level, maintenance of good-quality scientific-research base and evaluation of research and the use of results in practice. When asserting the priorities, stress will be primarily put on direct and practical applicability of the results so that the Office can fulfil its tasks on the level corresponding, in every moment, to the current science knowledge and that the adequate independence on entities subject to its inspections is ensured for the Office. From the content point of view, the program conception is based on the existing needs of the SÚJB, and it further respects the development in technical and organizational field.

Structure of Departmental Research System and Key Workplaces

Specific as well as institutional support of the tasks of research and development is directed by the SÚJB to the field of nuclear safety, radiation protection and control of non-proliferation and prohibition of weapons of mass destruction. The majority of tasks falling within the nuclear field are handled in particular within the specific research and development programs. With respect to specificity of this field the key scientific-research workplace is the *Nuclear Research Institute (ÚJV) Řež, a.s*., which is the largest multidisciplinary Czech research organization in the field of peaceful utilization of nuclear energy, which disposes of many erudite experts and many research collectives. The Institute is also recognized partner of the prominent European research organizations.

The Departmental Program of the institutional research is ensured by two workplaces of the SÚJB department – *the State Institute for Radiation Protection,* which is the organizational state component*, and the State Institute for Nuclear, Chemical and Biological Protection*, which was established as a contributory organization.

The *SÚRO* provides expert support to the SÚJB in performance of state surveillance and state administration in the field of protection against ionizing radiation. For this purpose, the Institute ensures in particular:

- Research in the field of measuring methods for determination of low activities of radionuclides in the environmental components, biological materials and in population,
- Research in the field of express methodologies to ensure emergency preparedness of the Czech Republic Radiation Monitoring Network,
- Research in the field of determination of doses for population from artificial radionuclides in connection with the nuclear facilities and other sources,
- Research in the field of human internal contamination,
- Research in the field of population exposure from natural sources,
- Research in the field of evaluation of population and employees radiation burden during medical exposure,
- Research in the field of monitoring of biological effects of ionizing radiation, in particular the qualitative dose-effect relation on the basis of epidemiological studies and microdosimetry.

With this research program the SÚRO is the only one scientific-research workplace in the Czech Republic. Therefore, it is necessary to ensure the development of the Institute so that it could provide good-quality outputs of the solution of research and development tasks. The SÚJB will support SÚRO's participation in the international cooperation in the field in question.

The *SÚJCHBO* provides the support to SÚJB activities in particular in the field of application of modes of control of non-proliferation of chemical and bacteriological and toxin weapons.

The Institute deals with research and development tasks related to:

- Measurement and collection of data in the field of evaluation of the effects of nuclear, chemical and biological materials on person and environment,
- SÚJB's tasks assigned within the constitutional Act No. 110/1998 Coll., on safety of the Czech Republic,

- Measurement and evaluation of the rate of protection of individual and collective means for person's protection against nuclear, chemical and biological materials; development of new testing methods in real and model conditions,
- Fulfillment of the Radon Program.

8. 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 86 applications were submitted to the State Office for Nuclear Safety in 2004 from physical or legal entities.

Three lawsuits were recorded in 2004 by reason of violation of the above-mentioned Act from SÚJB (two of them were brought in 2004). It concerned lawsuits against non-provision of information to prosecutors – the citizens' associations Greenpeace and the Citizens' Initiative for Environmental Protection. One judgement was pronounced for non-adherence to this act in 2004, which cancelled SÚJB decision and returned it for new 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 radiation protection and radiation situation monitoring on the territory of the Czech Republic
c) questions concerning texts of the Atomic Act and decrees
d) questions concerning the Radon Program and methodology for providing the government subsidies,
e) others (general information).

SÚJB's Internet page www.sujb.cz serves as a supplement to information provided in the forms mentioned above. In 2004 the page underwent radical content and graphical change. All information is available in Czech language, and overall majority of basic information is available in English language (the rebuilding of English page is being completed). 16,528 accesses were registered since November 2004, when

operation of new pages was officially started. 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 state administration, 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, and from the date of the accession of the Czech Republic to the European Union also the access to complete Union legislation.

The public can find the basic information on SÚJB through the state administration portal operated by the Ministry of Information of the Czech Republic.

SÚJB representatives, in accordance with the obligation stipulated to SÚJB by Act No. 18/1997 Coll., as amended (the Atomic Act), 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.

9. ACTIVITIES OF INSTITUTES CONTROLLED BY SÚJB

9.1. ACTIVITIES OF THE STATE INSTITUTE FOR RADIATION PROTECTION

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 relate to the state administration's role in protection against ionizing radiation in the Czech Republic.

In 2004 the construction of the SÚRO new premises in Bartoškova street in Prague 4 significantly proceeded and some workplaces of the Institute began to move from the premises of State Institute of Health in Šrobárova street to the new premises. The Institute has two branches: in Hradec Králové – Piletice dealing with problems related to radon and natural radionuclides in the environment, and in Ostrava, specialized in radio-diagnostics. As part of the organizational changes in SÚJB department another two separate divisions were established during the year of 2004; one in Brno focusing on monitoring of artificial radionuclides, and the second one in Ústí nad Labem focusing on problems related to monitoring of artificial and natural radionuclides.

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

- The Monitoring Division covers the problems of artificial radionuclides in the environment, problems of internal contamination and participates in the operation of 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 operation of a LAN network and SÚRO hardware and software and for RMS operation: data flows, data base and the processing of monitored data, 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 participates in preparation of providing the function of Crisis Staff (KŠ) of SÚJB and ensuring its back-up workplace.

In 2004 the Institute participated particularly in providing the following:

- Permanent and emergency staff ensuring a significant part of the operation of the Czech Republic's Radiation Monitoring Network (RMS) according to Decree No. 3129/2002 Coll., including ensuring the RMS Information System (IS);
- Crisis Staff of the SÚRO, the SÚRO Points of Contact and support for ensuring the SÚJB Crisis Staff, including direct performance of functions in the KŠ radiation protection group;
- In cooperation with the SÚJB on implementation of the RODOS system in the Czech Republic within the PHARE project and participation of the Czech Republic in the “EURANOS” project of the EU;
- Population protection by monitoring and controlling doses of exposure from natural sources, including providing the Radon Program;
- Population protection against radiation from natural radionuclides in relation to nuclear energy, including the support for independent inspection of the nuclear power plant operator;
- Evaluation and control of medical exposure in radiodiagnostics and radiotherapy;
- Research in the radiation protection field.

The Institute fulfilled other tasks assigned continuously by the SÚJB, i.e. 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; the English and Russian versions of this report were issued in 2004.

9.2. ACTIVITIES OF THE STATE INSTITUTE FOR NUCLEAR, CHEMICAL AND BIOLOGICAL PROTECTION, KAMENNÁ

The State Institute for Nuclear, Chemical and Biological Protection (SÚJCHBO) was established by the decision of the Chairperson of the State Office for Nuclear Safety (SÚJB) on January 1, 2000 as a contributory organization. The SÚJCHBO has its seat in Kamenná near Příbram with separate stations in Příbram, Brno, Prague and Dolní Rožínka (district of Žďár nad Sázavou).

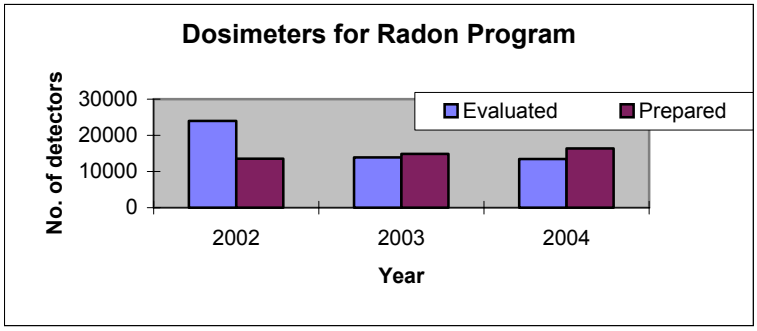
The SÚJCHBO organizational structure reflects the orientation of its expert activities. The nuclear, chemical and biological protection divisions and a separate division for inspection support were created to fulfil assigned tasks. The majority of the expert workplaces are accredited by the Czech Institute for Accreditation according to ČSN EN 17025, which enables performance of accredited testing engineering. The Authorized Metrology Center (AMS) for instruments for the activity concentration of radon and equivalent activity concentration of radon (official sign K, registration no. 113) also operates at the SÚJCHBO.

At the end of 2004 the SÚJCHBO accomplished five years of its activity. During this period the necessity and usefulness of the Institute's workplaces in handling all assigned tasks were proved, both in the support of surveillance activity of SÚJB inspectors consisting in providing of qualified documents for their decision-making activities according to relevant legislation, and in the performance of research and development works and in other specific and expertise activities, in which the SÚJCHBO participated in the Czech Republic as well as abroad.

In 2004 the expert workplaces of SÚJCHBO ensured the determined activity in full extent.

Nuclear Protection Division

The main activity of this division was the work related to measuring, evaluating and research of radon and its transformation products behavior, or other measurements and analyses related to these problems. The largest volume of work involved the preparation and evaluation of passive track detectors used for the evaluation of population's radiation burden within the Radon Program. In 2004 there were 17,564 new dosimeters prepared and 13,932 dosimeters evaluated, which were exposed in 2003. The graph below shows the comparison with the previous years:



A significant part of the activity was also the radon metrology. The Authorized Metrology Center for instruments for the activity concentration of radon (OAR) and the equivalent activity concentration of radon (EOAR) carried out 230 verifications of instruments and other work as a base for the approval of new types of instruments. In 2004 three new types of instruments were approved in this way. To carry out such work small thoron chamber is used, besides the radon chamber.

The nuclear protection division also evaluates the personal dosimeters of s.p. DIAMO employees, who perform their work in the underground of uranium mines. Furthermore, the so-called ecological dosimeters were evaluated that are used to monitor the environmental impact by radioactive substances in the vicinity of existing and former uranium mines and uranium milling plants. Another field of division activity was the performance of radiochemical and gamma ray spectrometric analyses of samples of water, building materials, sediments, soil, samples of vegetable and animal origin (e.g. vegetable, fish, etc.) and fallouts.

Chemical Protection Division

The division provides technical support for inspections performed by the SÚJB inspectors in the field of the adherence to the ban on chemical and biological warfare. The samples are taken, measured and analyzed in the meaning of Act No. 19/1997 Coll., and its implementing Decree No. 50/1997 Coll.; the division provides analyses of unknown chemical and biological substances and consignments with unknown matter, which are brought to the SÚJCHBO in order to be identified by the components of the Integrated Rescue System (IZS) from the whole Czech Republic. In 2004 the SÚJCHBO started to verify a new method of opening pressure and other vessels that cannot be, by various reasons, opened in a routine way in respect of explosion or burning risk.

Biological Protection Division

The biological protection division activity is focused in two directions – on monitoring of human in extreme conditions – in 2004 the specialized workplace particularly dealt with testing the protective clothes for specialists in the civil section and outside the civil sector, and on detection of hazardous biological agents and toxins. In 2004, the main activity of this laboratory, that started its activity in 2002, was introduction of other methods and procedures for quick detection of highly risk and risk agents and toxins into routine practice.

Separate Division for Surveillance Support

The main activity of this division is focused on the assurance of support for surveillance performed by the SÚJB Regional Center Kamenná inspectors at the workplaces with natural ionizing radiation sources. Another significant activity is the measurement, collection of samples and their evaluation when monitoring the environmental impact by the old burdens after the uranium mining in the Czech Republic. Their influence on the air and the subsurface and underground waters is especially monitored. The workplace also ensures the operation of measuring point of the air control in Kamenná, whose results of measurement are transmitted to RMS.

Extraordinary Action in 2004

In 2004 the SÚJCHBO was invited to cooperate in ensuring the control of chemical and biological safety during the World Ice Hockey Championship held in Prague and Ostrava from April 24, 2004 to May 9, 2004. The SÚJCHBO mobile laboratories and personnel of chemical and biological protection divisions were earmarked for this activity, which than provided emergency service on this action on a continuous basis.

Research and Development Activities

In 2004 the SÚJCHBO dealt with two tasks of institutional research and four tasks of specific research.

International Research Project

The SÚJCHBO participated in preparatory works of the EU project, which is aimed at laying the basis for complex scientific-research program of the EU countries. This program is focused on maximum elimination of effects of potential terrorist attack with the use of nuclear, chemical and biological weapons in the European countries. New detection technologies and new criteria for the emergency management of the EU countries are to be developed.

Participation in the Integrated Rescue System (IZS)

The permanent and mobile laboratories of the SÚJCHBO and personnel skills in the field of nuclear, chemical and biological protection are also used for specialized actions within the IZS of the Czech Republic. The SÚJCHBO was integrated into other components of the IZS of the Czech Republic in accordance with the relevant provisions of Act No. 239/2000 Coll. In 2004 the employees of SÚJCHBO chemical and biological laboratories took part in common actions organized by the IZS (CR Fire Brigade Headquarters) in the territory of the Czech Republic and within the EU.

Training and Educational Activity

Based on the Cooperation Contract the Clinical workplace of the South Bohemia University in České Budějovice was established at the SÚJCHBO in 2004. The students of the Health-Social Faculty – the postgraduate study in the field of Crisis Radiobiology and Toxicology, and the undergraduate study in the field of Applied Radiobiology and Toxicology are trained at the SÚJCHBO workplaces. The SÚJCHBO is authorized to provide the training (courses) for some selected employees performing activities important in particular from the radiation protection point of view. The statewide course related to these problems was organized in November 2004. In 2004, the SÚJCHBO employees with their lecture and presentation activities co-participated in many educational actions intended in particular for the members of the Fire Rescue Brigade and the Czech Police.

Detailed description of SÚJCHBO activities with the summary of results is presented in annual reports on Institute activities, which are then, together with the current information, published on the Internet pages of the Institute.

USED ABBREVIATIONS AND ACRONYMS

ALARA	As Low as Reasonably Achievable
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
ETE	ČEZ, a.s., Temelín Nuclear Power Plant (Temelín NPP)
ČVUT FJFI	Nuclear Engineering Faculty of Czech Technical University
HCČ	Primary Coolant Pump
HNČ	Main Feedwater Pump
HO	Emergency Protection
HPK	Main Steam Header
HRK	Safety, Control and Shim Assemblies
HVB	(Main Production) Unit
IAEA	International Atomic Energy Agency
INES	International Nuclear Event Scale
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
LaP	Safe Operation Limits & Conditions
LRKO	Laboratory for Monitoring of Environment Radiation
MAAE	Czech equivalent of IAEA (for IAEA see above)
MBA	Material Balance Area
MMKO	Air Monitoring Point
MSVP	Interim Spent Fuel Storage Facility
MV-GŘ HZS ČR	Department of Interior - CR Fire Brigade Headquarters
NPT	Nonproliferation Treaty
OAR	Radon Activity Concentration
OECD/NEA	Nuclear Energy Agency OECD

OPCW	Organisation for the Prohibition of Chemical Weapons
ORZ	Open Radionuclide Source
PFDE	Photon Dose Equivalent Rate
PG	Steam Generator
PNČI	HRK Frequency Converter (for HRK see above)
PoZJ	Quality Assurance Procedure
PpBZ	Final Safety Analysis Report
PS-ZRAO	Process system - Radioactive Waste Treatment
PZJ	Quality Assurance Program
QA/QC	Quality Assurance/Quality Control
RAO	Radioactive Waste
RC	Regional Center
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
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
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
WENRA	Western European Nuclear Regulators Association
ZIZ	Ionizing Radiation Source