INTRODUCTION

The annual report on activities carried out by the State Office for Nuclear Safety (hereinafter SÚJB) in 2000 stresses particularly its role of the authority supervising nuclear safety and radiation protection. The sections of key importance are those dealing with supervision of the mentioned issues at major nuclear installations, i.e. in agreement with the Czech Atomic Act, both at the country's nuclear power plants and with other licensees (particularly in medical facilities). The report includes detailed information on the status of radiation monitoring on the Czech Republic's territory. Attention is also paid to the issues of management and technical support, SÚJB legislative activities and international cooperation, highlighting some major international events held in the past year.

The newly introduced chapters deal with activities carried out by the State Institute of Nuclear, Chemical and Biological Protection and by the office monitoring the ban on chemical weapons, i.e. by institutions that have become part of SÚJB. The information provided on their activities is in brief form to present a general overview of all issues coordinated by SÚJB. The information has been excerpted from separate annual reports of the said institutions to be enclosed to the final version hereof and submitted to the CR government. There is another new chapter dealing with the provision of information to general public under the Act No. 106/1999 Coll.

1. STATE OFFICE FOR NUCLEAR SAFETY

The State Office for Nuclear Safety (SÚJB) is a central state administration body with a separate budget. It is headed by a chairperson appointed by the CR government.

SÚJB performs the state administration and supervision of the utilization of nuclear energy and ionizing radiation and supervision of radiation protection. Competencies of SÚJB are defined by Act No. 18/1997 Coll., on peaceful utilization of nuclear energy and ionizing radiation (the Atomic Act), and include particularly:

- execution of state supervision of nuclear safety, nuclear items, physical protection of nuclear installations, radiation protection and emergency preparedness in nuclear installation premises or at workplaces using ionizing radiation sources;
- licensing of activities under the Act No. 18/1997 Coll., e.g. siting and operation of nuclear installations and workplaces with very significant sources of ionizing radiation and radioactive wastes, transport of nuclear materials and radionuclide sources;
- approving of documents relating to the assurance of nuclear safety and radiation protection, as established by the Atomic Act, limits and conditions for operation of nuclear installations, methods of physical protection, emergency codes for transport of nuclear materials and selected radionuclide sources, internal emergency plans for nuclear installations and workplaces with ionizing radiation sources;
- establishing of conditions and requirements for radiation protection of population and exposed workers (e.g. establishing of exposure limits, definition of controlled zones), establishing of emergency planning zones and requirements for emergency preparedness of licensees under the Atomic Act;
- monitoring of population and occupational exposure levels;
- coordination of activities performed by the National Radiation Monitoring Network on the Czech Republic's territory and provision of international exchange of radiation protection data;
- keeping a national system of registration and control of nuclear materials, national registration system of licensees, imported and exported selected items, ionizing radiation sources, records on population exposure and occupational exposure;
- professional cooperation with the International Atomic Energy Agency;
- provision of data to municipalities and district offices about radioactive waste management on their respective territories and provision of adequate information to general public and CR Government about activities performed by the Office;
- provision of data from measurements and evaluation of the impact of nuclear, chemical and biological substances on human health and on the environment, including evaluation of the level of protection with individual and collective protective means against such substances;
- coordination and provision of activities to fulfill tasks resulting from the treaty about the ban on development, production, accumulation of supplies and use of chemical weapons and about their destruction under Act No. 19/1997 Coll.

To reflect its focus and performed activities the organizational structure of SÚJB was changed in 2000.

Section of Nuclear Safety includes a department of nuclear installations assessment, a department of nuclear installation inspections and a department of nuclear materials.

Section of Radiation Protection includes a department of sources and nuclear power engineering, a department of exposure regulation, a department for the environment and radioactive wastes and a separate licensing department.

Section of Management and Technical Support includes a department of international cooperation, an economic department and the Office bureau. The division also includes the office monitoring the ban of chemical weapons.

Directly to the Office Chairwoman report a **department of emergency preparedness**, which also provides for the function of Emergency Response Center and coordinates the Radiation Monitoring Network, a **QA department** and a **department of defense and auditing.**

SÚJB includes **Regional Centers** (RC) situated in Prague, Pilsen, České Budějovice, Ústí nad Labem, Hradec Králové, Brno and Ostrava, plus two local workplaces at NPP Dukovany and NPP Temelín.

SÚJB controls one budgetary organization - **State Institute for Radiation Protection (SÚRO)** based in Prague and one allowance organization – **State Institute for Nuclear, Chemical and Biological Protection** (**SÚJCHBO)** based in Příbram – Kamenné.

The average converted number of SÚJB employees in 2000 was 178, from which 48 were nuclear safety inspectors and 47 radiation protection inspectors.

Activities by SÚJB are fully funded by the state budget. The actual costs in 2000 for SÚJB activities, including those by SÚRO and SÚJCHBO, amounted to 207 546 thousand CZK.

Comparison of selected costs in chapter 375 – SÚJB

Year	1997	1998	1999	2000
Current expenditures - total	155 246	157 419	175 548	215 158
Capital expenditures - total	21 429	38 789	31 998	29 169

2. STATE SUPERVISION OF NUCLEAR SAFETY

2.1. Nuclear Power Plant Dukovany

2.1.1. Operation of NPP Dukovany

No event occurred in 2000 at NPP Dukovany resulting in an impermissible release of radioactive substances to the environment. The operation of all units was assessed by SÚJB as safe and reliable. One event from the overall number of 22 recorded operational events was ranked by SÚJB with grade „1“, under the INES international eight-grade scale introduced by the International Atomic Energy Agency (IAEA), as a failure caused by the human factor. The other 21 events did not have any significant impact on the nuclear safety and therefore they were ranked with grade „0“ under the INES scale as events with very little impact on nuclear safety.

In 2000 all four units of NPP Dukovany were operated as requested by the control center for energy supplies, mostly in the basic load mode or, if needed by the electric grid, in the mode of primary frequency regulation. Operation of the units is rendered in the diagrams below. The scheduled outages in 2000 for refueling and type general overhauls took place on all reactor units without any major problems.

2.1.2. Actions by Reactor Trip and Limitation Systems

In 2000 there was only one action performed by the reactor trip of 1st kind (emergency protection HO-1) and there were none by the reactor trip of the 2nd kind (emergency protection HO-2). The cause of HO-1 action was loss of power supply on sensors due to a short circuit on the cable route. The root cause was non-observation of the technological procedure in the course of bushing installation where base insulation on the conductors was damaged. The event was investigated by SÚJB in a specialized inspection. The investigation resulted in immediate targeted and suitable measures adopted by the licensee to remove the cause of the defect and technical and organizational provisions were adopted in I&C area. Before completion of the existing I&C renewal a project will be implemented dealing with cable bushings.

In 2000 there was no action performed by the limitation system reducing power output of the reactor (HO-3). There were fifteen actions by the limitation system to limit power output of the reactor (HO-4) while preventing movement of control rods upwards and the system acted in full compliance with the design after an action by the low frequency converter for motors of control rods assemblies in RCPS when the assembly falls to the bottom position. From the said fifteen actions by the limitation system and limiting the reactor power output (HO-4) only three cases were associated with a fall of the control rod assembly to the bottom position in the core.

The licensee has been introducing technical and organizational measures and consulting with experts from foreign power plants in order to reduce occurrence of defects in the low frequency converter for motors of control rod assemblies in RCPS. Currently, the issue of the converter reliability has been addressed using a „technical solution“ and at the same time impulse amplifiers have been used in the converters, originally developed for NPP Paks. It has been also planned to use the recent experience from NPP Bohunice in respect to mechanical adjustments in the low frequency converters unit.

Unit 1				
1	1.1.2000	50 %	HO-4	Assembly fall to the bottom position and action by low frequency converter for motors of control rods assemblies in RCPS
2	25.1.2000	100 %	HO-4	Assembly fall to the bottom position and action by low frequency converter for motors of control rods assemblies in RCPS
3	22.6.2000	100 %	HO-4	Fall of control rods 15-46 to lower limit switch position and action by emergency protection HO-4
4	22.6.2000	100 %	HO-4	Assembly fall to the bottom position and action by low frequency converter for motors of control rods assemblies in RCPS
Unit 2				
1	3.1.2000	100 %	HO-4	Assembly fall to the bottom position and action by low frequency converter for motors of control rods assemblies in RCPS
2	28.1.2000	100 %	HO-4	Assembly fall to the bottom position and action by low frequency converter for motors of control rods assemblies in RCPS
3	13.2.2000	100 %	HO-4	Assembly fall to the bottom position and action by low frequency converter for motors of control rods assemblies in RCPS
Unit 3				
1	5.1.2000	100 %	HO-1	Loss of power supply for reactor protections and designed action by emergency protection HO-1
2	10.1.2000	100 %	HO-4	Fall of control rods 09-58 to lower limit switch position and designed action by emergency protection HO-4
3	19.2.2000	100 %	HO-4	Assembly fall to the bottom position and action by low frequency converter for motors of control rods assemblies in RCPS
Unit 4				
1	11.5.2000	100 %	HO-4	Assembly fall to the bottom position and action by low frequency converter for motors of control rods assemblies in RCPS
2	12.5.2000	100 %	HO-4	Assembly fall to the bottom position and action by low frequency converter for motors of control rods assemblies in RCPS

3	28.5.2000	100 %	HO-4	Assembly fall to the bottom position and action by low frequency converter for motors of control rods assemblies in RCPS
4	2.9.2000	100%	HO-4	Assembly fall to the bottom position and action by low frequency converter for motors of control rods assemblies in RCPS
5	7.10.2000	100%	HO-4	Fall of control rods 06-55 to lower limit switch position and designed action by emergency protection HO-4
6	15.12.2000	100%	HO-4	Assembly fall to the bottom position and action by low frequency converter for motors of control rods assemblies in RCPS

2.1.3. Defects

There were 22 defects identified on the equipment at NPP Dukovany with relation to nuclear safety (including the above-mentioned situation associated with the action by reactor trip system). Only a single event was classified INES = 1, as an event with minor importance for nuclear safety. The ranking with grade „1“ was substantiated with the human factor failure which resulted in violation of Limits and Conditions for normal operation of the Nuclear Power Plant Dukovany: the super emergency feedwater pumps for steamgenerators had not been tested before the backup dieselgenerator of the 3rd safety system was started at Unit 1.

As mentioned earlier, all the other events (21 in total) were either ranked „0“ according to the IAEA INES grading scale, i.e. situations in which Limits and Conditions for normal operation were not violated and which could be safely controlled using suitable procedures, or they were ranked outside the scale as events with no impact on nuclear safety.

2.1.4. Limits and Conditions

In 2000 SÚJB approved one change in the Limits and Conditions (LaP) for the normal operation of NPP Dukovany. With the exception of the above described exceeding there was not other violation of the Limits and Conditions in the reported period.

2.1.5. Supervisory Activities at NPP Dukovany

All supervisory activities by SÚJB at NPP Dukovany in 2000 were documented in 101 reports. Based on the performed inspections and evaluations SÚJB issued 90 resolutions in total for NPP Dukovany. Inspection activities by SÚJB inspectors focused on safe operation of the plant, using both specialized and regular inspections, and on maintenance for which additional inspections were performed by inspection teams during the periods of general overhauls and refueling.

The regular inspection activities concentrated particularly on the inspection of limit and safety parameters under the „Program of Periodic Inspections“. The inspections proved that operation of the units in the reported period complied with selected operating procedures, with a single exception described above, and that the individual parameters corresponded to the design levels. No shortcomings were found in the observation of safety limits and set-ups of protective safety systems which in all cases complied with the Limits and Conditions requirements.

The regular inspection activities included systematic inspections of periodic operability tests of safety protections systems on individual units, along with automatic start of dieselgenerators for assured power supply category 2. Not all tests were evaluated as successful. During these tests SÚJB inspectors reported two failed dieselgenerator starts, one failure of automatics of assured power supply category 2, one unsatisfactory operation of a high-pressure emergency pump to make up water into the primary circuit during its testing and one unsatisfactory operation of a super emergency feedwater pump. In all these cases the tests were repeated after removal of the defects. Considering the number of tests performed on the systems the findings were not very serious but because the affected equipment is important for nuclear safety the inspection activities will continue to focus on these tests.

There were regular monthly inspections to check investigations of selected operational events by the defect commission at NPP Dukovany. SÚJB has come to the conclusion that the operational events were investigated by the defect commission as due and has not identified any significant shortcomings in this area.

Inspection activities included inspection of preparedness of individual units for refueling, while the inspectors used the related documents to check how the fresh fuel was prepared for refueling into the reactor core, checked functionality of the system to identify leaking fuel assemblies, checked that there were are no alien objects in the reactor core, refueling pool, spent fuel pit or in the transport container shaft and that their cleanliness met requirements for nuclear fuel handling. The inspection activities also included the refueling machine preparedness, refueling schedule and the course of refueling itself. During these inspections the regulatory body did not identify any shortcomings preventing the refueling. During the periodic integral sealed tightness test (PERIZ) in all units performed at the end of refueling outages the inspections focused on compliance with Limits and Conditions and the approved methodology to identify and determine leakages. The inspectors found out that PERIZ tests at the units were performed in compliance with Limits and Conditions and in agreement with applicable methodology and that tightness of the hermetic space on its outer interface met the specified limits.

SÚJB paid systematic attention to the course of shutdown of individual units for refueling and general overhauls and related repairs. No major shortcomings have been found in this area.

SÚJB focused its attention on the inspections performed before granting of a license to restart the nuclear reactor after refueling under Section (e) §9 paragraph 1 letter e) of Act No. 18/1997 Coll. The inspections concentrated on:

- execution of operational inspections, implementation of modifications and preparedness of the machinery part for the restart after refueling. The inspections proved no deviations from the program of operational inspections and no shortcomings or defects and that modifications were performed in agreement with the outage schedule,
- verification of results used in the evaluation of individual units operation during the past campaign with fuel assemblies containing zirconium spacer grids, course of refueling, verification of neutron-physical characteristics for the coming campaign in the individual units and assessment of units start-up programs and content of physical start-up,
- preparedness of personnel and particularly of selected control room personnel,
- an audit of the performed inspections in heavy-current electrotechnical systems and I&C systems,

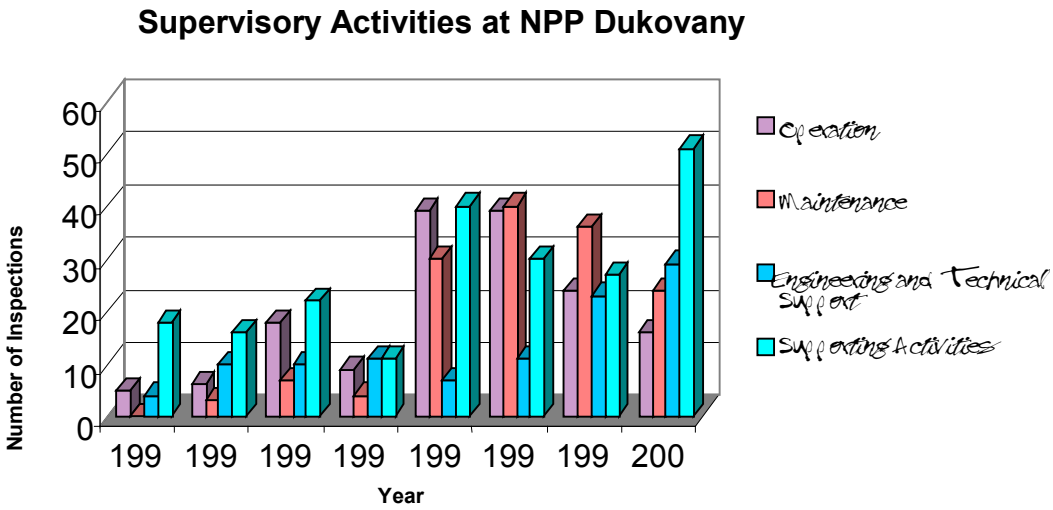
- compliance with the previous SÚJB resolutions concerning operation of the individual reactor units. SÚJB inspectors have concluded that the licensee continuously meets the conditions specified in the previous resolutions.

The findings from these inspections have shown that there were no deviations identified from the program of operating inspections and that no shortcomings or defects were found. Implementation of modifications was also performed in agreement with the outage schedule. All safety requirements and established procedures were met in the above mentioned areas and in terms of neutron-physics the reactors in the individual units were ready for operation in the coming fuel campaign. The licensee continuously met conditions specified in the previous resolutions. SÚJB inspectors did not find any shortcomings preventing the State Office for Nuclear Safety from issuing licenses for the reactors to reach criticality after refueling and therefore the licenses were issued in all cases.

SÚJB also systematically monitored reaching of the minimal controlled power on the reactors of the units after refueling and the course of selected tests during physical and power start up, in agreement with the conditions in the issued licenses to reach the minimum controlled power. The shutdowns and restartings occurred in agreement with these conditions, Limits and Conditions and in agreement with selected operating procedures.

2.1.5.1. Assessment of Supervisory Activities

To assess the supervisory activities SÚJB splits them into four main areas (operation, maintenance, technical and engineering support, supporting activities) and subsequently performs qualitative evaluation of the nuclear installation operator, based on findings and conclusions from the individual inspections. The evaluation is supposed to be used by SÚJB to improve efficiency and planning of the supervisory activities and also to indicate to the nuclear installation operator which areas should be concentrated on in terms of compliance with nuclear safety principles and operational safety culture.



Results of Supervisory Activities for NPP Dukovany in the Individual Areas:

Operation

There were 16 inspections of operation at NPP Dukovany in the concerned period. From this number 4 inspections were specialized ones, in agreement with the approved plan of inspections, and there were 12 regular (monthly) inspections.

The results of supervisory activities have shown that selected operating procedures were observed during operation of the units in the concerned period, with the exception of Limits and Conditions exceeding as described above, and that individual parameters corresponded to the designed levels. No shortcomings were found in safety limits and set-up of protection safety systems, which in all cases complied with Limits and Conditions. The total number of events in the past years was constantly low and also the single reactor trip confirms the reliable operation.

Conclusions:

SÚJB has concluded that this area has been at a very high level on long-term basis. Due to the importance of operation SÚJB will continue its efforts, using particularly regular inspections; based on the results achieved in this area the currently used scope of specialized inspections is considered sufficient.

Maintenance

There were 24 inspections of maintenance in the concerned period: 7 inspections were specialized, 12 regular monthly inspections and there were 5 inspections before the units start-up after outage.

The inspections of units' preparedness for restart after refueling found no defects (no conditions were given in the reports) contradicting to Act No. 18/1997 Coll. and preventing issuance of licenses to restart individual units of NPP Dukovany to reach minimum controlled power after refueling. Also the results of sealed tightness tests complied with Limits and Conditions. Training of maintenance personnel was carried out in agreement with requirements imposed by applicable statutory regulations. Some minor defects were found during the operation to be addressed by maintenance, however, the problems have been resolved in agreement with previously prepared procedures and supervised by respective SÚJB inspectors (e.g. complete solution of the steam generator graphite seal.).

Conclusion:

SÚJB has evaluated favorably the increased level of quality in this area where the inspection activity identified no major shortcomings; on the contrary, preparation of maintenance has improved and the encountered problems were correctly addressed. The achieved standard in this area will be monitored by SÚJB in a scope similar to that in the past year.

Technical and Engineering Support

Observation of nuclear safety principles in technical and engineering support was assessed based on 29 inspections. The evaluation in this area was based mainly on documents used by defect commissions, data obtained from inspections before units start-up in the part focusing on implementation of changes, quality assurance inspections and inspections reviewing sufficiency of technical and engineering activities at the nuclear installation.

A persisting problem was the not always full compliance of operating procedures with Limits and Conditions, or references in Limits and Conditions, which is a document with a legally superior status to operating procedures. The operator addressed the issue by elaborating new Limits and Conditions to be in compliance with the Atomic Act.

Conclusion:

SÚJB has evaluated the given area favorably, however not all shortcomings have been redressed and improvements made since the previous assessment. As a result, more attention will be paid to supervisory activities in this area, particularly in respect to input materials for gradual modernization and replacement of I&C equipment.

Supporting Activities

There were 51 inspections focused on physical protection in nuclear material transport, accounting for nuclear materials, management of spent nuclear fuel, radioactive wastes and radiological monitoring and leakage monitoring. All activities performed by the operator and monitored by SÚJB based on its assigned competencies were generally supervised, except the sub-area of emergency preparedness which was, however, found trouble-free in the previous period. The condition of reviewed nuclear materials corresponded to the submitted accounting and operating documents. No defects were found during inspections and no corrective measures were requested. The procedures and regulations were in compliance with the requirements in statutory regulations. The assurance of physical protection of nuclear materials and nuclear installations in ČEZ, a.s., NPP Dukovany, including activities by the control center shift personnel in the course of an inspection of physical protection technical system, was without defects and in full compliance with respective documents. Results of monitoring of personal and collective effective doses confirmed that radiation protection was assured in full scope during outages and that the achieved results were at a very high level.

Conclusions:

Inspections performed by SÚJB in this area have not identified any deviations or defects. The procedures and regulations have been found in compliance with the requirements in statutory regulations and this area has been assessed by SÚJB as at a very high and stable level. Supervisory activities in this area will continue with the existing intensity, mostly due to the Czech Republic's commitments in the area of material inspections.

2.1.5.2. Evaluation of Safety Indicators

The evaluation of a set of indicators for NPP Dukovany in 1999 showed that the plant's operator achieved in 1999 the best performance since the evaluation of indicators started (in 1991). In respect to the nuclear safety evaluation with safety indicators the operator of NPP Dukovany achieved similarly good results also in 2000.

The evaluation of individual areas of operation at NPP Dukovany with a set of safety indicators has confirmed a very good standard of safety. Good performance continued in the area of „important events" (with one exception), in operability of most safety systems, in effluents of radioactive substances (despite the slight increase) and in the protection of personnel and population against ionizing radiation. Still, several issues have been identified as deserving attention:

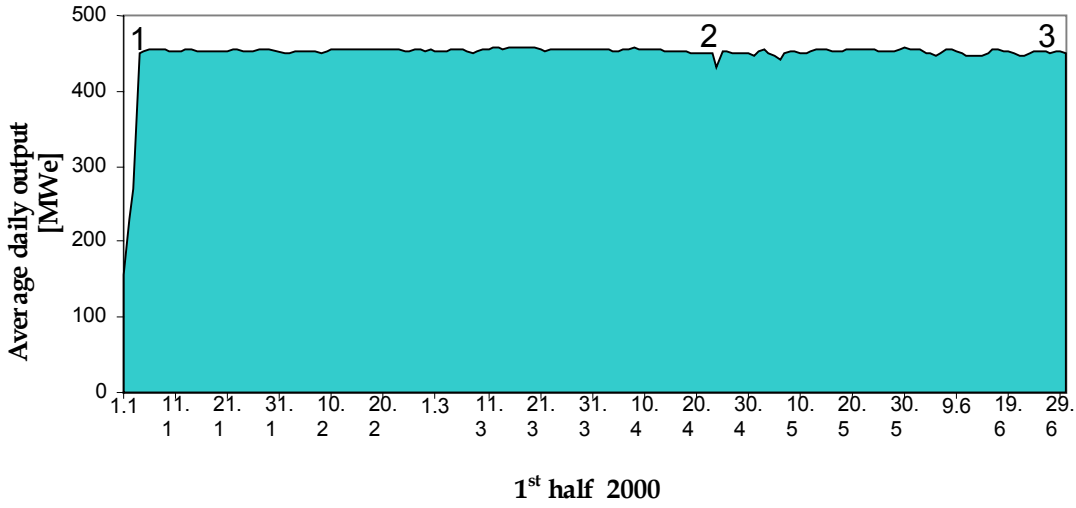
1. The number of actions by protections HO-4 along with falls of control assemblies has for several years documented the reduced reliability of the low frequency converter for motors of control rod assemblies. This finding is rather a long-term

operational issue and the safety functions of the system have been always retained. Currently, the problem is being addressed within the I&C renewal project.

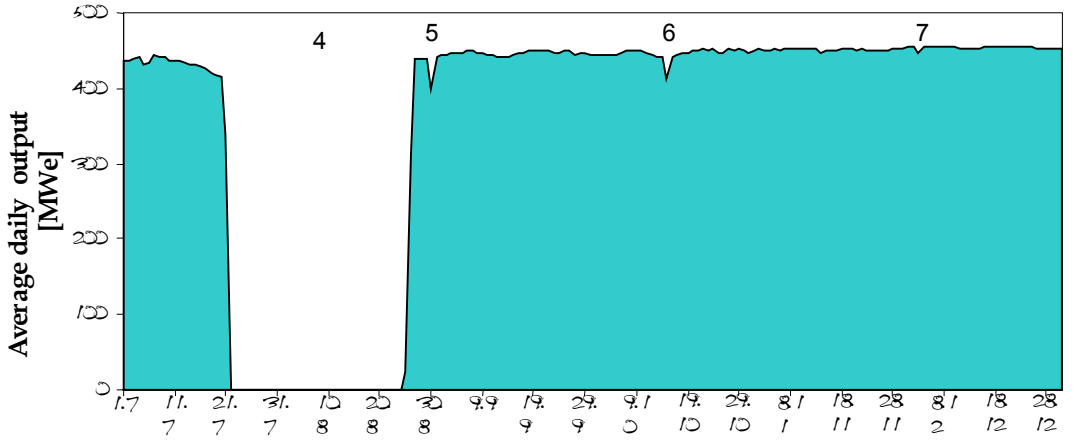
2. The step increase in the inoperability of dieselgenerators pertaining to the first double-unit. There was no dramatic decrease in the reliability of dieselgenerators start and operation. The sharp increase in dieselgenerators inoperability in 2000 was due to the performed modernization and renewal of the I&C system for dieselgenerators and service water essential.
3. The increased operability of the TJ and TH system (core emergency cooling system – its high and low pressure parts) has been more or less due to an administrative measure (change in Limits and Conditions), rather than technical modifications. Although an essentially identical measure was used in the TQ system (spraying system) the achieved improvement has not been equivalent which only confirms that duration of administrative measures effects may be short or even none.
4. The fuel assemblies taken out from the core have been so far always deep below limit levels for fuel cladding leakage and have been preventively stored in the storage pool to prevent radioactive contamination of the primary circuit equipment. The more frequent occurrence of fuel assembly „leakages“ (in 2000 two leakages were identified) was caused by the fact that the fuel is now operated closer to its operational limit compared to the first years of NPP Dukovany operation.

In the coming period it will be necessary to closely monitor development of the indicators in all the mentioned areas.

OPERATION OF NPP DUKOVANY UNIT 1



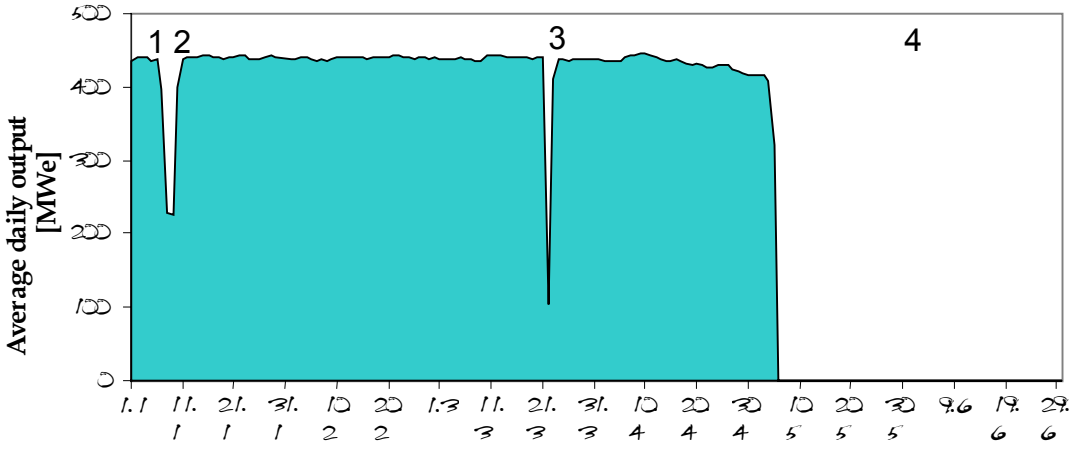
1st half 2000



2nd half 2000

1. Reserve for Y2K
2. TG12 output reduction to remove leakage on the fifth bleed
3. Unit output reduced due to fall of control rods 15-46
4. Unit shutdown for refueling and regular inspections and repairs
5. TG12 failure from false I&C protection signal (“generator bearing temperature”)
6. TG12 failure from false I&C protection signal (“hydrogen pressure in stator vessel”)
7. Output reduced to shutdown MCP5 due to replacement its switch in the IBC.4 field

OPERATION OF UNIT 2 NPP DUKOVANY



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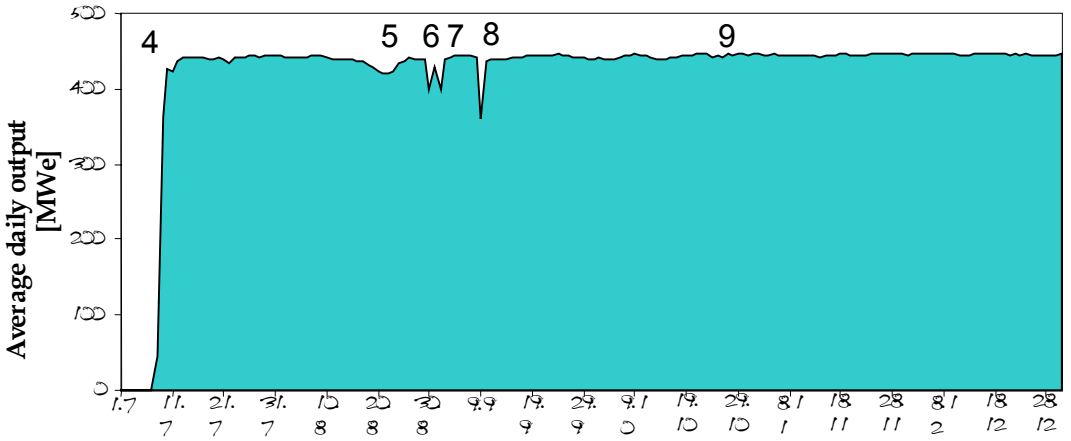
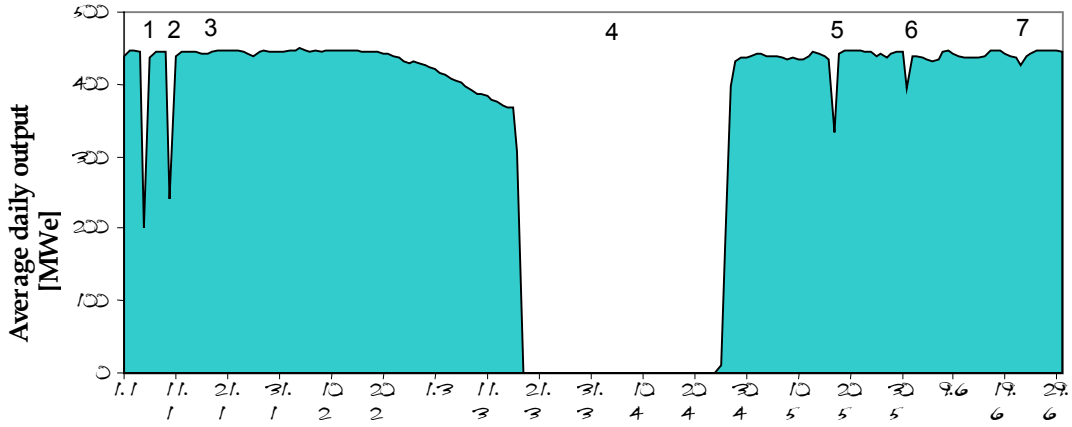


2nd half 2000

1. Reserve for Y2K
2. Repair of leakage on TG22 high-pressure drain
3. Repair of leakage on high-pressure air in the primary circuit.
4. Unit shutdown for refueling and regular inspections and repairs
5. Reduced output due to failure of power supply automatic control on steamgenerator No. 3
6. TG22 failure from a false I&C protection signal
7. TG22 failure from a false I&C protection signal
8. TG22 failure from a I&C protection signal
9. Output reduced from protections and interlocks setpoints (MEZ I) following failure of electric feedwater pump 2.

OPERATION OF NPP DUKOVANY UNIT 3



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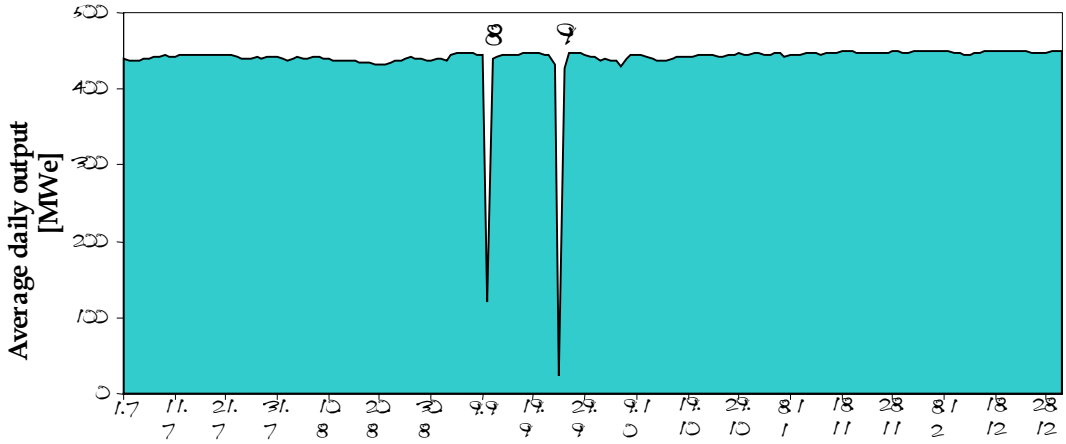
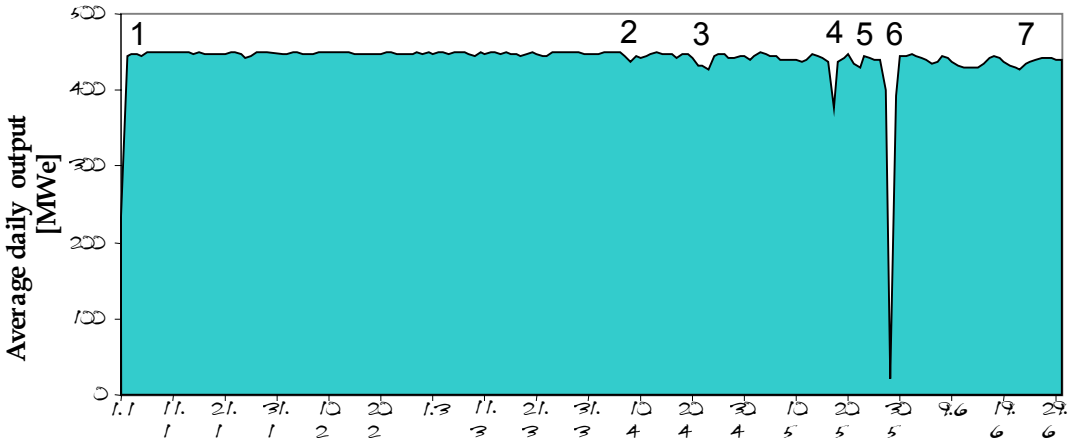


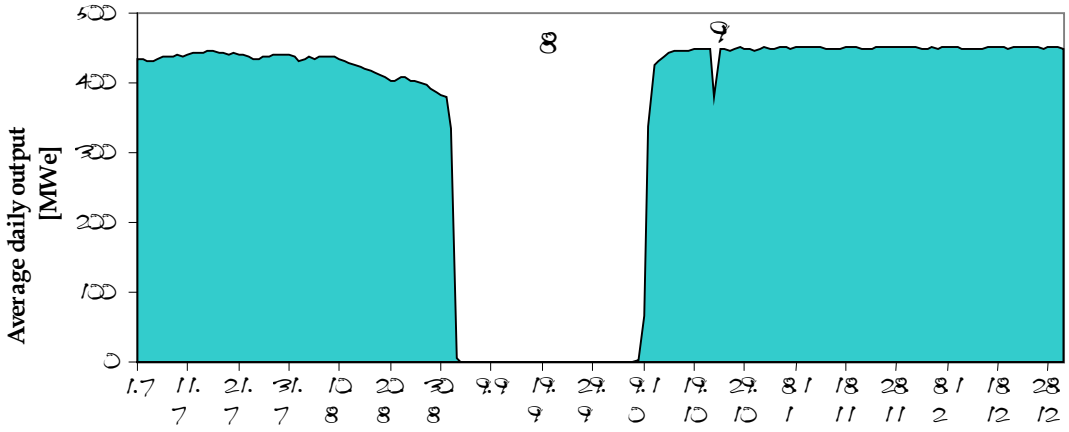
2nd half 2000

1. Reserve for Y2K
2. Reactor trip due to loss of power supply for level measuring secondary devices in the steamgenerator
3. Fall of control rod assembly 09-58 and its subsequent immobility
4. Unit shutdown for refueling and regular inspections and repairs
5. Output reduced due to BQDV No. 3 pump failure
6. Failure of TG 31 due to a defect in oil regulation
7. Unit output reduced due to closing of a control valve on the condensate polishing plant
8. Planned phase-out of both turbogenerators to switch off the V485 line and to enable work in RSLA
9. Planned phase-out of both turbogenerators to switch off the V485 line and to enable work in RSLA

OPERATION OF NPP DUKOVANY UNIT 4



1st half 2000



2nd half 2000

1. Excess of power in the grid
2. Output limited during tests of secondary frequency regulation
3. Power supplied to heat Unit 3
4. Output reduced due to BQDV No. 3 pump failure
5. Production failure from a defect on the non-return flap-valves at electric feedwater pump delivery
6. Reconstruction on the Slavětice switching station
7. TG 41 output reduced due to increased oil temperature 4 AT 01
8. Unit shutdown for refueling and regular inspections and repairs
9. TG42 failure from a false I&C protection signal ("exciter air temperature")

2.2. Nuclear Power Plant Temelín

2.2.1. Approval Process

In the first half of 2000 SÚJB focused on evaluation of the Preoperational Safety Report (PpBZ) for NPP Temelín Unit 1. The Report was submitted to SÚJB for evaluation at the end of 1999 as one of the important documents required by Act No. 18/1997 Coll. to issue a license for the plant's commissioning. SÚJB gradually assessed amendments to and changes in the Report, as well as other documents relating to the issue and documenting assurance of nuclear safety. The assessment of the PpBZ was concluded with a favorable result before granting of the license for fuel loading.

In the first half of the year other documents were gradually assessed and approved, required to be submitted before the issuance of permits to start individual commissioning stages at NPP Temelín Unit 1. These documents included particularly programs of the individual stages in agreement with the SÚJB Decree No.106/1998, Limits and Conditions for safe operation of the nuclear installation, quality assurance program, program of operational inspections, internal emergency plan and monitoring programs. A permit to start non-active testing was issued by SÚJB on 25 February 2000.

SÚJB reviewed and approved programs for individual sub-stages of active testing – physical and power start –up; also a program of trial operation was submitted for approval. Selected programs of individual tests in physical and power start up were approved. On 5 July 2000 SÚJB issued a permit to start the active testing stage – physical start-up. In the resolution SÚJB also specified conditions to be met before the minimum stabilized controlled power may be reached at Unit 1 and before physical start-up tests. The approval to bring Unit 1 to the minimum stabilized controlled power was provided on 9 October. SÚJB considered all documents required by law on the execution of prescribed tests and on the fulfillment of all acceptance criteria during the physical start-up sub-stage and on 31 October 2000 gave its permission to launch another sub-stage of active testing – power start-up. The resolution contained criteria to be met to obtain approvals from SÚJB for individual power levels in the course of power start-up.

2.2.2. Construction, Installation and Commissioning

Unit 1

The key construction works on Unit 1 were completed back in 1999; in the first half of 2000 inspections and refurbishments of lifts were performed and final finishes on walls and floors were applied. Efforts continued to implement amendments to the design and design changes.

Moreover, other activities were performed in the first half of 2000 necessary for gradual preparation of the commissioning stages. Efforts continued particularly in the so-called activation of I&C system, including input and output tests, also continued algorithm tests, communication tests and input/output tests of PCS, RCLS, PRPS, DPS, PAMS and NPL systems, including installation of modified software and implementation of changes. Individual equipments were live tested in electric switching stations. Individual tests continued on the radiation monitoring system. Insulation was completed in the individual systems. Tests on the refueling machine continued etc. The activities were practically completed before the beginning of physical start-up tests.

In the first half of the year additional activities were performed in the reactor hall within the non-active testing stage, divided as requested into the integrated hydro-test part and inspections part. These activities verified capability of the primary circuit and selected

systems to perform their designed functions, including their mutual cooperation and subsequently in the inspections period it was verified that individual systems and components passed the tests as required without substantial wear or damage. Throughout this stage the found defects and outstanding items were continually addressed so that the delivered systems were ready in compliance with the requirements in approved programs to start the first part of active testing – physical start-up, i.e. loading of nuclear fuel.

The fuel was loaded in early July. Subsequently, there were repeated tests of containment tightness, tightness and strength pressure tests of the primary circuit and tests of activation of safety systems (ESFAS, DESFAS). The primary circuit tightness test was repeated three times due to the recurring minor leakages. Repairs and adjustments were performed on junctions of safety valves on steam-generators and pressurizer where internal leakages were identified.

Physical start-up tests started in October once Unit 1 rector reached the minimum stabilized controlled power on 11 October. All tests during physical start-up were implemented under supervision of SÚJB inspectors. Despite minor shortcomings in I&C, e.g. noise of the ionization chamber on the console for physical start-up, or defects in control cabinets of some clusters that occurred in the course of tests and were gradually removed, the correctness of the reactor core design and its characteristics was confirmed.

On successful completion of the prescribed physical start-up tests the power start-up sub-stage was launched on 31 October and continued until the end of 2000 and after the outage it will continue further in 2001. The required tests were passed successfully at power levels 5 % and 12 % of the reactor nominal power (N_{nom}). The tests performed at the mentioned levels did not reveal any deficiencies of the technological equipment and therefore SÚJB on 15 December permitted tests at 30 % of the nominal power. At this power level the turbogenerator 1000MW was put into phase for the first time on 21 December and the first supply of electric power was delivered into the grid. Tests of the turbogenerator were repeated several times in late December 2000 and the problems encountered during the tests, associated mainly with trembling and vibrations of steam inlet piping into the turbine high-pressure section, were addressed only after the period described herein, i.e. in 2001.

Unit 2

Key construction works on Unit 2 were also completed and construction works in the rooms for the installation of Westinghouse and EZ Praha technology were finalized. The installation of I&C equipment from Westinghouse was started and the first pre-functional tests were performed at the year's end on a limited number of cabinets from this system. The turbo-set in the turbine hall was inspected and re-preserved. The reactor installation inspection was carried out in the reactor hall and the installed equipment was re-preserved. Post-installation cleaning operations were started on important systems of the primary circuit and on dieselgenerator systems. Running-in of electric motors and pumps was performed on safety systems, their post-installation cleaning and comprehensive tests. Pre-functional tests of electric equipment were performed. In the second half of the year construction and pressure tests were performed on auxiliary systems of the primary circuit. Pre-functional tests of auxiliary and I&C systems started on dieselgenerator stations of Unit 2.

Apart from the mentioned activities, a pressure tests was performed to verify containment integrity in the second half of the year. Following completion of tightness tests on individual local groups a test of the entire containment integrity was executed on 10-24 December 2000. The leak of mass in 24 hours, similarly as on Unit 1, complied with a great margin with the design criteria and the approved test program.

Changes and modifications in the auxiliary building resulting from the change procedure were completed. Pre-functional tests continued of water purification systems, laundry water systems, system of final processing of radioactive wastes and radiation monitoring system. Technological systems in the auxiliary building were completed in the second half of the year, including pre-functional tests, and the equipment linked with Unit 1 is now in a regular operating mode.

2.2.3. Operation of Unit 1 NPP Temelín

Since the beginning of active testing the technological systems of Unit 1 have been in regular operating condition in agreement with the requirements in Limits and Conditions. Although the performed tests were not typical for the nominal operating condition of the plant and in some cases were quite exacting, SÚJB monitored and evaluated in the second half of 2000 also the operation of Unit 1 of NPP Temelín using methods similar to those used for the operating units at NPP Dukovany.

In the 2nd half of 2000 no events were reported at NPP Temelín resulting from impermissible release of radioactive substances to the environment. The operation of Unit 1 in the course of power start-up was evaluated by SÚJB as safe. From among the recorded events twelve were classified as grade 0, according to the INES seven-grade scale, because they did not have any significant impact on nuclear safety and the protection systems always responded in agreement with the design and with the operating procedures. One event was classified by SÚJB as grade 1. It was a defect described below that occurred on 16 December 2000: after a failure of condensate pumps there was a fast action to cool primary circuit, the reactor tripped and the signal „steam leakage from low pressure in the secondary circuit " acted which confirmed correct performance by the reactor equipment protections.

2.2.4. Reactor Trip Actions

Date, time	Automatic	Note
26.10.20001 18:19	Reactor trip (PRPS)	Manual trip following failure of all MCPs, HOP 252/00
18.11.2000 02:49	Reactor trip (PRPS)	Discrepancy between output and flow rate levels in the primary during the PC test under E013, HOP 208/00
16.12.2000 01:14	Limitation system(a), Reactor trip (PRPS)	Failure of condensate pump and subsequent steam leakage, HOP 310/00

The reactor trip is a preventive measure protecting the reactor and systems important for safety against non-design conditions or situations whose further development may result in a situation with nuclear risks. The reactor trip however, does not mean that such a situation has already occurred. On the contrary, the reactor trip time and action are set-up to prevent with sufficient lead the occurrence of a dangerous nuclear situation.

Reactor Trip on 26 October 2000

On 26 October there was a failure of all MCPs due to a too long transfer of a signal between control cabinets inside the control system. The transfer under normal circumstances lasts 1 - 2 seconds and in this case it was by 5 seconds longer than anticipated by the design, which resulted in loss of the "GOOD" quality signal for some technological parameters and action by a protection to stop MCP. Since the reactor output was below 5% N_{nom}, the design

did not require an automatic reactor trip. However, since the general condition from Limits and Conditions was not met - at least two loops of the primary circuit shall be in operation - the operator correctly tripped the reactor manually with a pushbutton. Also the ensuing activities occurred in agreement with the operating procedures.

Reactor Trip on 18 November 2000

On 18 November, during the tests of natural circulation under the E013 testing program, all MCPs were stopped as required with the reactor output at 2,5% N_{nom}. Subsequently responded the reactor protection with the signal from PRPS "Power to Flow" (set-up comparison between output and flow rate) and tripped the reactor. The protection acted due to the conservative set-up of constants in the protections algorithm, which for very low output levels had to be calculated since values from measurements are difficult to obtain. All activities following the reactor trip were performed in agreement with the operating procedures and once its cause was identified the unit was again brought on the minimum controlled level in 40 minutes.

Reactor Trip on 16 December 2000

On 16 December when the reactor output was increased from 12% to 20%N_{nom} the condensate pumps failed in the course of level regulation in the feedwater tank. The transient condition caused by the pumps failure initiated action by the limitation system and, along with manually controlled activities of a by-pass valve to condenser, resulted in a drop of level in the pressurizer and subsequent reactor trip signal. Due to the condition in the secondary circuit the reactor trip resulted in a reduction of pressure in the main steam header and the reduction initiated the signal "steam leakage" along with the start of low-pressure and high-pressure emergency pumps. Twenty minutes later the deliveries of the started emergency pumps were closed. In total 3x7,5m^3 of boric acid solution was introduced into the primary circuit and thus compensated for the drop in the volume due to cooling. All activities performed during this event were in agreement with the design and operating procedures.

2.2.5. Limits and Conditions

In the period from fuel loading into the main production building of Unit 1 NPP Temelín until the end of 2000 there were four non-compliances with parameters specified in the approved document Limits and Conditions for safe operation of NPP Temelín. It included one failed level measurement in the pressurizer, non-verified function of a pressurizer relief valve, exceeding of a permitted time for the unit transition to the mode No. 5 and incorrect securing of the valve on delivery of one pump on safety systems.

The most significant violation of Limits and Condition at NPP Temelín occurred on 1 November when it was impossible to control a valve on delivery of one of the three divisions of the high-pressure emergency cooling of the reactor core. The reason of the loss of valve control was its erroneous long-term immobilization which had not been signaled. This reduced, but did not endanger, the safety of NPP operation since the remaining two divisions were all the time ready to carry out the required safety functions. Before implementation of technical measures SÚJB requested the operator to increase the frequency of inspections of the valves condition in safety systems.

In the reported period SÚJB issued six resolutions to approve permanent changes and two resolutions to approve temporary changes in Limits and Conditions for NPP Temelín. In all the cases the reason was to improve the document while reflecting on experience from the active start-up. The temporary changes concerned adjustments in the set-up of safety systems for a time necessary to complete the prescribed test.

2.2.6. Supervisory Activities by SÚJB

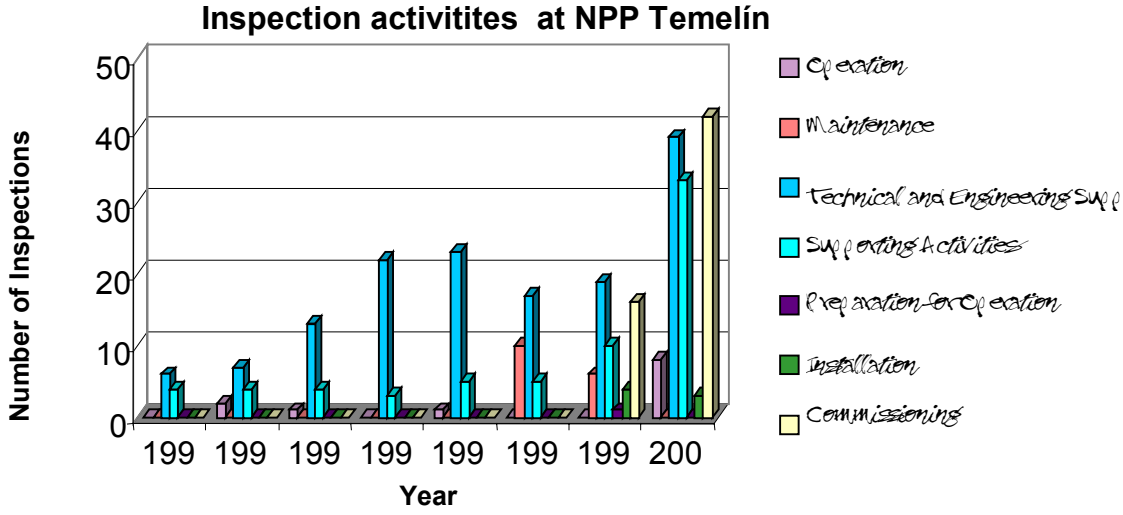
The supervisory activities and inspections performed by SÚJB in 2000 have been documented in separate 106 reports and 98 resolutions.

The focus of inspections performed by SÚJB was based on a plan of inspection activities in 2000. In agreement with the plan the main inspected activities for Unit 1 included implementation of the plant's commissioning stages, their preparation and evaluation, compliance with the requirements specified in Limits and Conditions, quality of welding works, training of selected personnel concluded with state exams, physical protection, quality assurance system of NPP Temelín and compliance with the requirements in SÚJB resolutions. For Unit 2 the inspection activities generally covered all important activities, particularly welding, quality of installation and pre-functional tests.

The most closely observed activities included gradually: implementation and evaluation of hot hydraulic tests during non-active testing of Unit 1, preparedness for the stage of active testing and the course of this stage. The course of tests performed during physical and partly also power start-ups was monitored by SÚJB continually (in shifts). Evaluation of the tests included compliance with the requirements specified in individual pre-functional tests programs, meeting of the criteria and observation of procedures in the approved programs for the stage - 1P091 and 1P500 for non-active testing - and programs for sub-stages of active testing - 1F001 and 1E001. Hot hydraulic tests were assessed as successful with some outstanding items. The outstanding items were considered by experts and deadlines were established for their gradual removal. No shortcomings were identified in the reactor core design during the physical start-up tests.

In the course of power start-up tests the necessity to fine-tune the equipment was identified and gradually addressed (e.g. unreliable function of control valves on the auxiliary condenser reduction station, occasional defects in the system indicating clusters positions, not entirely correct set-up of controls and automatics in the secondary circuit). A more significant deficiency in terms of scope were the elevated vibrations of the steam piping into the turbine identified at the end of the last year. Since the equipment influences nuclear safety only indirectly SÚJB monitors how the problem is addressed, particularly from the viewpoint of compliance with all acceptance criteria as specified for tests prescribed at individual output levels and the problem with vibrations shall be successfully resolved before these output levels are achieved.

SÚJB inspectors also verified meeting of the requirements for radiation protection within the NPP Temelín complex, particularly in connection with the preparation of fresh fuel loading into the reactor core, including primary sources handling. In most of the monitored areas no shortcomings were found and the few identified minor problems were addressed in the 2nd half of 2000, e.g. dosimeters introduced on the site without properly assured evaluation, insufficient keeping and filing of records about TL dosimetry measurement results, the submitted documents failing to specify the calculation method for doses using the ISOD program.



2.2.7. Summary Evaluation of the Licensee based on the Inspections

Operation

With the progressing commissioning of the plant more activities were gradually carried out in the category of operating functions because some systems already operated on the same parameters as those anticipated for the commercial operation of the plant and the operation had to be in agreement with Limits and Conditions for safe operation. In 2000 eight inspections were performed in the operation area which enabled to view the operation more comprehensively than in 1999, i.e. not only in the partial field of operating personnel training but also in the partial fields documenting operating culture, adequacy and feasibility of emergency and abnormal operating procedures and the course of monitoring and registration of data about the equipment condition. The inspections have verified that the condition of the simulator corresponded to that of the unit and that the training was relevant for the actual manipulations at the unit.

The performed regular inspections exposed some deviations from the operating procedures which were necessitated by discrepancies between the designed and actual set-up of I&C. The operating procedures were not adjusted accordingly to reflect these manipulations and no operating instructions were developed; however, the operating personnel actions were in agreement with the principles of operational vigilance as specified in superior documents. This was taken into account in the evaluation of technical and engineering support.

The reported exceedings of Limits and Conditions were assessed by SÚJB as insignificant from the viewpoint of nuclear safety. One violation of Limits and Conditions as described above was due to a failed signaling.

Based on the data in reports dealing with the operation and based on the facts reported above the operation has been assessed - considering the necessity to deal with complex operational and non-standard conditions during physical and power start-up tests, further compounded with sometimes insufficient technical and engineering support – very favorably and in full compliance with nuclear safety requirements. Due to the importance of this area from the viewpoint of nuclear safety a major part of regular inspections will focus on the issues of operation and a part of inspection activities will also focus on the operation of Unit 1 instead of on its start-up.

Maintenance

Some activities may be classified partly as maintenance and partly also as the plant's start-up process and therefore they were evaluated within the latter. Since there was no inspection in 2000 dedicated only to maintenance no separate evaluation of maintenance has been performed. In the coming period the maintenance activities will be carried out particularly within routine inspections and, if an increase in activities or shortcomings is identified, specialized inspections will be included into the program for this area.

Technical and Engineering Support

The area of technical and engineering support was inspected and evaluated on regular basis. Unfortunately, this area had the highest number of deficiencies which were redressed only very reluctantly. This statement may be documented with the facts identified in the individual sub-areas.

In the sub-area of preparation, inspecting and control of start-up programs the actual condition of the equipment was not considered and evaluated properly in connection with the implementation of tests, particularly in connection with the actual set-up of the I&C system. This resulted in frequent adjustments in the start-up programs, using the form of flexible programs, however, these were not always prepared with a sufficient lead. Often the programs were prepared only when requested by SÚJB.

In the sub-area of quality assurance the inspections of quality systems documentation for non-active tests on units 1 and 2 identified mostly formal deficiencies which were entered into the reports and their redressing has been followed up.

In respect to technical and document support the documents from tests performed during the start-up were submitted to SÚJB sometimes incomplete and in inconsistent form, with insufficient informative value. Some documents failed to meet requirements of the respective quality assurance system. This complicated the supervision by SÚJB of the start-up since the documents had to be quite often returned to be reworked.

Based on the performed inspections in technical and engineering support SÚJB has assessed this area as acceptable and has concluded that the inspections frequency should be increased to press the licensee to quality improvements in technical and engineering support during the start-up.

Supporting Activities

There were 22 inspections in the area of supporting activities in 2000 that monitored and evaluated compliance with valid statutory regulations from the viewpoint of nuclear safety, in the sub-areas of physical protection, including authorization of entry, radiation protection, transport of radioactive materials, inspections of nuclear materials and activities associated with radioactive wastes.

In the first half of 2000 the radiation protection inspections identified several shortcomings and their redressing was checked by subsequent inspections in the 2nd half of the year. The subsequent inspections confirmed that the shortcomings were removed and that activities in radiation protection were performed at the required level.

Since inspections in the other sub-areas did not identify any shortcomings and since there was an improvement in the radiation protection sub-area, where shortcomings in the 1st half of the year caused the unfavorable evaluation, the area of supporting activities has been assessed as stable and at a high level; in future the inspection activity will continue with the

same intensity as in the previous period. This is also due to the SÚJB commitment to perform activities required by international treaties and agreements on nuclear materials.

Installation

Apart from regular inspections there were three specialized inspections performed in 2000 to check compliance with the technical conditions of installation.

Activities in the sub-area dealing with methods and provision of works on electric and I&C systems were monitored and evaluated within regular inspections performed by local inspectors. The inspections confirmed that the concerned technical conditions were mostly complied with. Some non-compliances were identified e.g. in WEC rooms with unsealed penetrations into the cable room, dustiness, open cabinets. Most of the found shortcomings were removed before the next inspection.

The welding sub-area was monitored by SÚJB in the past year using repeated inspections, including a comprehensive follow-up of corrective measures in welding, in the course of NPP Temelín construction.

In agreement with the requirements of the Program P092 visual, capillary and ultrasonic inspections were performed on the main circulation piping. The automatic ultrasonic method identified impermissible defects in three welds on the main circulation piping. The supplier and the licensee carried out independent evaluations of the inspection results using a more accurate method that proved the piping quality to be sufficient, except the defect in the weld No. 8, which was entered into the system for defects monitoring at NPP Temelín (two defects were reclassified as complying).

The SÚJB inspection identified shortcomings which ČEZ-NPP Temelín was able to remove in the course of the inspection. However, the shortcomings in the observation of technical conditions, identified in some of the inspected premises during the first inspection rounds, meant also noncompliance with the binding technical conditions for installation (under the valid partial quality assurance program – design). It has been concluded that the compliance status with technical conditions for installation as identified by the inspections is better that in the comparable stage of installation activities on Unit 1 and that it has been continually improving. For these reasons the installation area has been assessed as acceptable and continually improving.

Commissioning

A significant proportion of all inspections performed at NPP Temelín in 2000 focused on its commissioning. There were inspection performed by teams to check preparedness for the stage of non-active testing, specialized inspections to evaluate the course of non-active testing of individual systems in the primary and secondary circuits (to evaluate preparedness for the active testing stage) and subsequently to evaluate the course and results of physical and partly also power start-up. Commissioning was evaluated based on materials from 42 inspections in total.

The sub-area of pre-functional tests on the equipment was inspected particularly during non-active testing, and also by inspections relating to the permit to start active testing and during those tests, while SÚJB monitored the course of the tests, removal of the identified defects and outstanding items. Although the tests of equipment were performed in agreement with the requirements in applicable pre-functional tests programs some minor deviations and shortcomings were found that had to be redressed.

In the course of physical start-up and power start-up sub-stages SÚJB monitored fulfillment of the approved programs, particularly E001.

In the course of inspection the inspectors identified e.g. a non-compliance in the E013 program linked to the valid program E001, however, the objectives and acceptance criteria of the tests, including safety-related criteria, were met. Similarly, during the inspection of documents for tests of impulse valves on the pressurizer – the inspection that evaluated preparedness for mode 2 under Limits and Conditions - SÚJB received a test report saying that the regulation was complied with, despite the fact that the tests were not performed entirely in agreement with the valid temporary amendment to T010 and the report failed to meet requirements of the valid partial quality assurance program H24: this was identified also in the area of technical and engineering support.

In connection with the above-said, i.e. several cases where pre-functional tests were not observed or documented or where the course of the prescribed tests was not observed, and based on other related findings reported and evaluated in engineering and technical support, the commissioning area has been assessed as acceptable; still, attention should be paid to consistent observation of the approved programs and evaluation of tests in agreement with the partial quality assurance programs. The inspection activities in the coming period will focus on the mentioned deficiencies, on monitoring of selected tests during power start-up and on fulfillment of the established criteria.

2.3. Other Nuclear Installations

2.3.1. Reactor LVR-15 in ÚJV Řež, a. s.

The plan of the reactor operation in 2000 was met in full. The reactor produced 35182 MWh. Since the beginning of its trial operation in 1989 (following the overall refurbishment of its equipment) the reactor has produced 244746 MWh. The rector operation was safe and reliable and no violation of the approved Limits and Conditions occurred. The reactor was used mainly for the purposes of material research – exposure in experimental probes and loops; horizontal channels to basic and applied research in the Institute of Nuclear Research and FJFI were used. Works continued on the mastering of the neutron-capture method to expose the first patients and on measurements of neutron beam parameters and radiation levels in the exposure box and its surroundings.

The inspection activities performed by SÚJB last year contributed to the assurance of nuclear safety of the reactor operation; no shortcomings or defects, including violation of Limits and Conditions, were identified and no corrective measures were required. It has been concluded that the current condition of the equipment and the monitored nuclear safety parameters in a prevailing majority of cases comply with the EU standards.

2.3.2. Reactor LR-0 v ÚJV Řež, a.s.

The LR-0 reactor in ÚJV a. s. Řež was operated for 527 hours and it was used for physical experiments on models of VVER 1000 and VVER 440. Its Limits and Conditions were observed during the operation.

2.3.3. Reactor VR-1P at FJFI ČVUT

The school reactor VR-1P at FJFI ČVUT was operated in agreement with the approved Limits and Conditions in a safe and reliable manner. The inspections performed by SÚJB did not identify any defects in its operation. The school reactor VR-1P was used with very high intensity for teaching purposes, also beyond the sector managed by the Czech Ministry of Education, particularly for ČEZ, a.s. training courses and for commissioning of NPP Temelín. The reactor operated for 1124 hours over the year and at a very high level of operational safety.

2.3.4. Fresh Fuel Storage Facility

In early 2000 the fresh fuel storage contained 163 fuel assemblies for NPP Temelín Unit 1 and 3 reserve assemblies. In July the 163 fuel assemblies were transported into the Unit 1 reactor building and loaded into the core. In November 42 fuel assemblies for Unit 2 were brought into the fresh fuel storage. On 31 December 2000 the fresh fuel storage contained 45 fuel assemblies.

In 2000 SÚJB inspectors performed three inspections in the fresh fuel storage at NPP Temelín. In June the inspectors identified shortcomings in the records on fire-fighting equipment inspections and requested a written material to be submitted by the licensee to SÚJB on the condition of documents concerning operation and maintenance of fire-protection systems (one week before the beginning of active testing at the latest). The licensee fulfilled the request.

In April 2000 a package assembly was delivered into the fresh fuel storage containing primary neutron sources; the sources were stored there until introduced into the fuel assemblies in agreement with a SÚJB resolution. Immediately after neutron sources were taken out of the package assemblies the actual radiation situation in the fresh fuel storage was mapped. To complete the shielding of neutron sources inserted into the fuel assemblies a special shielding was used, with an annular cross-section and containing boric acid solution. To verify the radiation situation in the fresh fuel storage SÚJB inspectors performed in early June 2000 independent equivalent dose rate measurements for gamma radiation and neutrons and the results confirmed the data measured by the licensee.

2.4. Other SÚJB Supervisory Activities

2.4.1. Spent Fuel Management

2.4.1.1. Interim Storage of Spent Nuclear Fuel in Dukovany

The interim storage of spent nuclear fuel in Dukovany has been continually operated since 1997. The inspections performed by SÚJB in 2000 focused on compliance with Limits and Conditions and no deficiencies were identified. Throughout the year the licensee monitored the required physical parameters – pressure between the primary and secondary lids of CASTOR-440/84 casks to check their tightness, equivalent dose rate to map the radiation situation in the interim storage and its surroundings and, beyond the standard requirements in the approved Limits and Conditions, surface temperature of all the storage containers. The measures levels were in compliance with the levels approved by SÚJB in Limits and Conditions for permanent operation of the interim storage and in safety documents. As on 31 December 2000 the interim storage contained 38 CASTOR-440/84 casks containing 3192 fuel assemblies.

In May SÚJB opened an administrative procedure in respect to ČEZ, a. s. application to operate the interim storage of spent nuclear fuel at Dukovany as a nuclear installation under Act No. 18/1997 Coll. SÚJB reviewed safety documents enclosed to the application and in June suspended the procedure until shortcomings in the safety documents are redressed in respect to quality assurance and proposed decommissioning under provisions of Section (§) 47 in Decree No. 195/99 Coll. At the end of the year ČEZ, a. s. submitted modified and amended safety documents which will be reviewed to issue a resolution in this matter.

2.4.1.2. Spent Fuel Storage Pools at NPP Dukovany

As on 31 December 2000 the spent fuel pools contained in section one 566, in section two 619, in section three 544 and in section four 619 fuel assemblies, i.e. in total 2348 fuel assemblies containing spent fuel.

2.4.1.3. Central Storage Facility for Spent Fuel - Skalka

Based on a favorable result of a safety documents review required by the Atomic Act SÚJB issued a permit on 31 January 2000 to place a central storage for spent fuel in the Skalka locality, as a reserve facility to store spent fuel from NPP Dukovany and NPP Temelín.

2.4.1.4. High-level waste storage facility at ÚJV Řež, a.s.

Two inspections were performed in the facility in 2000, concentrating particularly on quality of water in the spent fuel pool, on optimization of the automatic system monitoring quality of water in the pool and efficiency of the water purification plant. The first inspection was performed in connection with an exceeding of the limit concentration for chlorides in the B pool reported in April and deadlines were agreed during the inspection to implement respective corrective measures for future exceedings. Later, based on a request from ÚJV Řež, amendments were approved to the Limits and Conditions in May 2000 for the operation of high-level waste storage, which incorporated the approved modifications aimed at the improvement of nuclear safety. The other inspection took place in November 2000 and focused on observation of the modified Limits and Conditions and implementation of corrective measures requested by the first inspection.

As on 31 December 2000 the facility contained 206 fuel assemblies EK-10, from which 190 fuel assemblies in dry boxes, 16 fuel assemblies in the pool B and 228 fuel assemblies IRT-M and IRT-2M, also in the pool B.

2.4.2. Transport of Nuclear Materials

In 2000 there were four in-house transports of spent nuclear fuel in ČEZ, a. s. NPP Dukovany.

In the ÚJV Řež complex 30 fuel assemblies with irradiated fuel were transported from the LVR-15 reactor to the high-level waste storage facility.

In the concerned period there were also seven international transports of fresh fuel from the Russian Federation to ČEZ, a. s. NPP Dukovany and one international transport of fresh fuel from the United States to ČEZ, a. s. NPP Temelín. Inside the complex of NPP Temelín there were 10 transports of fresh fuel and one transport of primary neutron sources from the fresh fuel storage into Unit 1.

Moreover, there were two international transports of uranium concentrate from the state enterprise DIAMO, s. p. to France, three to the Russian Federation and one to Canada. There was one transport of uranium concentrate inside the country, between two DIAMO, s.p. facilities. There were twelve transports of natural uranium inside the country from ŠKODA-ÚJP Praha, a.s. to glassworks.

Within its supervisory activity SÚJB performed six inspections of nuclear material transport, three of them dealing with international transport. Based on these inspections SÚJB concluded that requirements for nuclear safety and radiation protection were met in the course of transport.

SÚJB reviewed and type-approved submitted documents for seven transport containers whose previous approvals were about to expire, and two new transport containers manufactured in the Czech Republic and one manufactured abroad. The reviewing process has not been completed yet for another two new containers: one for spent fuel, a RBMK type CONSTOR 1500 RBMK made by GNB (Germany) and one for fresh fuel, a VVER 440 type called 3525 AF made by BNFL (Great Britain).

2.4.3. Physical Protection of Nuclear Materials and Nuclear Installations

In agreement with its plan of inspection activities for the first and second halves of 2000 SÚJB performed 15 scheduled inspections of physical protection of nuclear materials and nuclear installations and 5 inspections of physical protection of nuclear material transport. Beyond the scheduled ones there were also 4 inspections of nuclear installations with nuclear reactors to check implementation of additional measures adopted to reinforce their physical protection in connection with the IMF session in Prague.

2.4.3.1. Nuclear Power Plant Dukovany

The inspection of physical protection has proved that the licensee complies with the requested manner of physical protection for nuclear materials and nuclear installations, at least in the scope approved by SÚJB, and that the licensee on a contractual basis provides for physical protection of the radioactive waste repository at Dukovany for SÚRAO Praha. The licensee met requirements specified in SÚJB reports and completed refurbishment of the control system for the technical system of physical protection in due time to assure smooth transition to the year 2000. The system of physical protection was operated in a reliable way, it was continually maintained and gradually modernized and in 2000 - 2002 the main efforts will concentrate on implementation of technical measures to meet in full the requirements of Decree No. 144/1997 Coll. by the time required under the Atomic Act.

2.4.3.2. Nuclear Power Plant Temelín

Physical protection of the plant was a standing subject of SÚJB inspections in 2000. Major attention was paid to preparations of a resolution about the manner of physical protection assurance, based on the safety documents submitted to and reviewed by SÚJB in December 1999.

Based on a favorable result of the documents review and eight inspections performed by SÚJB in the course of implementation of the technical system of physical protection performed in 1999, that concentrated on tests of the system carried out in agreement with programs approved by SÚJB for comprehensive tests and their preparation, SÚJB issued a resolution approving the submitted documents and the manner of physical protection for nuclear materials and nuclear installations in the period of commissioning and operation of Unit 1 and construction of Unit 2.

In February and March SÚJB performed 3 thorough inspections of the approved method of physical protection for nuclear materials and nuclear installations at NPP Temelín. Results of the inspection confirmed that physical protection on the ČEZ-NPP Temelín side was assured in full compliance with the issued resolution.

SÚJB inspectors issued an inspection report requesting a corrective measure to be adopted by the licensee to the effect that the general supplier of technology should select individuals authorized to independently enter the control room and make sure that these persons enter the control room only via the technical system of physical protection. SÚJB was informed about implementation of this corrective measure with a letter and checked the implementation while performing the next inspection at the plant.

On ČEZ NPP Temelín side the physical protection was assured in agreement with requirements of the Decree No. 144/1997 Coll., at least three months before the scheduled loading of fresh nuclear fuel into the reactor. In this connection pyrotechnical inspections were performed in selected buildings of the plant's guarded area on 5 - 12 May 2000. The inspections were executed by CR Police – South Bohemian Administration - OKTE and results of the inspection were documented in an „Official Protocol“ from 12 May 2000.

SÚJB also received from ČEZ-NPP Temelín a schedule of pre-functional tests of the technical system of physical protection for the second stage, while comprehensive tests of the entire technical system of physical protection at NPP Temelín should be performed in April 2001. A preliminary agreement has been achieved about the scope, structure and schedule of the documents to be submitted for approval.

2.4.3.3. ÚJV Řež, a. s.

There were two inspections of the approved method of physical protection of nuclear installations and nuclear materials in ÚJV Řež, a. s. and no defects have been identified. In connection with the SÚJB resolution approving the document „Proposed method of physical protection of nuclear materials and nuclear installations at the Nuclear Research Institute in Řež a. s.“, ÚJV Řež, a. s. carried out a tender for a supplier of the physical protection technical system. A new technical system of physical protection shall be under Act No. 18/1997 Coll. implemented by 30 June 2002 at the latest, which is also the expiry date of the above-mentioned resolution. Therefore SÚJB did not grant to the licensee any exception in respect to the law and did not accede to the ÚJV request to extend the deadline for implementation at least by one year. In the course of the year the licensee concluded the tender for a supplier of safety documents and of the technical system of physical protection.

2.4.3.4. Other Nuclear Installations

SÚRAO, Radioactive Waste Repository Richard near Litoměřice

SÚRAO accepted the obligation to assure physical protection of this nuclear installation, starting from 1 January 2000, when it took over the radioactive waste repository Richard near Litoměřice from the former licensee - ARAO a. s. The new licensee assured full compliance with the approved documents.

No defects and deviations were found in comparison with the method of physical protection approved for the nuclear installation by SÚJB. Physical protection of the radioactive waste repository Richard near Litoměřice uses electronic protection alarms connected to the CR Police board of centralized protection.

ŠKODA - ÚJP, Praha, a. s.

The results of the performed inspection have confirmed that physical protection of nuclear materials in ŠKODA – ÚJP, Praha, a. s. is assured as approved by SÚJB. The licensee meets conditions in the respective SÚJB resolution and complies with the administrative and technical requirements for physical protection as approved by SÚJB. The inspection has confirmed that the electronic protection alarms system is functioning, mechanical preventive means are compact and intact. No defects or deviations have been found in the method and scope of physical protection assurance. At the end of the year the licensee submitted a request to SÚJB to approve amended documents for physical protection method in agreement with Act 18/1997 Coll., confirming compliance with the requirements in Decree No. 144/1997 Coll. Within the said process the licensee implemented a link between the protection technology and the CR Police board of centralized protection.

ŠKODA JS a. s., Plzeň

Results of the inspections have confirmed that the method and scope of physical protection of stored nuclear materials in terms of quantity for category III corresponds to the approved method of physical protection. No defects or deviations have been identified from the requirements specified in Decree No. 144/1997 Coll. and from conditions in the respective SÚJB resolutions.

It has been confirmed that at the inspection time the nuclear materials kept in ŠKODA JS a. s. were below the lower limit established for category III from the viewpoint of physical protection and, as a result, the nuclear material storage as a nuclear installation did no more require classification in the category III from the viewpoint of physical protection. Based on the licensee's request to terminate the approved method of physical protection of nuclear materials and nuclear installations in ŠKODA JS a. s. SÚJB issued a permit to terminate the method of physical protection assurance.

Faculty of Nuclear Science and Physical Engineering (FJFI), Czech Technical University in Prague 1

Results of the inspection have confirmed that the method of physical protection of the nuclear installation – school reactor VR-1 and nuclear materials in the nuclear reactor's department of FJFI ČVUT in Prague was observed without shortcomings by the licensee.

Uranium Concentrate Storage Facilities

Results of the inspection have proved that the applied physical protection of uranium chemical concentrate and nuclear installations in DIAMO, state enterprise, Stráž pod Ralskem and DIAMO, state enterprise – branch facility GEAM, Dolní Rožínka, is in full compliance with the approved method of physical protection and with the requirements in Decree No. 144/1997 Coll. The chemical uranium concentrate is handled in agreement with the technical conditions approved by state administration of tangible reserves (SSHR), SÚJB and DIAMO s. p.

Czech Metrology Institute – Inspectorate of Ionizing Radiation in Prague

Results of the inspection have confirmed that the applied physical protection of nuclear materials in the Institute, in terms of method and scope, complies with the documents approved by SÚJB.

2.4.4. Physical Protection of Nuclear Materials during Transport

a) Fresh Nuclear Fuel

In the course of 2000 two inspections were performed of physical protection assurance during a combined transport (by plane and road) of nuclear material, when fresh nuclear fuel was transported from the Russian Federation to ČEZ, a. s., NPP Dukovany and there was one inspection of physical protection assurance during a combined transport (by plane and railway) when the fresh fuel was transported from USA to ČEZ, a. s., NPP Temelín. The level of physical protection of the transports complied with the requirements for nuclear materials in category III and with the conditions in the SÚJB resolution.

In July, in connection with the issued SÚJB approval for active testing and for the method of physical protection of nuclear materials and nuclear installations, there were 2 inspections of physical protection during transport of fresh nuclear fuel from the auxiliary building – fresh fuel store – into the Unit 1 main production building. The physical protection of the fresh fuel in-house transport and of nuclear materials and nuclear facilities in ČEZ, a. s., NPP Temelín was found in full compliance with documents approved by SÚJB.

b) Spent Nuclear Fuel

In 2000 there were two inspections of physical protection assurance during transport of spent nuclear fuel:

- Transport of the loaded container CASTOR 440/84 from the main production building to the interim storage of spent nuclear fuel at NPP Dukovany. The inspection in the course of transport confirmed that physical protection of nuclear materials was

assured as required for nuclear materials classified in category II, in agreement with the applicable SÚJB resolution.

- Transport of the spent fuel assembly IRT-2M from the reactor LVR-15 into the storage of high-level waste in ÚJV Řež, a. s. The inspection in the course of transport confirmed that physical protection of nuclear materials was assured as required for nuclear materials classified in category III, in agreement with the applicable SÚJB resolution.

During the transports CR Police units performed tasks assigned to them by the applicable documents.

2.4.5. National System of Nuclear Materials Registration and Control

In 2000 76 inspections were performed focusing on nuclear materials management, while 47 inspections were performed in cooperation with IAEA and 29 inspections were performed independently by SÚJB inspectors. All the inspections have confirmed that nuclear materials were managed in agreement with applicable requirements and the positions issued by IAEA on the performed inspections have confirmed data in the national system of nuclear materials registration and control.

A common inspection by SÚJB and IAEA performed in ČEZ, a. s. NPP Temelín reviewed the first fuel loading into Unit 1 of the plant. There were random inspections performed by SÚJB and IAEA in ČEZ, a. s. NPP Dukovany in connection with the calibration of pressure sensors on CASTOR 440/84 containers in the interim storage of spent fuel at NPP Dukovany.

The course and results of the inspections have been in detail documented in the inspection protocols and the reports have been made available to holders of licenses for nuclear materials procurement and also in the inspection reports. No objections have been raised by the licensees against the protocols under Section (§) 17 of Act No. 552/1991 Coll.

In the past year SÚJB issued 65 new licenses for nuclear materials management. By the end of 2000 there were 201 licensees in total in the Czech Republic for nuclear materials management or procurement (issued before validity of the Atomic Act) in 228 operating-organizational units.

In 2000 SÚJB issued 126 licenses for import/export of nuclear materials, selected items and items of dual use in nuclear field. From this number 6/9 licenses were issued for import/export of nuclear materials, 11/5 for import/export of selected items, 78/11 for import/export of dual use items in nuclear field and 6 licenses were issued for export and reimportation of nuclear materials or dual use items in nuclear field. In 2000 SÚJB inspectors performed in total 10 inspections focusing on import and export of nuclear items.

Overview of Inspection Activities in 2000.

MBA Code	Number of IAEA Inspections	Number of SÚJB Inspections	IAEA Inspection Efforts [1)] (man-days)
CZ-B	4	4	5 (6)

MBA Code	Number of IAEA Inspections	Number of SÚJB Inspections	IAEA Inspection Efforts [1] (man-days)
CZ-C	1	1	1 (3)
CZ-D	1	2	1 (5)
CZ-E	1	1	1 (1)
CZ-F	1	1	1 (3)
CZ-G	4	4	4 (3)
CZ-J	9	9	9 (26)
CZ-K	8	8	10 (42)
CZ-L	8	8	8 (7)
CZ-T	5	5	5 (20)
CZ-V	1	1	2 (1)
CZ-W	0	2	0
CZ-X	0	1	0
CZ-Y	0	1	0
CZ-Z	4	28	3 (9)
T O T A L	47	76	50 (126)

[1] The inspection efforts as approved by the respective amendment on the installations in 2000.

3. STATE SUPERVISION OF RADIATION PROTECTION

The State Office for Nuclear Safety performs also a number of activities in health and environment protection against adverse effects of ionizing radiation. They include, in particular:

- state administration and supervision of radiation protection for a wide range of workplaces using ionizing radiation sources (nuclear installations, workplaces employing unsealed radionuclide sources, dental x-ray devices, type approving for sources, nuclear waste management and release of radionuclides to the environment);
- monitoring, evaluation and regulating of personal exposure, including exposure to radon and other natural sources of ionizing radiation and exposure due to emergency situations;
- coordination of activities in the national radiation monitoring network, including provision of international exchange of data on radiation situation;
- nationwide registration of ionizing radiation sources and nationwide registration of exposed workers;
- enforcement of radiation protection regulations, including imposition of corrective measures and fines.

3.1. Overview of Workplaces with Ionizing Radiation Sources

The scope and complexity of work associated with the state administration and supervision of radiation protection may be well documented with the number of workplaces using ionizing radiation sources. There are five categories of the sources under Act No. 18/1997 Coll., reflecting the increasing potential risks to human health or to the environment – insignificant, minor, simple, significant and very significant. The higher the category the stricter and more extensive requirements for radiation protection, the more complicated approval process and the higher required level of expertise. The inspection activities focus primarily on management of the potentially most hazardous sources and the respective inspections are more frequent, more extensive and more detailed.

The following workplaces use very significant sources of ionizing radiation:

- workplaces with nuclear reactors and related technological equipment (for more details see chapter 2 hereof), specifically 4 power generating reactors in NPP Dukovany, and one currently commissioned reactor in NPP Temelín, two research reactors in ÚJV Řež, a.s. and one school reactor in ČVUT FJFI in Prague;
- interim storage of spent nuclear fuel and spent fuel pools within the plant complex at NPP Dukovany, radioactive waste repository "Richard" near Litoměřice, high-level waste storage facility in ÚJV Řež, a.s.;
- uranium industry workplaces – mining and uranium ore processing facilities in Dolní Rožínka, clean-up of the mining facility in Příbram location and the closed mine Hamr, cleanup of the chemical extracting facility in Stráž pod Ralskem location and cleanup of the sludge fields in Mydlovary;
- workplaces with big industrial sources, specifically for food irradiation (particularly spices), owned by Artim Praha s.r.o. and workplaces for radiation sterilization of medical materials owned by Biostér, a.s., Veverská Bitýška.

The important workplaces with significant ionizing radiation sources include those manufacturing, distributing and, if applicable, using unsealed and sealed radionuclide

irradiators with generally high activities, particularly workplaces of Cesio Praha s.r.o., Sorad Praha s.r.o., Isotrend Praha s.r.o., ÚJV Řež a.s, Nuclear Physics Institute of CR Academy of Sciences in Řež.

Numbers of significant and simple ionizing radiation sources as at 31 December 2000 can be found in tables 3.1 through 3.3, based on the source type.

Table No. 3.1. Workplaces with Unsealed Radionuclide Sources

	Workplaces with **significant** ionizing radiation sources (workplaces in category III under Decree No. 184/97 Coll.)	Workplaces with **simple** ionizing radiation sources (workplaces in categories I and II under Decree No. 184/97 Coll.)
Medical and veterinary applications	4	150
Industrial applications	1	15
Other applications (research etc.)	5	123
Total	**10**	**288**

The table 3.1 indicates numbers of workplaces with unsealed sources, i.e. workplaces where radioactive materials occur in a form that does not exclude dispersing of radionuclides on the site or their release to the environment. These sources are usually in form of a chemical and not a „piece“ product; in most cases they are radionuclides with very short half-time and therefore their current activity quickly changes with time. From the viewpoint of radiation protection workplaces with significant sources of ionizing radiation are those with unsealed sources from category III under Decree No. 184/1997 Coll. Workplaces with unsealed sources from categories I and II are classified as workplaces with simple sources. The table 3.1 does not include the above-mentioned workplaces with unsealed very significant sources.

The table 3.2 indicates numbers of sealed radionuclide sources, radioactive materials sufficiently enclosed and tested so that under predictable circumstances of use dispersing of radionuclides on the site or their release to the environment is excluded. Sealed radionuclide sources are of „piece“ nature and, except the calibration sources, they are not used directly but installed into respective instruments (e.g. – defectoscopy and logging sets). The number of individual sealed radionuclide sources is not identical with the number of equipment using such sources – the equipment may use several sealed radionuclide sources at a time or one after another, sometimes even the number in the equipment may change (this is typical for brachytherapy).

Table No. 3.2. Sealed Radionuclide Sources

	Sealed radionuclide sources in equipment classified as significant ionizing radiation sources	Other sealed radionuclide sources
Medicine	63	477
Industrial and other applications	676	3534
Total	**739**	**4011**

The table 3.3 indicates numbers of radiation generators, i.e. devices generating ionizing radiation, however only during their operation, as it is the case for x-ray instruments. The radiation generators include (in agreement with the definition in Act No. 18/1997 Coll.) only those units generating radiation with energy over 5 keV. If one generator may be used

with several x-ray tubes (e.g. in x-ray diagnostic instruments) the table indicates the number of generators.

Table No. 3.3. Radiation Generators

	Significant ionizing radiation sources	Simple ionizing radiation sources
Medical and veterinary applications	1467	5684
Industrial applications	198	309
Other applications (research etc.)	23	143
Total	**1688**	**6136**

No license is required to use minor sources under Act No. 18/1997 Coll. which shall be only reported to SÚJB. There are 160 thousand of such sources registered. For insignificant ionizing radiation sources there is no reporting obligation since such sources due to their nature pose no risk to human health or to the environment. – these sources are not subject to state registration.

3.2. Emergencies

In 2000 there were 77 emergencies reported and investigated in respect to management of ionizing radiation sources or nuclear practices (cases concerning NPP Dukovany and not related to the fulfillment of radiation protection requirements are reported in the part dealing with nuclear safety):

- In 32 cases measuring instruments at entrances to steelworks or at border crossings detected radioactivity in vehicles (railway carriages, trucks) transporting **iron scrap** – from this number in 26 cases the contamination was caused by natural radionuclides (mainly Ra-226); in 6 cases the materials were contaminated with artificial radionuclides (mostly Co-60) – steel strips, parts of machines manufactured from steel contaminated in the heat etc. Based on resolutions by SÚJB inspectors the contaminated materials were returned to the forwarder, isolated and safely stored or disposed.
- In 19 cases contaminated material was detected at **entrances to waste incinerator facilities** – 16 cases of contamination in **garbage-collecting trucks** (in 11 cases individual items were isolated – children diapers, clothes, sanitary waste, etc. contaminated with radionuclides used for therapy and diagnosing in nuclear medicine – specifically 10 times Tc-99m, once Cs-137; in 2 cases Ba-133 etalon sources were found, in one case 50 ml bottle containing uranylacetate, in one case uranium ore and in one case Co-60 – a metallic cylinder 2x2mm); in 3 cases contamination was identified at an incinerator facility entrance in AVIA trucks with **contaminated** rear axle spring (Co-60).
- There were 3 cases of contamination at **border crossings**; in two cases the vehicles legally transported material with increased levels of **natural radionuclides** (paints, ceramic material); the vehicles were checked and released for further transport; in one case there was a **contaminated** steering turn-plate of LIAZ trailer (Co-60).
- 4 cases concerned **fire alarms** (finding on a scene of a fire, in communal waste, loss); the found sources were disposed by a company auhorized for the purpose, no contamination of the environment was identified, the loss of 100 pieces of alarms is investigated by CR Police.

- In 9 cases **minor or insignificant radiation sources** were identified (in Bílkovice municipality a bag with 40 pieces of surge arrestors - Pm-147 was found; during liquidation of a warehouse in the MEDIPO company 2 containers containing etalons VAJ 18 were found; in 2 cases contaminated working clothes were identified; during relocation of RC Brno a non-registered Ra-226 calibration source was identified; in one case military material was intercepted while traded – components containing Sr-90, Y-90 and Ra-226; in one case a source of Co-60 that contaminated steel strips was traced - in the cultivator; in one case a source of Co-60 contaminated holder castings at the scrap yard and in one case a woman was detained at the international airport in Prague suspect of transporting a radiation source – she carried a compass (with a Ra-226 face). Sources and contaminated items were disposed by entities authorized for the purpose.
- In 1 case the CR Police executed a report on **repossession of a thing** (radiation source - Emanation apparatus - activity 337 kBq Ra-226), in a commission sale (antiquity shop) from a private person; the owner was requested by SÚJB regional center to provide for the liquidation of the source.
- 5 cases were **spurious alarms** – unconfirmed suspicions of personal exposure, illegal possession of radioactive substance, unconfirmed increase of natural radioactivity levels.
- In 4 cases the events were important from the viewpoint of radiation protection, requiring specific investigations:
    - ❖ On 11 January 2000 **mistaken exposure** of a patient occurred due to human failure at the department of radiotherapy in the teaching hospital FN Motol Praha. A detailed analysis of the radiological event resulted in corrective measures. The afflicted patient was informed about the situation and has been under medical surveillance.
    - ❖ On 7 April 2000 the department of nuclear medicine in Chomutov reported a **missing delivery containing Y-90** with activity 1,4 GBq from M.G.P. company The consignment was dispatched on 5 April 2000 from the Masarykovo railway station in Prague and the investigation by CR Police concluded that it had been stolen in the course of railway transport on the way to Ústí nad Labem. Considering the nature of Y-90 radionuclide there is no life threat to the population or individual persons and CR Police has continued the investigations.
    - ❖ On 8 June 2000 in the radiotherapy clinic in the teaching hospital (FNsP) in Ostrava **one laboratory technician** was exposed due to non-observation of operating procedures during medical exposure with a linear MEVATRON accelerator. The exposure was due to a human failure of the operating personnel. Based on evaluation of her personal film dosimeter the effective dose amounted to 0,7 mSv. A blood sample was taken from the afflicted woman to establish chromosome aberrations. On 12 June 2000 the FNsP workplace was inspected by the staff from Ostrava Regional Center, corrective measures were discussed and an administrative procedure was launched about the fine.
    - ❖ On 14 September 2000 **mistaken exposure** of a patient occurred at x-ray department of the teaching hospital in Krč due to a human failure. The radiological event was analyzed in detail, including a description of corrective measures. The patient was informed about the situation and has been under continual medical surveillance.

3.3. Licensing of Activities with Ionizing Radiation Sources

The administrative activities of SÚJB in radiation protection consist mainly in the issuing of licenses for management of ionizing radiation sources and licenses for workplaces using significant or very significant sources under Act No. 18/1997 Coll. The procedure applies to over 6000 legal entities in the Czech Republic, most of them medical facilities.

In 2000 SÚJB as a state administration body issued 2381 resolutions, from which 1858 were issued by the regional centers and 523 by its central workplace. In comparison with previous years (3063 resolutions in 1999 and 1919 in 1998) the number reflects demand for licenses required under the new legislation. The indicated number fails to include additional 648 specific resolutions issued to physical persons in connection with professional authorizations for activities particularly important from the viewpoint of radiation protection.

3.4. Inspections

Similarly as in 1999, the inspection activities in 2000 consisted of local inspections (by SÚJB regional centers) and specialized inspections (to inspect specific sources of ionizing radiation throughout the CR territory). This approach has proved to be the only viable way allowing to carry out inspections with a limited number of inspectors (they also participate in extensive administrative activities of SÚJB and in other tasks required under the law) and at the same time to maintain the necessary professional standard of the inspections.

The inspections have been divided into the ones performed by SÚJB regional centers (hereinafter RC) and their inspectors within the regions, and into specialized inspections performed by specialized inspection teams appointed by the SÚJB deputy for radiation protection from among the inspectors from SÚJB Prague headquarters, as well as from regional centers. Activities performed by special inspection teams focused on specific types of ionizing radiation sources and related workplaces where a higher level of uniformity in radiation protection is desirable throughout the country (e.g. workplaces with significant and very significant unsealed radionuclide sources, nuclear power plants, uranium industry etc.). The system is complemented with additional inspections carried out by *ad hoc* established teams, particularly for time-consuming and sophisticated inspections at workplaces using very significant sources.

The inspection results used the following classification:

I sources managed in full compliance with the legislation,

II formal shortcomings identified, without any impact on radiation protection,

III shortcoming identified, requiring corrective measures or limitation/suspension of the performed activities,

N serious shortcomings identified, requiring license withdrawal or sources managed without a proper license.

3.4.1. Inspections Performed by SÚJB Regional Centers

Inspection activities by SÚJB regional centers are performed based on approved semi-annual plans set-up by the individual centers. Due to the high number of ionizing radiation sources and the involved workplaces in the Czech Republic it is impossible to inspect all the workplaces and all the licensees every year. Therefore annual plans of the individual regional centers take into account the number of workplaces and licensees in the region and the following principles:

- workplaces with significant sources used in the industry shall be checked at least once in two years,

- inspections of significant sources of ionizing radiation shall have priority over inspections of simples sources, particularly in medical applications,
- priority shall be given to inspections of „problematic“ simple sources where some shortcomings are expected,
- in respect to natural sources, attention shall be paid to suppliers of water to public water distribution systems and producers of building materials.

In terms of content, the inspections by RC in 2000 were similar to those in 1999, i.e. :

- harmonization of the practices with the new legislation – content and structure of documents required by the new legislation – quality assurance programs, monitoring programs, emergency plans;
- supervising of tests of long-term stability of sources used in radiotherapy and radiodiagnostics (regulation of patients exposure) and supervising of entities performing the tests.

In 2000 the regional centers performed 1466 inspections in total, a number similar to that in 1999 (1555 inspections).

In 2000 SÚJB regional centers performed 965 inspections of **artificial sources**, from which 712 in human or veterinary medicine facilities, 168 inspections in industrial facilities and 85 inspections in other facilities. From all the performed inspections 76% workplaces were classified in categories I and II, 18% in category III (mandatory documents missing, insufficient equipment of the workplace from the viewpoint of radiation protection assurance, non-observation of monitoring programs – corrective measures were used in these cases) and 6% of the inspected workplaces were classified as N (serious noncompliance with requirements of the new legislation). When compared to 1999, the number of inspections classified as III and N increased, as a result of the stricter inspection process based on the new legislation and also because the inspections gradually included also entities dealing with simple sources of ionizing radiation in the industry and in medical facilities, with generally lower levels of radiation protection.

In 2000 SÚJB regional centers performed 501 inspections of **natural sources**, from which 157 with producers of building materials, 319 with water suppliers, 15 with bottled water producers and 10 inspections at workplaces with increased natural exposure levels. None of the inspections have been ranked as N. 93% of the inspected entities were ranked as category I and II, 7% as category III (particularly due to non-observation of measuring intervals for construction materials and exceeding of guidance levels in supplied water or produced building material).

3.4.2. Specialized Inspections

3.4.2.1. Radioactive Waste Management and Release of Radionuclides to the Environment

A specialized inspection team performed 17 independent inspections focused on radioactive waste management in ÚJV Řež, a.s., SÚRAO, (repository Richard, regional repositories Dukovany and Bratrství), ISOTREND s.r.o., ČEZ a.s. – NPP Dukovany and NPP Temelín, SORAD s.r.o., Institute of Physiology – CR Academy of Sciences, ARTIM, s.r.o., ZAM-SERVIS, s.r.o.

The inspection at SÚRAO – repository Richard identified exceeding of Limits and Conditions and the action level for tritium volume activity in water from the deep borehole PV-1 (in the early 1990s it was used for a tracing experiment to verify underground water

flow in the repository surroundings) and for radon volume activity in the repository atmosphere. SÚRAO evaluated the situation and submitted a new monitoring program for approval. In ČEZ, a.s. - NPP Temelín an uneven dosing of ion exchangers in the bituminisation process was identified and addressed. In ÚJV Řež, a.s. an unsuitable concrete mixture for radioactive waste storage was replaced based on the inspection. The inspections of radioactive waste management in ISOTREND s.r.o. and SORAD s.r.o. identified nonconformities in radioactive wastes registration and marking of recyclable packaging, in both cases the problems were redressed. Shortcomings were identified and redressed in the Institute of Physiology – CR Academy of Sciences in documents about release of radionuclides to the environment.

Eight inspected entities were evaluated in category I, seven entities in category II and two entities (ČEZ, a.s. – NPP Dukovany) in category III (failure to meet conditions in the SÚJB resolution and failure to observe the approved monitoring program).

3.4.2.2. Uranium Industry

There were 61 inspections performed in 2000 in agreement with the approved plan and one extraordinary inspection. The inspection focused on compliance with radiation protection conditions (operation and monitoring programs, observation of exposure limits and safe operation at workplaces). Special attention was paid to compliance with the requirements in SÚJB resolutions dealing with release of radionuclides to the environment. Three inspections in mining facilities were performed in cooperation with the national mining administration (OKD-Ostrava and ČMD-Kladno). It has been concluded that the standard of radiation protection in the inspected entities has been continually increasing.

23 inspections were evaluated in category I, 46 in category II and 3 inspections in category III (shortcomings in documentation of results from monitoring programs and in exceeding of reference levels, in one case due to non-observation of the controlled zone regime and non-cooperation during inspection – resolved through an administrative procedure).

3.4.2.3. Nuclear Medicine Workplaces and Workplaces with Unsealed Sources Category II and III

In 2000 46 inspections were performed at workplaces using unsealed radionuclide sources, from which 37 at nuclear medicine workplaces, 2 with distributors of unsealed radionuclide sources and 7 at other workplaces using unsealed radionuclide sources.

Most attention was paid to fulfillment of the requirements from previous inspections, checking of operating records, transport of unsealed radionuclide sources and completeness of the required documents. The identified shortcomings were reported in the inspection protocol, including deadlines for their redressing.

24 inspected workplaces were evaluated in category I, 18 workplaces in category II and 4 workplaces in category III (lack of systematic supervision by a worker with special professional competence, contamination of the working environment, deficiencies in the monitoring program).

3.4.2.4. Nuclear Power Plants, Research Reactors

At NPP Dukovany 17 inspections were performed in 2000, focusing on observation of radiation protection-related requirements and conditions. „The Operative Contacts Daybook“ contained 25 requirements concerning, particularly, registration of simple and significant sources of ionizing radiation, events resolved by the defect commission, comparison of results

from electronic and film dosimetry and the method used for data transmission between the plant and SÚJB. Perpetual attention throughout the year was paid to the contractors and their activities at NPP Dukovany.

At NPP Temelín 12 inspections were performed in 2000, focusing on preparedness for operation and dealing particularly with the provision of monitoring programs (personnel, workplaces, effluents and surroundings of the nuclear power plant) and observation of the controlled zone regime. Major attention was paid to the overall radiation monitoring system, its functioning and evaluation of measured data from the commissioning process. Two inspections dealt with radiation protection provision with the contractors and coordination of their activities in the controlled zone of NPP Temelín.

Inspection activities in ÚJV Řež, a.s. focused on completion of harmonization with the new legislation, on radioactive waste management and on release of radionuclides to the environment.

3.4.2.5. Radiotherapeutic Facilities

A specialized inspection team performed 17 inspections in 2000, covering 62 sources used for therapy. The inspections concentrated on compliance with the requirements from previous inspections, performing of prescribed tests, completeness of documents and compliance of the performed activities with the issued license. At one workplace the inspection dealt with its decommissioning.

14 inspected entities were evaluated in categories I and II, two entities in category III and 1 entity in category N (a therapeutic generator was operated without a license, without documentation and without a person possessing special professional competence).

3.5. Regulation of Occupational Exposure

The exposure of workers with ionizing radiation sources was monitored in 2000 by five concurrently operating dosimetry services – the national service in personal dosimetry (a limited liability company based in Prague), dosimetry services at NPP Dukovany and NPP Temelín, dosimetry service at ÚJV Řež, a.s. and dosimetry service ÚEŘMS which monitors workers in the uranium industry (Diamo, s.p.). Since 1999 the Institute of Dosimetry with the CR Academy of Sciences has had a valid license to calculate doses received by aviation personnel. Around 20 thousand people working with ionizing radiation sources are monitored in total. The doses are registered in the Central Register of Occupational Exposure kept by SÚJB. The following conclusions have been drawn from the preliminary evaluation of doses:

- at NPP Dukovany 2161 workers were monitored in 2000 (from which 867 were employees of the plant and 1294 employees of the contractors), the total collective effective dose was 1295,9 mSv (including all doses over 0,05 mSv) and the average personal effective dose was 0,78 mSv; the highest annual individual effective dose was found for a contractor employee (17,95 mSv),
- in the uranium industry (operating mine Dolní Rožínka) 479 people were monitored at workplaces both underground and above the ground, the total effective collective dose was 4,118 Sv and the average individual effective dose was 8,6mSv; the highest individual effective in 2000 was 34,31 mSv (underground);
- in connection with other industrial applications approximately 4500 workers were monitored while the average individual effective dose was 1 -2 mSv; the professions exposed to higher doses in general were defectoscopy (2,02 mSv) and logging activities (1,8mSv);

- for medical facilities using ionizing radiation sources doses received by nearly 11 thousand workers were evaluated, while in 35% the annual individual effective dose was below the recording level, the average annual individual effective dose in the remaining 65% was 1,6 mSv; the average annual individual effective dose in doctors – cardiologists was around 2,5 mSv, in nuclear medical doctors 1,5mSv;
- ca. 800 workers in specialized professions, e.g. in servicing and inspecting of sources, received the average annual effective dose around 1 mSv.

The collective effective dose in 2000 was estimated at 17 Sv and the average individual effective dose per one monitored worker was estimated at 1,0 mSv.

In 2000 there was no case of exceeding the valid annual personal limit dose of 50 mSv. SÚJB inspectors investigated 18 cases where dosimetry services reported a **one-off** (in the given inspection period) exposure of personal dosimeters with doses exceeding 20 mSv. The cases included 6 workers in medical facilities, 8 workers in the industry – particularly in defectoscopy, one case of a police investigator and three laboratory technicians in university laboratories. Nine investigated cases were evaluated as non-personal doses. In both the cases investigated in medical facilities the workers reported to have used a protective apron and therefore the doses were recalculated to reflect the attenuation; after the recalculation all the individual effective doses were below 20 mSv. There were four serious cases of internal contamination in workers dealing with the manufacture of sources. Investigation of causes of the contamination has been continuing with involvement of a special SÚJB team.

The evaluation of doses in 1999 (the Central Register processes the annual data only in the second quarter of the following year, based on the data received from the dosimetry services) has shown that 46 workers exceeded the **summary annual** individual effective doses of 20 mSv. These doses do not include the one-off doses evaluated during the year as non-personal or those, if applicable, corrected for the protective apron. From this number in 6 cases the dose was over 30 mSv, in 3 cases over 40mSv and in 3 cases over 50mSv. In respect to the exceeded annual limit of 50 mSv, in one case it was found out that personal dosimeters were systematically incorrectly stored close to an irradiation probe, so the dose was evaluated as non-personal and in two cases the afflicted persons were doctors using protective aprons so the doses were recalculated.

The conclusions drawn from the investigations have confirmed that in medical facilities the afflicted workers are doctors who have performed demanding interventions and their increased exposure was due to the time of such activities – it cannot be concluded that the conditions of a license for radiation source management were violated. In 2000 SÚJB paid more attention to the assurance of radiation protection for these workers and special detailed monitoring was started for selected doctors. The results will be processed in 2001 and based on them measures will be proposed to reduce doses received by these workers. In case of increased doses received by workers in defectoscopy in most one-off exposure cases the workplaces reported that the dosimeter had been left close a source and the dose was non-personal. However, for annual doses it has been found out that the exceeded limit of 20 mSv was often connected with conditions of the performed activity and that measures should be introduced to reduce the doses in 2001.

3.6. Regulation of Public Exposure

The main efforts to reduce public exposure concentrated on the exposure to radon in buildings which accounts for the prevailing portion of the total effective dose received by population in the Czech Republic. This component of personal exposure is very varied, while higher exposure levels may be controlled at reasonable costs as proved by the experience

from previous years. Another important component of public exposure is medical exposure and SÚJB also focused on its reduction. This type of exposure occurs in patients receiving medical treatment involving utilization of ionizing radiation sources.

3.6.1. Medical Exposure

The methodology of monitoring and evaluation of public exposure to sources used in medical facilities was devised in previous years, particularly in cooperation with SÚRO for radiodiagnostics and with the teaching hospital in Olomouc for nuclear medicine. In 2000 SÚJB received a data file from the country's major healthcare insurer „Všeobecná zdravotní pojišťovna" about the performed examinations involving ionizing radiation sources in 1998 and 1999. In 2001 the data will be statistically processed, using the already developed methodologies for the calculation of effective doses for individual types of examinations.

3.6.2. Exposure to Natural Sources

In cooperation with SÚRO and district authorities SÚJB continued the goal-oriented efforts to locate citizens living in locations with excessively high radon-related risks. The statistics of locating efforts has been processed for the past calendar year. Results of measurements are continually reported to owners of houses and buildings and in case of increased risks the owners are informed about the possibility to apply for a contribution from the state budget for anti-radon measures.

A database of results from the locating efforts has been routinely used and, apart from regular outputs, it also enables to produce detailed maps for municipalities to predict radon risks in their residential facilities.

In this area SÚJB (directly or through SÚRO) performed also the following other obligations required particularly by the CR governmental resolution No. 538 of 31 May 2000 on the Czech Radon Program:

- an index of radon-related risks was established for each district as a criterion for the state subsidy for anti-radon remedial measures in housing facilities in 2000,
- a central register was maintained of financial requirements from district authorities for anti-radon remedial measures in school buildings, public water distribution systems and apartments,
- a proposal for allocation of subsidies to individual districts has been elaborated, giving preference to school buildings and water supply systems,
- a meeting was held with contact workers from all district authorities on current tasks under the Radon Program,
- heads of district offices were informed about the current tasks under the CR Radon Program,
- a preliminary report was elaborated on the fulfillment of tasks from the CR Radon Program established by the governmental resolution No. 538/1999 and administered by SÚJB,
- long-term and day-to-day tasks were assigned for the purposes of Radon Program implementation and their fulfillment was reviewed,
- official positions for district offices were elaborated on anti-radon remedial measures in 13 school buildings and 18 public water distribution systems.

In 2000 special-purpose funds were added to the SÚJB budget from the cooperating

ministries (resolution by the CR government No. 538 of 31 May 1999) for the so called "Radon Program". However, some employees of the cooperating ministries have not been able to fully participate in the efforts organized by SÚJB. Consequently, a part of the dedicated funds had to be returned as unused to the state budget.

3.7. Medical Aspects of Radiation Protection

In 2000 SÚJB examined 97 suspected cases of occupational disease, from which:

- For workers from uranium mines there were 83 cases of lung cancer and 3 cases of other diseases (2x skin basaloma, 1x ca hrtanu). In 33 cases of cancer and one skin basaloma the probability of a causal link between the disease and work in underground uranium mines was evaluated as prevailing, in five cases of lung cancer as borderline. In the other cases no interrelation was proved between the disease and work in the risky environment with ionizing radiation.
- For workers in other professions there were 11 cases of considered diseases – four cases of lung cancer, four cases of breast cancer, one case of chronic radiation dermatitis, one case of esophagus cancer and one case of cataract. In two cases of lung cancer the probability of causal link between the disease and work in risky environments was found as borderline (work in ore mines, radiology technician). In cases of the chronic radiation dermatitis and cataract the link with work in risky environment was admitted, due to the typical clinical findings and due to the possible high exposures before introduction of monitoring with regular personal dosimetry. In all the other cases the causal link was denied.

Estimation of a dose received by a fetus due to radiodiagnostic examination of the mother was made in 26 cases. In eight cases the estimated dose exceeded 20,0 mSv (53,81 mSv; 50,0 mSv; 43,5 mSv; 36,4 mSv; 36,0 mSv; 30,4 mSv; 29,5 mSv; 26,0 mSv), in eight cases it was 5,0 - 10,0 mSv and in ten cases it was below 5,0 mSv. The results were in the fastest possible way transmitted to the applicant, mostly genetic consultants or radiodiagnostic workplaces and attending gynecologists. A uniform procedure has been introduced in all regions to estimate the dose received by a fetus, including specification of technical inputs, which contributed to more accurate estimating of the doses.

As part of the efforts to harmonize the Czech medical exposure legislation with that of EU and to prepare the implementation plan for Directive No. 97/43/EURATOM SÚJB representatives repeatedly talked to representatives of the Czech Ministry of Health, committees of ČLS JEP – Radiological Society-Nuclear Medicine Society, Society for Radiation Oncology, Biology and Physics, Society of Radiology Technicians and Assistants, the major national health insurer „Všeobecná zdravotní pojišťovna“ and other healthcare institutions. Moreover, the Czech Society for Healthcare Technology and SÚJB organized a workshop on issues of harmonization with the EU legislation: Atomic Act and its Implementation in Practice, attended by tens of the involved healthcare workers. SÚJB workers are also members of specialized commissions of the Czech Ministry of Health (Commission for evaluation of placement of selected healthcare instruments, Commission for mammography screening) where they enforce radiation protection requirements to regulate medical exposure; the cooperation with the CR Ministry of Heath also includes registration of radiopharmaceuticals and research with the involvement of ionizing radiation sources.

SÚJB continued its involvement in a system providing help and special medical assistance to individuals exposed in radiation accidents. In this connection SÚJB evaluated a medical part of the system and a part dealing with iodine prophylaxis in the external emergency plan for NPP Temelín and other workplaces with very significant sources of

ionizing radiation. The issue of iodine prophylaxis was consulted with the CR Ministry of Health, SÚKL, responsible employees of the plant, National Healthcare Institute and Endocrinology Society ČLS JEP; a contact was established in this matter with IAEA in Vienna and with WHO in Geneva. A workshop was organized in cooperation with the district medical counselor for the District Office in České Budějovice, for healthcare workers involved in the provision of external emergency plan for NPP Temelín. SÚJB employees regularly attend workshops organized by the Occupational Disease Clinic with the 1st medical faculty of the Charles University, particularly those dealing with assistance to people suffering from internal contamination with radioactive substances. A training course for the instructors organized by IAEA and Center of Disaster Medicine in Kiev was attended by the department manager and found very useful.

Significant attention was paid to the evaluation of chromosome aberrations in exposed workers. The issue was discussed with representatives of hygienic stations, CR chief hygienic officer, representatives of Genetic Society and Radiological Society ČLS JEP. To continue the correct practices in the evaluation of chromosome aberrations (in the past provided for by the State Institute of Radiation Protection) SÚJB started a research project „Updating of cytogenetic examination methods to evaluate exposure to high doses of ionizing radiation“, resolved by the genetic department of the teaching hospital “Fakultní Thomayerova nemocnice” in Prague.

The attention of workers from the department of exposure regulation focused also on the provision of information to general public, on biological effects of ionizing radiation, medical exposure and exposure to natural sources.

3.8. Central Registers and Databases in Radiation Protection

In 1997-2000 the radiation protection section of SÚJB developed tools for administration of national registers by SÚJB as required by Act No. 18/1997 Coll. (the Atomic Act). They are central registers of occupational exposures, ionizing radiation sources, licensees, notifying persons and population exposures to ionizing radiation sources used in medical facilities and to natural sources.

3.8.1. Central Register of Occupational Exposures

The register is now routinely used in its 2.1. version at SÚJB workplaces in Prague. The register is fully functional, contains tools to process data from the individual providers so that the database can be updated. The register enables to search data about the individual registered workers, collective data about individual workplaces or professional groups and collective information in form of statistical outputs with selected parameters. The register is available on the SÚJB intranet.

3.8.2. Register of Sources

The application has been in routine operation since 2000 throughout SÚJB, including its regional centers. It enables to search and display historical data on the registered sources and contains tools for management of the agenda relating to individual sealed radionuclide sources, facilities containing such sources, facilities with unsealed radionuclide sources and generators of ionizing radiation.

3.8.3. Register of Licensees and Notifying Persons

Implementation of the register of licensees and notifying persons started in 2000 as a tool to integrate registers run by SÚJB. The register is linked with the central register of occupational exposures and to the register of sources, as well as to the register of nuclear materials and register of resolutions.

3.8.4. Central Database of Medical Exposures

The database has been developed using data from the major national insurer "Všeobecná zdravotní pojišťovna" (VZP) requested by SÚJB and it is maintained separately, without any links to the registers described above. The processed data from VZP enable to identify frequencies of examinations in different types of x-ray diagnostics and nuclear medicine, structured by age groups and sex of the patients. For nuclear medicine the quantity of applied radiopharmaceuticals is available for each examination. The data are anonymous in respect to individuals and workplaces.

3.9. Radioactive Waste Management

3.9.1. NPP Dukovany

A method was tested for sludge removal from containers used to store concentrated liquid radioactive wastes. The test was successfully completed.

The quantity of radioactive wastes is now far below Limits and Conditions defined for radioactive waste storage.

3.9.2. NPP Temelín

An application filed by ČEZ, a.s. – NPP Temelín was considered and on-site investigation was performed in an administrative procedure by SÚJB to issue a license for radioactive waste management under Section (§) 9 paragraph 1 letter j) of Act No. 18/1997 Coll. and a license for release of radionuclides to the environment under Section (§) 9 paragraph 1 letter h) of Act No. 18/1997 Coll.

3.9.3. Nuclear Installation – Repository in Dukovany

Safety analyses of the repository were performed repeatedly as requested by SÚJB and the results will be submitted to SÚJB within the first six months of 2001. The repository is operated in compliance with the approved Limits and Conditions.

3.9.4. Nuclear Installation – Radioactive Waste Repository Richard

The Administration of Radioactive Waste Repositories (SÚRAO) requested a change in the monitoring program based on the results of its own measurements and based on investigations performed by SÚJB. The reason for the change is that one monitoring borehole will be excluded from the program to be used for a test to track flow of underground water and now contains a radioindicator; also a change has been proposed in reference levels for radon measurements in the repository premises. SÚRAO failed to report in time that action levels in the monitoring program were exceeded and failed to follow the program as approved by SÚJB. As a result, an administrative procedure to fine SÚRAO has been started.

3.9.5. Other Facilities

In its resolution of 31 March 2000, from the administrative procedure started on 21 September 1999 and several times suspended, SÚJB issued a license to ALLDECO.CZ a.s., based in Hodonín, for radioactive waste management, including gathering, sorting, processing and storing of solid and liquid radioactive wastes, to be performed by the applicant as a contractor in controlled zones of nuclear power plants in the Czech Republic, using technology and equipment of its customers, based on the contracts and under the terms specified in the mentioned resolution.

3.10. Release of Radionuclides to the Environment

3.10.1. Decommissioning of Nuclear Installations

Based on a submitted application and Revision 1 of the requested documents SÚJB issued a resolution on 11 August 2000, approving the proposed decommissioning method for the spent fuel storage at NPP Dukovany.

In response to the application by ÚJV Řež, a. s. for a license to perform partial refurbishment of workplaces in buildings 250 and 363, SÚJB on 12 December 2000 approved Revision 1 of the proposed decommissioning of workplaces using ionizing radiation sources in these buildings.

3.10.2. Decommissioning of Workplaces in the Uranium Industry

In connection with the license for operation of the branch company Těžba a úpravna uranu, DIAMO, s. p. in Stráž pod Ralskem SÚJB considered and by its resolution of 14 January 2000 approved a revised document proposing a decommissioning method for workplaces with very significant radiation sources, however for any change in decisive facts on which the proposal had been developed, particularly any change in the scheduled deadline for completion of the activities, the document shall be submitted to SÚJB. SÚJB also approved the proposed decommissioning method for the chemical treatment facility under the terms required by law.

Based on an application from DIAMO, s. p., o. z. Těžba a úpravna uranu, and based on the submitted revised documents SÚJB issued a resolution on 15 February 2000, approving the proposed decommissioning method for the dewatering facility.

Based on an application from DIAMO, s. p., o. z. Těžba a úpravna uranu, and based on the submitted revised documents SÚJB issued a resolution on 17 February 2000, approving the proposed decommissioning method for the mine Důl Hamr I.

In the administrative procedure based on an application from ŠKODA – ÚJP, a. s., Praha-Zbraslav for a license for operation, SÚJB on 2 June 2000 approved the proposed decommissioning method for a workplace with a very significant source of ionizing radiation.

In the administrative procedure based on an application from DIAMO, s. p. Stráž pod Ralskem for a license for operation, SÚJB on 5 June 2000 approved the proposed decommissioning method for a workplace with a very significant source of ionizing radiation water decontamination station – shaft No. 11 Bytíz.

On 4 August 2000 SÚJB issued a resolution on decommissioning of the stage-II settling pit at Důl chemické těžby, a workplace with a very significant source of ionizing radiation in Stráž pod Ralskem; the facility will be gradually decommissioned and the construction will be dismounted and removed in three subsequent stages consisting of liquidation of water left in the stage-II settling pit in two variants: underground flooding of the mine Důl Hamr I or treatment, dilution with other process water and discharging to the Ploučnice river, then extraction and relocation of sediments and other materials from the stage-II settling pit into the stage-I settling pit and subsequent reclamation of the stage-II settling pit site. The license was issued based on an application from DIAMO, s. p. o. z. Těžba a úprava uranu in Stráž pod Ralskem, based on a review of all documents required by law and based on an on-site inspection performed by SÚJB on 27 July 2000 (Protocol Ref. No. 10490/4.3/00), while the applicant was found ready for the decommissioning process in terms of radiation protection assurance; the works are scheduled to start on 1 January 2001 and should be completed by 2015.

The State Office for Nuclear Safety issued a resolution on 21 November 2000, rejecting the application from DIAMO, s. p., o. z. Správa uranových ložisek in Příbram and did not permit decommissioning of settling pits of former CHÚUP MAPE in Mydlovary – workplaces with significant and very significant sources of ionizing radiation. The administrative procedure started on 30 September 1998 was suspended two times and proved persisting deficiencies in the documents required by law, specifically a document was missing containing a position of a competent state body on environmental impact of the decommissioning.

3.10.3. Decommissioning of Other Facilities

On 1 June 2000 SÚJB issued a resolution approving a new decommissioning method proposed by ARTIM s.r.o., based in Prague, for its workplace with a very significant source of ionizing radiation – industrial irradiator Perun containing sealed ^{60}Co sources.

4. EMERGENCY PREPAREDNESS

4.1. Emergency Preparedness and Emergency Response Center

In the first quarter of 2000 the SÚJB emergency preparedness department and the Emergency Response Center participated in the assessment of the Preoperational Safety Report of NPP Temelín, providing for the coordination and evaluation of its entire Part 2 – „Locality Characterization" including the resulting report, and for evaluation of chapter 13.3 – „Planning of Activities in Emergency Situations," including the resulting report. In the course of 2000 SÚJB reviewed 10 internal emergency plans for nuclear installations of DIAMO s.p. (from which three were for workplaces currently decommissioned, three for newly issued licenses pursuant Section (§) 9 of Act No. 18/1997 Coll. and the remaining ones were revisions of earlier approved internal emergency plans); SÚJB issued resolutions approving changes in the internal emergency plan of NPP Dukovany, a revision of the internal emergency plan for Škoda facilities – Institute of Nuclear Fuels, Praha a.s. and reviewed a revision of the internal emergency plan for ÚJV Řež, a.s.

In 2000 SÚJB continued its cooperation with the Ministry of the Interior – General Headquarters of the CR Fire Protection and Rescue Corps in the following areas:

a) assessment of the proposed external emergency plan for NPP Temelín whose development was coordinated by the District Office in České Budějovice; among other activities SÚJB was pro-actively involved in negotiations on the provision and implementation of measures anticipated by the external emergency plan and on the plan's updating in agreement with the Interior Ministry Decree No. 25/2000 Coll., organized by the Interior Ministry and District Office in České Budějovice. The negotiations were attended by representatives of those district and municipal offices whose territories are penetrated by the NPP Temelín emergency planning zone.

b) discussing issues relating to the external emergency plan updating to meet requirements in the Interior Ministry Decree No. 25/2000 Coll. with district offices whose territories are penetrated by the NPP Temelín emergency planning zone.

In agreement with a plan of activities for 2000 for its sub-committee for population protection within the Committee for Civil Emergency Planning SÚJB outlined a concept and proposed content of the National Emergency Plan for Radiation Accidents. The document

was submitted to the 6th meeting of the sub-committee on 25 May 2000, it was discussed, approved and handed over to the Committee for Civil Emergency Planning.

SÚJB organized a workshop „Monitoring in Cases of Nuclear and Radiological Accidents and for the Purposes of Treaty Banning Chemical Weapons ", held on 23–27 October 2000 in the premises of the Military Academy in Vyškov and the Military Technical Institute of Protection in Brno. The workshop was held within the IAEA/RER/9/050 Project „Harmonization of Emergency Preparedness". From the total number of 68 participants 46 were from the Czech Republic and 22 from the Slovak Republic. Individual modules were presented by 7 lecturers from the Czech Republic and 5 from the Slovak Republic. A number of professional discussions took place at the workshop, including exchange of experience. The workshops included a final test that confirmed very good understanding of the lectured topics by the participants. The content, structuring and organization of the workshop were favorably assessed by all the participants. The participants who passed the final test received certificates.

SÚJB also continued its efforts in international cooperation – extensive discussions were held with EU specialists, resulting in a delivery of one part of the RODOS program equipment. The Emergency Response Center took over a material defining the scope of assistance to be provided by EU. The Center also held negotiations with the Emergency Response Center of the Slovak counterpart of SÚJB.

Activities by the Emergency Response Center in 2000 concentrated also on the provision of its routine operation. Preparations were under way for data transmission from NPP Temelín, i.e. a master agreement was concluded with NPP Temelín, a displaying "KBF-ETE" program was installed in the Center in its testing off-line version, a project was started to develop a database for NPP Temelín data and data transmission was prepared between the ČEZ headquarters and SÚJB. Continual efforts were made to test data transmission from NPP Dukovany.

4.2. Participation in Emergency Preparedness Drills

SÚJB participated in preparation of emergency drills for NPP Temelín (to verify the internal and external emergency plans), held on 20 April 2000 and 30 November 2000. During the drills SÚJB also verified activities of the staff and functions of the Emergency Response Center workplace, including the Liaison Point service.

A drill on emergency cooperation was held on 26 May 2000 at NPP Dukovany , called DEKO 2000, prepared by the plant, regional civil defense office in Brno, District Offices in Třebíč, Znojmo, Brno-venkov, Dukovany municipality and civil defense units from Lower Austria. The drill verified activities to be carried out by the municipal authority and residents of Dukovany in case of an extraordinary event level 3 – radiation accident, including school evacuation.

All drills with the SÚJB involvement tested proper transmission of messages and information in agreement with the respective internal emergency plan. The drills confirmed good level of preparedness of the individual internal emergency organization units at the plants to deal with extraordinary events.

5. NATIONAL RADIATION MONITORING NETWORK IN THE CZECH REPUBLIC

Activities performed by the national radiation monitoring network are coordinated by SÚJB which, in cooperation with SÚRO, also functions as its headquarters. The results of

monitoring were as usual submitted in form of the annual Report on Radiation Situation on the Czech Republic's Territory and submitted to the central governmental bodies and to the general public through district offices, hygienic service centers and libraries.

The national radiation monitoring network operates in two modes: the regular mode focuses on monitoring of a current radiation situation and timely identification of radiation accidents while the emergency mode focuses on evaluation of consequences of such an accident. The regular mode is continually executed by the so-called permanent elements of the network while the emergency mode uses also the standby elements of the system. Under normal circumstances the monitoring is performed by several subsystems with the involvement of selected or all permanent elements of the monitoring network. The sub-systems may be structured into the following six groups:

- **early warning network** consisting of 58 measuring points with an automated transmission of the measured levels. The network is operated by the SÚJB regional centers, SÚRO, Czech Hydrometeorology Institute (ČHMÚ) and CR civil defense,
- **network of 11 permanent measuring points of the CR Army** performing in a normal radiation situation two single measurements per day of photon dose equivalent and the results are regularly transmitted to the central database of the monitoring network. In emergency situations the network performs measurements more frequently, as requested by SÚJB. The network of permanent points is complemented with standby measuring points used in emergency situations based on SÚJB instructions,
- **territorial network of 184 measuring points (TLD network)** with mounted thermo-luminescent dosimeters operated by SÚRO and SÚJB regional centers,
- **local TLD networks with 86 measuring points in the surroundings of NPP Dukovany and NPP Temelín**, operated by the plants´ laboratories monitoring radiation in the atmosphere and by the SÚJB regional center in Brno,
- **territorial networks of 11 measuring points of atmosphere contamination** operated by SÚJB regional centers, laboratories monitoring radiation in the atmosphere of nuclear power plants (one such network contains 6 stations situated around NPP Dukovany, another includes 8 stations around NPP Temelín), SÚRO and ÚEŘMS,
- **network of 9 laboratories** (laboratories of the SÚJB regional centers, radiation monitoring laboratories in surroundings of the nuclear power plants and SÚRO laboratories) with the equipment for gamma-spectrometry or radiochemical analyses of radionuclide levels in environmental samples (aerosols, fallout, foodstuffs, drinking water, feed etc.).

There was no extraordinary release of radionuclides to the environment in 2000 and no exceeding of the established levels was indicated at the measuring points. The variations in the measured levels of dose rates were caused by fluctuations in the natural background.

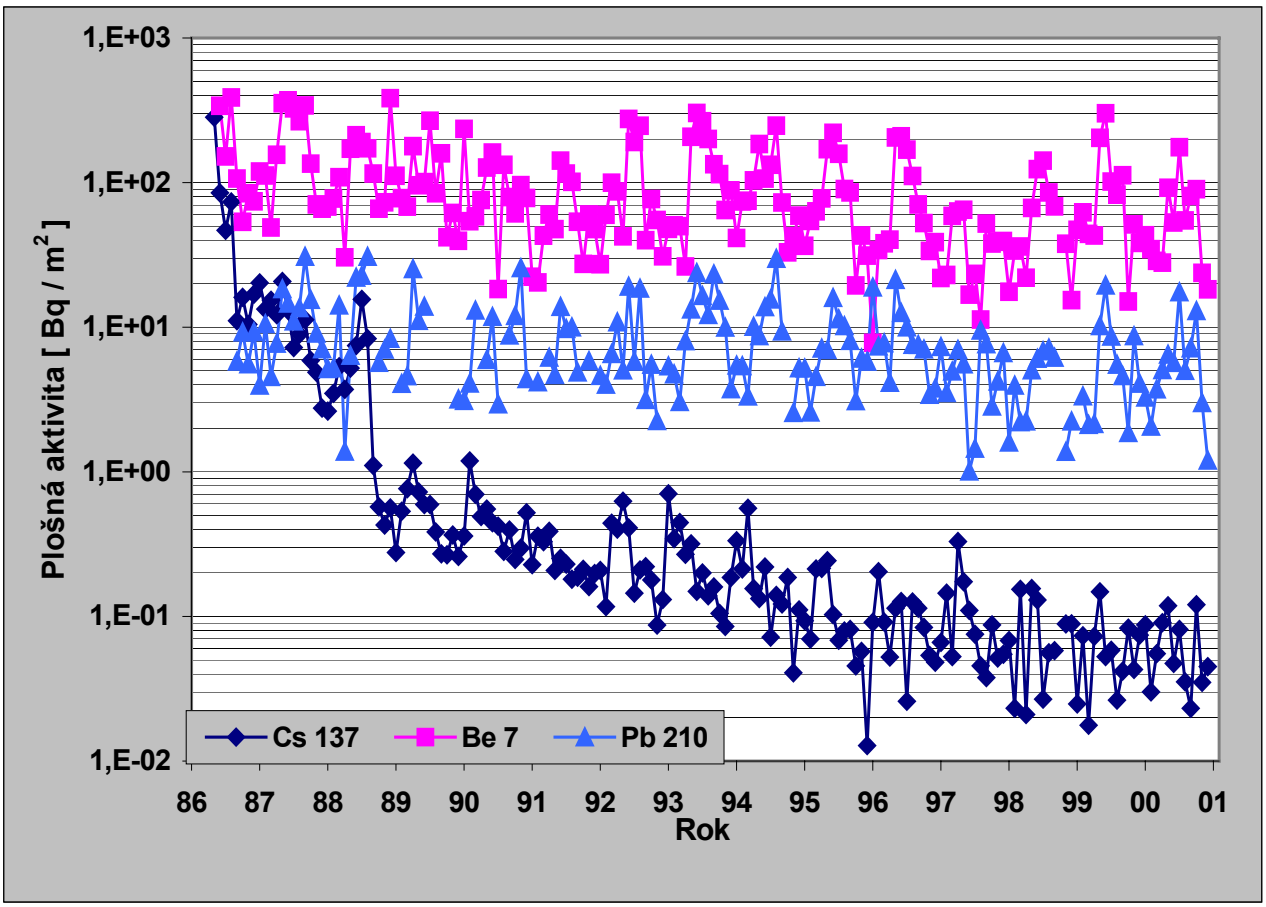
5.1. Monitoring of Artificial Radionuclides in the Environment

The purpose of the monitoring program is to identify distribution of radionuclides activities and doses of ionizing radiation on the national territory in terms of place and time, to obtain, in particular, the long-term trends and to early identify potential deviations from such trends. Attention is paid to artificial radionuclides occurring in measurable quantities and the national radiation monitoring network measures ^{137}Cs, ^{90}Sr, $^{239+240}Pu$, ^{85}Kr - in the atmosphere, ^{137}Cs, ^{90}Sr, ^{3}H - in foodstuffs and ^{137}Cs in human bodies.

5.1.1. Air Contamination

In 2000, similarly as in previous years, no serious deviations were identified in levels of artificial radionuclides in the atmosphere. The volume activities of ^{137}Cs due to the transport for higher atmosphere levels and re-suspending of the original fallout from the soil surface were mostly in the order of Bq/m^3 units.

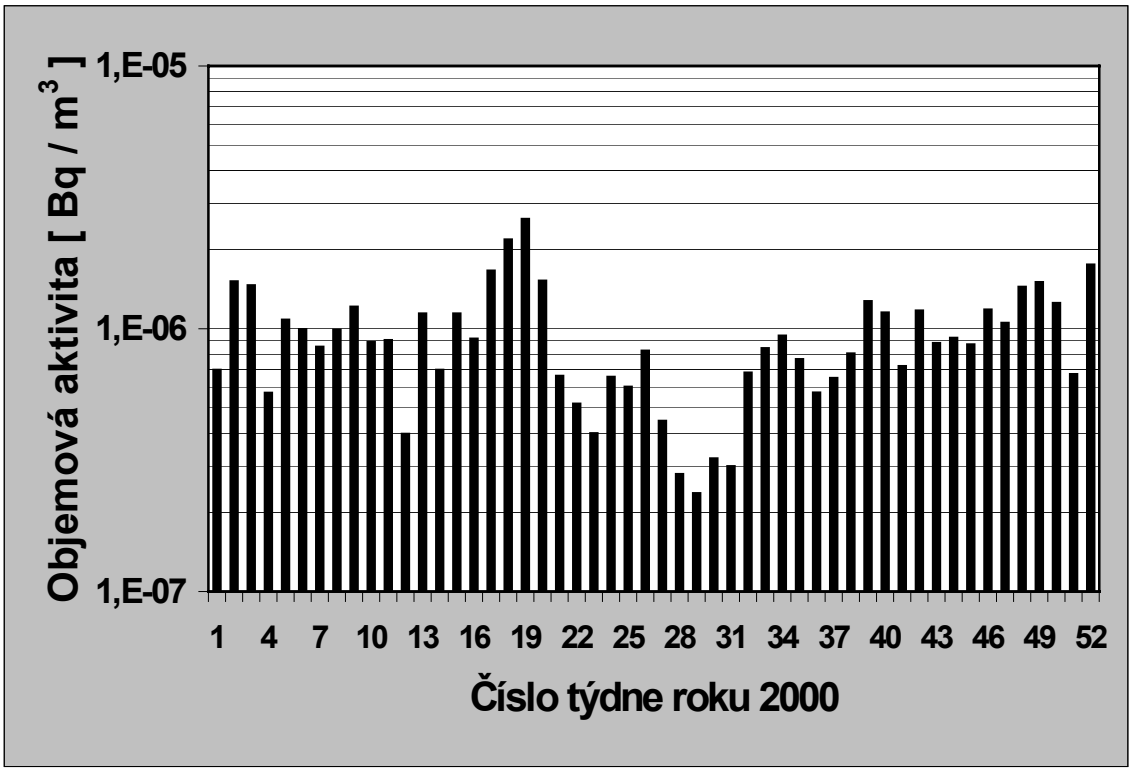
A part of ^{137}Cs in the atmosphere comes from the global fallout due to earlier tests of nuclear weapons in the atmosphere. Apart from ^{137}Cs the aerosols also contain ^{7}Be of cosmogenous origin and ^{210}Pb, a decay product of ^{222}Rn. These radionuclides in the aerosols and fallout are determined with semiconductor gamma spectrometry. The average monthly volume activities of ^{137}Cs, ^{7}Be and ^{210}Pb in atmospheric aerosols and average monthly surface activities of the same radionuclides in the fallout are shown as an example of results from measuring points of atmosphere contamination performed by SÚRO in Prague since 1986 (Figures 1 and 2). The diagrams show a long-term, currently very slow decrease in the



volume activity of ^{137}Cs and seasonal variations in ^{7}Be and ^{210}Pb levels throughout the year.

Figure 1. Volume activity of selected radionuclides in airborne aerosols, monthly average levels - MMKO SÚRO Praha

Figure 2. Fallout on water surface, monthly samples - MMKO SÚRO Praha



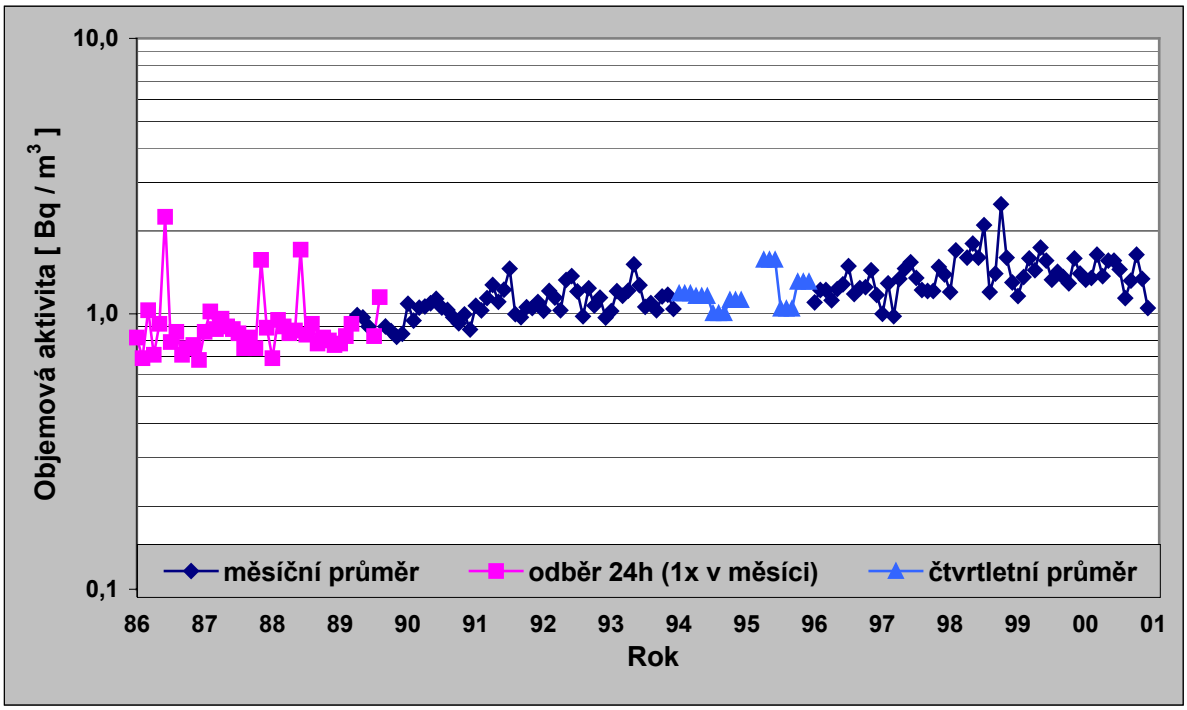
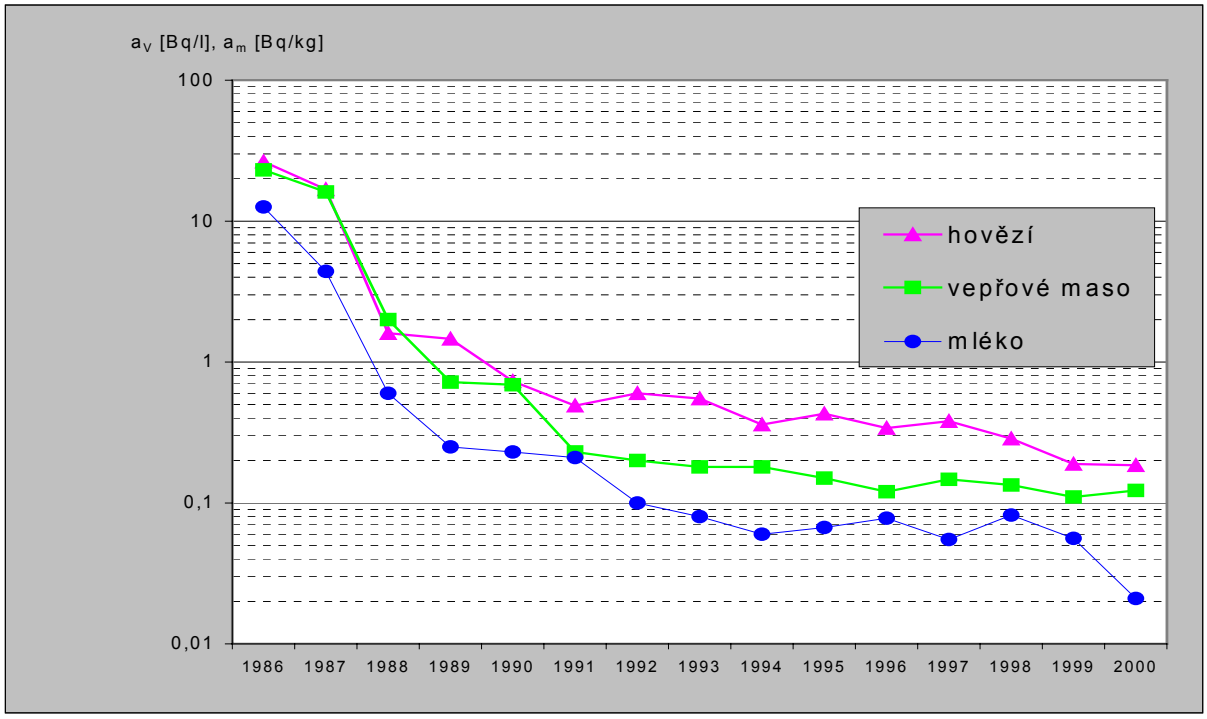


Figure 3. ^{137}Cs in airborne aerosols in 2000 - MMKO SÚRO Praha

Figure 3 shows weekly average volume activities of ^{137}Cs as measured in 2000 in measuring points of atmosphere contamination by SÚRO in Prague.

^{85}Kr was included into the monitoring system of radionuclides in the atmosphere back in 1996, as part of the efforts to gradually monitor all artificial radionuclides detectable in the environment. Krypton-85 is a fission product and occurs in small quantities also in nuclear power plants effluents. Still, the main source of ^{85}Kr are now facilities for nuclear fuel reprocessing and in the past also nuclear weapons tests. Measuring of ^{85}Kr volume activities continued the monitoring performed by the Radiation Dosimetry Institute of the Czech Academy of Sciences. The measurements were performed at the same location - in the complex of radiation dosimetry department of Nuclear Physics Institute of the Czech Academy of Sciences (ÚJF ČAV) in Prague 8. Volume activity levels of ^{85}Kr since 1986 are shown in Figure 4.

FIGURE 4. VOLUME ACTIVITY OF ^{85}KR IN THE ATMOSPHERE, SAMPLES FROM THE COMPLEX OF RADIATION DOSIMETRY DEPARTMENT, ÚJF ČAV PRAGUE 8 - BULOVKA



5.1.2. Contamination of Foodstuffs

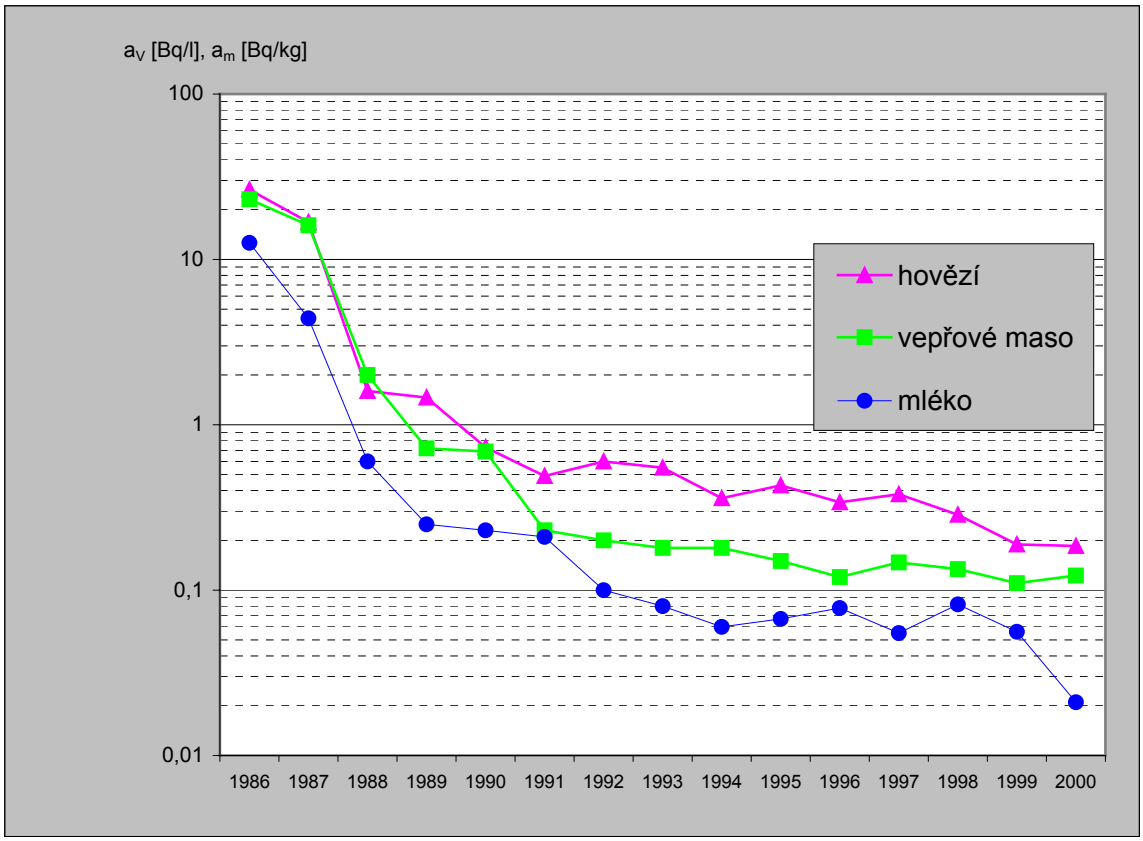
Contamination of foodstuffs with radionuclides has been monitored on long-term basis in agreement with a monitoring plan. The plan has been outlined for individual commodities, particularly in respect to their consumption levels. Since no event was detected in 2000 to increase the level of radionuclides in the environment there was also no increase in the foodstuffs contamination levels.

Mass and volume activities of ^{137}Cs in some staple foods – in milk, beef and pork - were in the order of tenths of Bq/kg, or Bq/l. Volume activities of ^{137}Cs and ^{90}Sr in drinking water were very low (tenths or units of mBq/l) or below the detection limits. The tritium levels in drinking water were in units of Bq/l and over the years have been steadily decreasing.

Similarly as in other years, the public attention focused on the increased levels of ^{137}Cs in mushrooms, forest fruits and game meat. Although these commodities account only for a minor fraction of the food basket their contamination has been closely monitored since 1986. Results of the measurements have been regularly published in the annual reports on radiation situation on the Czech Republic's territory. Levels of ^{137}Cs in the mentioned commodities do not represent a significant dose load to the CR population (although in some localities in Northern Moravia and Šumava the levels amount to units or tens of kBq/kg).

Figure 5 presents levels of ^{137}Cs volume activities in milk, beef and pork, as monitored by the national radiation-monitoring network since 1986.

FIGURE 5. AVERAGE ANNUAL MASS/VOLUME ACTIVITIES OF ^{137}CS IN PORK, BEEF AND MILK



5.1.3. Internal Contamination of Individuals

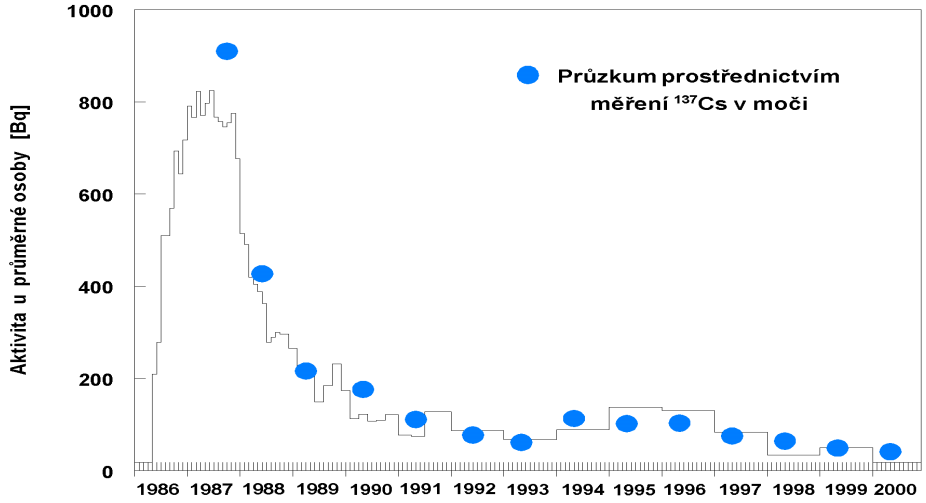
The whole-body counter in the State Institute of Radiation Protection in Prague was used to continue the monitoring of internal contamination with ^{137}Cs in a group of 30 persons (15 males, 15 females), most of them Prague residents, aged 19 - 77. Considering the very low levels of ^{137}Cs in population the whole-body count is now performed only once per year and long measuring times are applied to reach the lowest detectable limit. The average activity level of ^{137}Cs found by these measurements in one person was 18 Bq.

Similarly as in previous years a national survey of internal contamination with ^{137}Cs was carried out using ^{137}Cs activity measurements in 24-hours urine samples. The samples were collected in May and June 2000 from 39 females and 35 males whose diets roughly represented the national average. The average activity level of ^{137}Cs found in 24-hours urine

samples was 0,25 Bq. The corresponding calculated average of ^{137}Cs activity retained in the body was 41 Bq.

Figure 6. Activity levels of ^{137}Cs in the Czech population since the Chernobyl accident

(activity in an average person, ^{137}Cs measured in urine samples)



5.1.4. Monitoring of External Exposure

Results of monitoring from the territorial TLD network in 2000 are shown in Table 1. Measurements performed for several years with the territorial TLD network have confirmed its capability of identify a potential significant deviation from the normal levels in the given locality. Detailed results from the local TLD networks measured in 2000 will be presented in the Report on Radiation Situation on the Czech Republic's Territory in 2000.

Table 1. Quarterly average photon dose equivalents H_X, as determined by the territorial TLD network on the Czech Republic's territory (nSv/h)

Region	**Prague**	**Central Bohemia**	**South Bohemia**	**West Bohemia**
Workplace	**SÚRO**	**SÚRO**	**SÚRO/RC Č. Budějovice**	**SÚRO/RC Pilsen**
Number of measuring points	**13**	**25**	**30**	**25**
	$H_X \pm s$	**$H_X \pm s$**	**$H_X \pm s$**	**$H_X \pm s$**
I/00	129.0 ± 17.4	133.2 ± 43.8	148.3 ± 24.1	132.3 ± 23.7
II/00	116.4 ± 12.9	124.8 ± 40.3	142.5 ± 22.1	127.1 ± 21.1
III/00	123.9 ± 14.9	131.5 ± 39.3	147.0 ± 22.0	120.6 ± 20.9
IV/00	120.5 ± 13.2	130.7 ± 37.3	146.4 ± 23.6	125.3 ± 21.0
Region	**North Bohemia**	**East Bohemia**	**South Moravia**	**North Moravia**
Workplace	**SÚRO/RC Ústí nad Lab.**	**SÚRO/RC Hr. Králové**	**SÚRO/RC Brno**	**SÚRO/RC Ostrava**
Number of measuring points	**23**	**21**	**26**	**21**
	$H_X \pm s$	**$H_X \pm s$**	**$H_X \pm s$**	**$H_X \pm s$**
I/00	115.5 ± 25.7	116.3 ± 21.8	123.7 ± 18.1	104.6 ± 13.7
II/00	110.6 ± 19.7	119.5 ± 28.1	129.9 ± 23.9	106.3 ± 13.3
III/00	114.0 ± 20.0	123.3 ± 26.1	129.4 ± 21.5	106.7 ± 11.4
IV/00	111.2 ± 25.8	118.2 ± 22.8	125.4 ± 23.5	111.9 ± 13.1

Note: H_X – average value, s – standard deviation

For workplaces marked SÚRO/RC: SÚRO performs measurements and processing of results while the regional center only provides for transport of dosimeters.

Measuring of equivalent dose rate is carried out continually in the early warning network, average values are measured every 10 minutes. The measured values are transmitted once in 24 hours to a central database of the national radiation monitoring network in SÚRO; 10 measuring points in SÚJB regional centers and in SÚRO use modems and telephone lines and 38 measuring points on ČHMÚ workplaces use its communication network to a central ČHMÚ computer and then a dedicated telephone line. If needed, the transmission intervals are shortened.

5.2. Monitoring of NPP Effluents and Surroundings

The total amount of radionuclides discharged from NPP Dukovany to the atmosphere and waterways continued to be very low in 2000. There were no accidental leaks reported and, based on the quarterly and monthly reports "Radiation Situation in NPP Dukovany Surroundings" issued by its operator, the total releases to the atmosphere were less than 1% of the derived annual limits, releases into waterways were below 3% for corrosion and fission products and below 70% for tritium.

The dose rate in the surroundings of NPP Dukovany is continually monitored with a teledosimetry system operated by the plant. Both plants also have at least one monitoring point in the national early warning network in the vicinity. Monitoring of the dose rate equivalent due to external exposure in the surroundings of nuclear power plants is performed

with local TLD networks operated by the radiation monitoring laboratory of the respective NPP. Independently of these networks measurements with TLD are performed by the respective SÚJB regional centers. In 2000 no exceeding of the investigation levels was identified in any of the mentioned networks.

Regular sampling and measurements of radionuclide activities in various environmental components in the surroundings of nuclear power plants are performed, both by the environmental radiation-monitoring laboratory and by the respective SÚJB regional center. As in the past years no differences were found in 2000 between the content of radionuclides in individual environmental components from the surroundings of NPP Dukovany and from other parts of the Czech Republic's territory.

6. NATIONAL INSTITUTE FOR NUCLEAR, CHEMICAL AND BIOLOGICAL PROTECTION

The National Institute for Nuclear, Chemical and Biological Protection (SÚJCHBO) was established based on a resolution by SÚJB Chairwoman, ing. Dana Drábová, on 1 January 2000 as a subsidized organization under SÚJB Prague. The resolution was preceded by an agreement of 22 November 1999, concluded between Minister of Health and SÚJB, on a transfer of selected workplaces, employees, assets and management rights from ÚEŘMS Příbram – Kamenná to SÚJB Prague.

The main task of the Institute are measurements to be used in the evaluation of impacts of nuclear, chemical and biological substances on human health and the environment, including evaluation of protection levels by individual and collective means of protection against such materials. Its activities also include research and development in this area, performance of tasks supporting supervision by SÚJB inspectors and fulfillment of tasks required by the constitutional law No. 110/1998 Coll., on CR security and provision of educational and training activities, while all the activities are performed nationwide.

6.1. Nuclear Protection Department

The nuclear protection units includes:

- laboratory for personal dosimetry and monitoring,
- laboratory for radon measurements,
- trace dosimetry laboratory,
- calibration laboratory of the national monitoring network for the instruments measuring radon concentration and equilibrium equivalent radon volume activity.

The workplaces specialized in radon measurements focused particularly on the following activities:

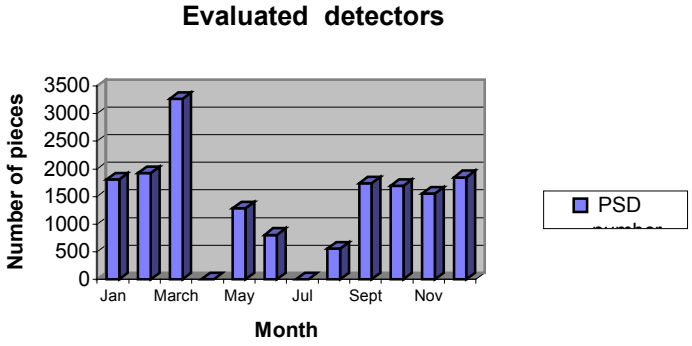
- extending of knowledge about behavior of radon decay products,
- perfecting of measuring and evaluation methods for all types of measurements performed (evaluation of atmosphere in new houses/buildings, radon diagnostics in places with already identified high radon concentrations, identification of radon risks on land plots and radon levels in water),
- expert measurements in caves, radioactive waste repositories, transport of material from waste heaps etc.

The advantage of the radon laboratory consists in its involvement in objectivization and perfecting of the measuring methods while the laboratory uses the methods in the field and may test their updated versions.

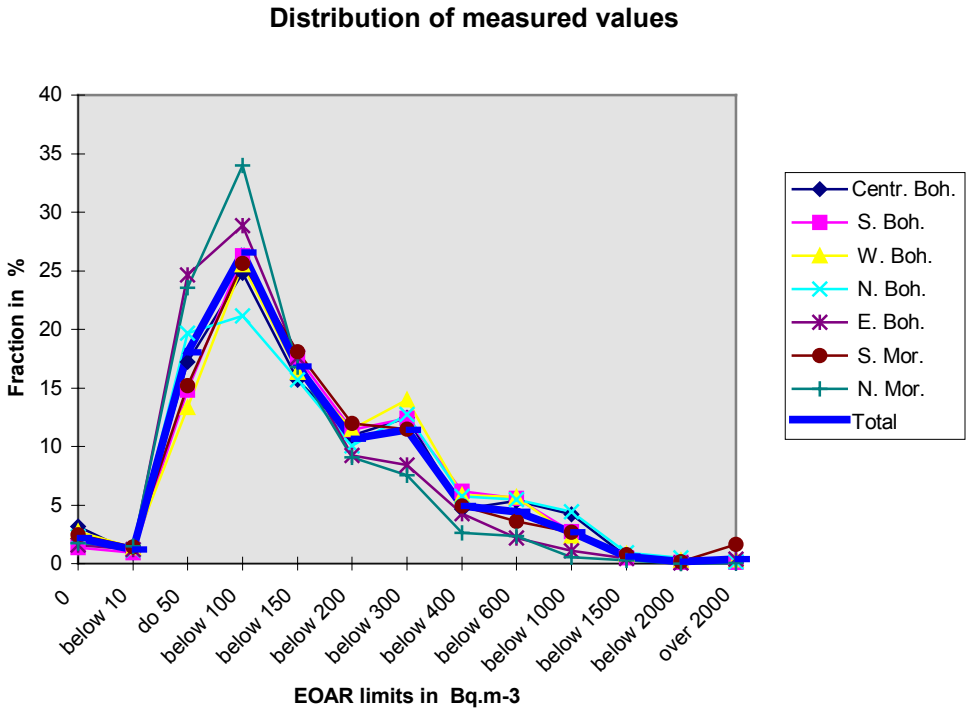
Another significant activity of the department is trace radon dosimetry. The technique is a cornerstone of the Radon Program in the Czech Republic. In SÚJCHBO it is performed by the trace dosimetry laboratory which provides and evaluates all trace dosemeters used on the CR territory within the SÚRO locating program. The workplace prepares trace detectors to be subsequently distributed from SÚRO workplaces to selected buildings and after 1-year-long exposure they are returned to the laboratory for processing (trace etching) and evaluation; the laboratory determines the number of alpha particles traces on a KODAK detection foil to calculate radon equivalent volume activity.

The following numbers of trace detectors were provided and evaluated within the Radon Program by 31 December 2000:

	Number of detectors
Provided detectors	41 500
Evaluated detectors	18 000



For the illustration, the diagram below presents the distribution of radon equivalent volume activity as identified with trace detectors:



Note:

Centr. Boh. Central Bohemia
S. Boh. South Bohemia
W.Boh. West Bohemia
S.Mor. South Moravia
N. Boh. North Bohemia
E. Boh. East Bohemia
N. Mor. North Moravia

The research in this field is currently carried out in the following three directions:

a) increase of sensitivity and reliability of equilibrium equivalent radon volume activity measurements, using the KODAK LR 115 trace detector. Among other objectives, the research seeks to resolve some unclear issues in detectors returned from the field (unexpected effect of thoron etc.),

b) use of trace detectors as radon measuring instruments. The FotoRn and FíRn variants are now in the stage of basic research and the customers now use the RAMARN system,

c) use of a special variant of trace detectors for retrospective measurements (use of glass as a source of information on historical exposure).

The nuclear protection department includes the National Metrology Center which performed technical tests for type approval of the measuring instruments and verification of measuring instruments for radon volume activity and radon equivalent volume activity.

	Number
Tests for new type approval of the measuring instruments	2
Verification of measuring instruments	238

Since SÚJCHBO is a subsidized organization its workplaces also seek to win commercial orders. The long-term orders of the nuclear protection department include personal dosimetry services for DIAMO s.p. Stráž pod Ralskem – evaluation of personal dosimeters - types ALGADE and OD 88 (i.e. determination of a received mixture of long-term radionuclides emitting alpha radiation, effective doses of photon radiation identified with TLD and reception of latent energy). This activity is performed particularly by the SÚJCHBO laboratory of personal dosimetry and monitoring.

The following numbers of dosemeters were evaluated in 2000:

	Number
ALGADE dosemeters	4712
OD 88 dosemeters	3142

The obtained results are used to calculate the monthly effective dose for each worker to be reported to the Central Register of Occupational Exposures.

Apart from the above mentioned activities the workplaces performed other measurements and analyses in the field and in the laboratory, most frequently:

- determination of overall volume alpha and beta activity in waters,
- determination of ^{226}Ra and ^{238}U volume activities in waters,
- gamma spectrometric determinations of other radionuclides in waters, sediments, fallout, agricultural crops, building materials, filters etc.

6.2. Chemical Protection Department

In 2000 the department of chemical protection consisted of a laboratory for chemical protection and monitoring + mobile laboratories.

Apart from the work on research projects the laboratory focused mainly on expert activities and in 2000 particularly on:

- testing of protective respiratory means,
- evaluation of tightness of imported filtration clothes in chlorine atmosphere,
- analyses of materials contaminated in the course of liquidation of the liquid chlorine accident in Neratovice,
- testing of protective filtration clothing,
- testing of insulating protective clothing,
- testing of protective means for the respiratory tract and body protection for the special fast-deployment unit.

Mass and infrared spectroscopy was used to meet special needs of CR Interior Ministry units and evaluate samples of unknown composition for presence of toxic substances, narcotics and psychotropic substances and heavy and rare metals. Mobile laboratories were employed to test e.g. atmosphere in the vicinity of Spolana Neratovice, Synthesia Pardubice, Lachema Brno and the incinerator plant Spalovna Brno. Analyses were performed for organic substances dissolved in the Svratka river. The laboratories also verified sampling methods and analyses of poisonous materials for specialized workplaces.

In the methodology area the following methods were developed and verified:

- use of methylsalicylate for the tests of protective clothing,
- replacement of pressure gaseous chlorine by generation from less dangerous precursors,

- introduction of OPWC standard operating procedures in the mobile laboratory for determination of chemical substances for military purposes.

Based on an agreement between SÚJB and the CR Interior Ministry SÚJCHBO participated in security operations during the Annual Meeting of MMF Board of Governors and the World Bank Group in Prague in late September 2000. 15 employees of SÚJCHBO participated in this extremely demanding event and they were on continual standby. Both the mobile laboratories were made available for the purpose, with special detection technology to determine dangerous chemical substances, including equipment necessary in case such substances are used in a terrorist attack. The substances were monitored in the course of the event, both in the meeting rooms and other premises of the Congress Center. Special attention was paid to the air-conditioning system in the building. Additional measurements were performed on the traffic routes and other places frequented by participants of the event. Activities by SÚJCHBO in the course of the MMF have been evaluated very favorably by the responsible officials.

6.3. Biological Protection Department

The department includes a laboratory for monitoring of persons in extreme conditions. The activities focus on expert measurements and determinations, as well as on research.

The most important activities included:

- evaluation of gear, equipment and other special means of individual protection from the physiological point of view in various microclimatic conditions,
- measurements of microclimatic conditions, determination of work thermal load and perspiration losses.

Some expert opinions were provided under EN 61010-1 for various legal entities. Based on the performed measurements the laboratory also gave its positions on the existing regimen of work and rest as practiced in the companies and recommended organizational measures to improve their working conditions and working environment.

The workplace also includes units dealing with health effects of ionizing radiation to evaluate risks of work with ionizing radiation in connection with diseases developed by former miners in uranium mines. In the course of the year 80 expert opinions were provided to respond to requests from medical departments and clinics, most frequently concerning the item III/6 on the list of occupational diseases (lung cancer caused by radioactive substances), and less frequently the item II/1 (leukemia, basaloma, esophagus cancer).

The workplace also participated in an epidemiological study of delayed effects of ionizing radiation on a large group of uranium miners from the Jáchymov and Příbram regions and on a group of persons living in the so-called „středočeský pluton“ in Central Bohemia, carried out jointly with SÚRO Prague as part of the Ministry of Health project IGA MZ ČR No. 4920-3.

6.4. Independent Department of Inspection Support

The main activity of this independent department focuses on support for the supervision carried out by the department of uranium industry and mining within the SÚJB department for radioactive wastes and the environment (OŽPRAO). Workplaces of both the departments were opened in SÚJCHBO Kamenná in July 2000 at presence of SÚJB Chairwoman, ing. Dana Drábová, and other SÚJB officials.

Employees of the department working in Kamenná and in Dolní Rožínka follow instructions by OŽPRAO SÚJB inspectors from Kamenná, Dolní Rožínka and Stráž pod Ralskem and perform inspections at the underground and above-the-ground workplaces of s.p. DIAMO and at other workplaces on the entire Czech Republic's territory where mining activities are performed (in 2000 they participated in 62 inspections in total). Their contribution to the inspection efforts included particularly:

- measuring of effective dose rates from outer gamma exposure,
- determination of volume activity of long-term radionuclide mixtures emitting alpha radiation from the uranium-radium series,
- determination of latent energy concentrations of radon decay products,
- determination of surface contamination with radioactive substances emitting alpha particles,
- sampling of water, aggregate and sediments to test specific activities of ^{238}U and ^{226}Ra. The samples are subsequently processed and analyzed in SÚJCHBO laboratories.

On the inspectors´ request the activities also include local investigations for administrative procedures carried out by or with the involvement of SÚJB.

Another important activity performed by the department is collecting and measuring of samples in the monitoring network, focused on effluents and effects on workplaces – licensees under Section (§) 9 paragraph 1 of the Atomic Act for works with natural sources of ionizing radiation.

A significant portion of this activity consists of the monitoring of old loads, i.e.:

- measurements of equilibrium equivalent radon volume activity using the BUSH method and regular evaluating of TLDs in the monitoring points in the Příbram area, West Bohemia, Okrouhlá Radouň, Mydlovary and Dolní Rožínky, to identify atmospheric contamination with radon and its decay products from the existing and former uranium mining facilities,
- sampling of water for determination of ^{238}U and ^{226}Ra volume activity, including,
- water samples from the Litavka, Kocába, Ploučnice, Mže, Loučka, Nedvědička, Hadůvka and Svratka river basins (waterways potentially influenced by the mining activities),
- sampling of waste waters and surface waters in all locations,
- sampling of underground waters in Dolní Rožínka location to monitor impact of effluents, waste heaps, settling pits or seepages etc. on the water quality.

7. DEPARTMENT MONITORING THE BAN ON CHEMICAL WEAPONS

In 2000 activities performed by the department monitoring the ban on chemical weapons (hereinafter ÚKZCHZ) pursued the tasks resulting from the Treaty about the ban on development, production, accumulation and use of chemical weapons and about their

destruction, and from Act No. 19/1997 Coll., on some provisions relating to the ban on chemical weapons.

On 9 August 2000 Act No. 249/2000 Coll. was published in the collection of laws, amending Act No. 19/1997 Coll., on some provisions relating to the ban of chemical weapons, and passed the monitoring competence from the Ministry of Industry and Trade to SÚJB.

In connection therewith a new system of notifying of SÚJB staff has been introduced to inform them about international inspections and for communication after working hours. Based on a SÚJB request the Czech embassy in Hague executed a direct link between SÚJB and OPCW (Organization for Prohibition of Nuclear Weapons) in Hague do deal with international inspections and for communication after SÚJB office hours.

In 2000 all reports provided by the involved organizations in the chemical industry in CR were systematically inspected and compared with the data reported in previous statements. As a preparation for international inspections by OPCW the department performed on-site inspections in the concerned organizations.

Three international inspections took place in the Czech Republic in 2000:

- 13 – 16 March: Aliachem, a.s., branch facility Synthesia, Pardubice (substances from List 3),
- 28 – 31 August: Spolek pro chemickou a hutní výrobu, a.s., Ústí nad Labem (certain organic chemical substances),
- 4 – 7 December: DEZA, a.s., Valašské Meziříčí (certain organic chemical substances).

All inspections confirmed agreement between the data reported in the statements and inspection results and the approach of Czech parties was assessed as obliging. As a result, all inspections were completed within the scheduled time and without reservations.

In agreement with the Implementation Provisions for the Treaty about the Ban on Chemical Weapons in the Czech Republic in 2000 the information about the treaty was updated and published, including the resulting obligations for the Czech Republic. Lectures were prepared and presented to state administration workers (chief officials of the chemical troops of land forces, CR Fire Protection and Rescue Corps) and representatives of chemical industry companies (CHEMTEC 2000, APROCHEM 2000), concerning various aspects of the Treaty implementation. A pilot training of inspectors from the Organization for Work with Substances on List 1 was organized in CR for OPCW on 11 – 20 November 2000 and assessed very favorably by its trainees.

All main tasks planned for 2000 were fulfilled by ÚKZCHZ. The Czech Republic has been one of the countries strictly meeting its obligations from the Treaty about the ban on development, production, accumulation and use of chemical weapons and about their destruction.

8. MANAGEMENT AND TECHNICAL SUPPORT

8.1. Personnel Training

Based on a request from ČEZ, a.s. and having reviewed the submitted documents SÚJB in agreement with the Atomic Act approved a list of activities important from the viewpoint of nuclear safety and performed by ČEZ NPP Temelín employees and permitted to train the selected ČEZ NPP Dukovany personnel on the full-scale simulator VVER 440/V-

213 type – a replica of the unit control room at NPP Dukovany. In 2000 SÚJB performed an overall review and updating of examination questions for the selected personnel of ČEZ NPP Dukovany.

In 2000 there was an inspection at NPP Temelín concentrated on the shift staffing and on documenting of qualification requirements for the selected personnel before the first load of NPP Temelín Unit 1 and also on documenting of personnel qualification by the general supplier of technology Škoda and scientific commissioning. At NPP Dukovany there were four scheduled inspections focused on preparedness of the shift personnel before restarting of the units after refueling. The submitted documents did not indicate any shortcomings in contradiction to the Atomic Act.

The state examining board testing special professional competence of selected personnel of nuclear installations held 22 sessions in 2000. At these sessions the board tested special professional competence of 127 selected personnel from nuclear installations in total (from this number 61 from ČEZ NPP Temelín, 48 ČEZ NPP Dukovany, 18 ÚJV Řež, a.s. and ČVUT Prague). Based on the successfully passed tests and in agreement with the Atomic Act SÚJB issued respective authorizations for selected nuclear installations personnel to 110 candidates from the Czech Republic. 17 candidates had to repeat the exam and the resulting success rate in the tests was 87%.

Before a specialized SÚJB examining board testing continued of special professional competence for activities particularly important from the viewpoint of radiation protection. 648 physical persons took tests in special professional competence, from which 576 passed the tests and received certificates of special professional competence and 72 individuals failed in the tests.

8.2. Legislative Activities

In the reported period the main focus in the legislation area was on preparation of an amendment to Act No.18/1997 Coll. In connection with the negotiations held in 1999 there were working meetings within SÚJB to implement the CR governmental resolution No.1350 of 22. December 1999, that requested SÚJB to produce a draft of the amended Act No.18/1997 Coll., and submit it to the CR government by the end of 2000. Most of the changes in the amended Act were based on the requirements for harmonization of Act No.18/1997 Coll. and its implementing regulations with EC legislation. The amended Act responded to these requirements and covered radiation protection, emergency preparedness, international movement of radioactive substances and contamination of foodstuffs and feed with radionuclides. The amended Atomic Act includes transposition of some obligations from the international treaty about general ban on nuclear tests and from the Additional Protocol to the Agreement between the Czech Republic and International Atomic Energy Agency on safeguards implementation under the Treaty about Non-proliferation of Nuclear Weapons.

The draft was submitted for comments as required and meetings were subsequently held to consider the comments. All major comments were accepted with the exception of one controversy with the Interior Ministry concerning participation of the licensee in decontamination in the emergency planning zone. The other comments were submitted as recommendations and considered in the development of the final version of the amended Act.

The complete material containing a draft of Act No. 18/1997 Coll. was submitted to the CR government as due.

8.2. International Cooperation

In the field of international cooperation SÚJB in 2000 focused on the fulfillment of obligations from international treaties, maintaining and development of relations with partner

organizations and, last but not least, on coordination of international technical cooperation within its competence, both at bilateral and multilateral levels. Also significant was the SÚJB involvement in the process of CR accession to EU. International relations of SÚJB were also influenced by the commissioning of Unit 1 at NPP Temelín.

Bilateral Cooperation

One of the SÚJB long-term priorities in bilateral relations has been cooperation with the neighboring states, i.e. Germany, Slovakia, Austria and Poland. Other bilateral SÚJB relations are those with EU countries and countries with major programs for peaceful utilization of nuclear energy and ionizing radiation, e.g. USA, Canada, Japan, France and Russian Federation. Also significant have been contacts with other countries in the region, including Hungary and Slovenia.

Federal Republic of Germany

There was a regular annual meeting organized based on the agreement between the governments of the Czechoslovak Socialist Republic and Federal Republic of Germany on the issues of common interests in nuclear safety and radiation protection, held in May in Garching, Bavaria. Both the parties used the meeting to exchange information on the latest developments in nuclear area and particularly to discuss the course of consultations agreed by the parties in late 1999, between specialists in selected nuclear safety issues at NPP Temelín. By the end of 1999 the first workshop had been organized on one of seven topics selected by SÚJB and the German Ministry for the Environment and Reactor Safety, whose topic was „NPP Temelín Containment.“ More consultations took place in the first half of 2000 on the following topics:

- modified core design,
- methods for monitoring potential reactor vessel embrittlement,
- provisions preventing steam and water piping burst on the floor level +28,8,
- analyses of events with minor leakage of primary coolant,
- provision of unit protection against extreme events (plane crash, gas explosion),
- cooperation of the new control system with the original technology.

The extraordinary bilateral meeting with the FRG delegation held on 5 September in Prague was supposed to summarize results of the nearly one-year-long joint efforts in the assessment of selected safety aspects of NPP Temelín. At the meeting the German Society for Nuclear Reactors Safety (GRS - Gesellschaft fűr Anlagen und Reaktorsicherheit mbH) presented conclusions of their independent assessment. In most cases the German experts concluded that the solutions adopted at NPP Temelín meet the German requirements. In several cases where the requirements had not been met they concluded that the adopted solutions corresponded to the practice usual in other West European countries or in the US. The German experts pointed to three safety issues where the level of knowledge by the meeting's date did not enable to fully evaluate adequacy of the adopted technical solutions. The issues included verification of functional capability of the main valve on the steam dump station to atmosphere and safety valves at working load with water-steam mixture, technical solution of conducting the main steam pipeline and feedwater pipeline on the floor +28,8 m and sufficient capacity of accumulator batteries for emergency power supply. In September, based on a mutual agreement, the Czech party handed over additional information on the safety valves issue and accumulator batteries and the information was taken into account for the ultimate revision of the Final Report.

The German party had earlier and also at the mentioned meeting stated that the final assessment of nuclear safety and radiation protection at NPP Temelín was the exclusive business of SÚJB and the consultations may only contribute with new points of view.

In the last month of 2000 the cooperation with Germany focused on completion of the GRS Final Report on the assessment of seven selected areas from the viewpoint of nuclear safety, its brief version was mutually agreed and published. The bilateral cooperation with Germany also brought answers to the second set of questions from the Bavarian public.

Both the bilateral meetings, individual consultations and their preparation were attended by representatives of both Czech and German competent bodies in nuclear safety and radiation protection, as well as experts from the cooperating organizations (GRS, ÚJV Řež, a.s., ČEZ, a.s.- NPP Temelín, Škoda JS a.s., Plzeň, EGP). The bilateral meetings were attended by officials from the Czech Ministries of Foreign Affairs, Industry and Trade and the Environment and representatives of the German Embassy in Prague.

Austria

The main focus in bilateral relations with Austria moved in 2000 to the commissioning of NPP Temelín Unit 1 but covered also other issues. An example of the latter was the emergency drill organized in May at NPP Dukovany with the involvement of local authorities in Austrian regions adjoining the Czech Republic. Both the parties assessed the drill as very successful.

Based on the agreement between the governments of the Czechoslovak Socialist Republic and Republic of Austria on the issues of common interest in nuclear safety and radiation protection, an extraordinary bilateral meeting was held on 2 September 2000 in Prague, on request of the Austrian party. The agenda consisted of a discussion of several tens of issues relating to nuclear safety at NPP Temelín, raised in the middle of August 2000 by the Austrian party. The Austrian experts received from the Czech party a written position on the issues in advance. At the meeting the Austrian party was also informed about the current status of NPP Temelín and the nearest scheduled steps in commissioning of Unit 1. As requested by the Austrian delegation, the extraordinary meeting was not concluded with a protocol and after the meeting the Austrian party further significantly extended the number of original issues. In order to reduce the number of opened issues the Czech party offered specialized consultations on the selected technical topics. The consultations on the reactor vessel were held in September and October. A detailed information on selected seismicity aspects of NPP Temelín location was provided in written. Nevertheless, the scope of topics, their number and nature of individual questions raised by the Austrian party in the period between fuel loading and minimum stabilized controlled power on the Unit 1 reactor at NPP Temelín, considering the highly technical character of nuclear safety and radiation protection, were so high that it was impossible to respond with a standard procedure for bilateral exchange of information. The problem resulted in a series of negotiations at a political level and was concluded with an agreement between prime ministers of the two countries, signed in December 2000 in Melk in presence of a commissioner for EU enlargement.

A regular bilateral meeting scheduled for December in Vienna was agreed to be postponed and held in January.

Slovakia

Based on an agreement between the Czech and Slovak governments on cooperation in supervision of nuclear safety of nuclear installations and nuclear materials the joint efforts carried out in 2000 by SÚJB and ÚJD SR (Slovak Republic's Office for Nuclear Supervision) were traditionally extensive. In December 2000 there was a regular annual meeting of representatives of both the regulatory bodies. The main issues discussed included exchange of experience in supervision of commissioning of new reactors at power plants, integration of supervision in nuclear safety and radiation protection and, last but not least, aspects of nuclear installations nuclear safety in the context of EU enlargement. The parties concluded

the meeting stating that the mutual professional cooperation remained at a very good level. Beyond the cooperation with the Slovak regulatory body SÚJB contracted technical support by four experts from the Research Institute of Nuclear Power Plants Trnava (VÚJE) with experience in VVER reactors commissioning.

Poland

There are no formal agreements on cooperation between the Czech Republic and Poland in the field of SÚJB competence. In 2000 bilateral consultations were held with representatives of the Polish Atomic Energy Agency with the intention to develop a draft of an agreement containing, particularly, a procedure for early warning in case of nuclear or radiation events on territories of both the countries.

United States of America

During the general IAEA conference held in Vienna in late September a new agreement was signed by regulatory bodies of the two countries, governing the cooperation between US NRC and SÚJB, in line with the agreement concluded by governments of the Czech and Slovak Federal Republic and USA on cooperation in peaceful use of nuclear energy. SÚJB assessed the mutual cooperation since the early 1990s as very useful and productive. In general, the cooperation consisted of a transfer of experience in safety document review and in execution of inspection activities in supervision of nuclear safety of nuclear installations. Also significant were professional consultations on specific issues in licensing of freely programmable control systems, nuclear fuel and safety analyses, i.e. for the purposes of assessment of WESTINGHOUSE deliveries for NPP Temelín. This part of cooperation was concluded with a final workshop in April 2000 in Prague. Supported by opinions of US NRC experts and Scientech consulting company, SÚJB assessed the mentioned parts of NPP Temelín design as in line with the best international practice.

Japan

An extensive project organized by the Japanese government was under way in its ninth year, focusing on education and training of nuclear power engineering experts from Central and Eastern Europe. SÚJB acts as a coordinator for the scheme in the Czech Republic. In 2000 the project made it possible for 17 Czech experts to attend a number of training courses oriented generally on nuclear safety and radiation protection, management of NPP operation and maintenance, on I&C for technological processes and electric systems and on nuclear waste management. The Czech experts reported that the standard of the courses was very high.

Russian Federation

The cooperation between Czech and Russian regulatory bodies was in line with the agreement between the Czech and Russian governments on cooperation in nuclear energy area and in the reported period it was represented by only one Russian expert in the nuclear safety advisory body for SÚJB Chairwoman. Beyond the cooperation between the regulatory bodies SÚJB in 2000 contracted two technical consultants from the Russian Federation with experience in commissioning of reactors similar to VVER 1000/320. By doing this SÚJB sought to assure professional on-site consultations for its inspectors in the course of Unit 1 commissioning at NPP Temelín.

Slovenia

Last December technical consultations were held in Prague with representatives of the Slovenian body supervising nuclear safety and radiation protection. An agreement was signed at a ceremony during the meeting between the regulatory bodies of the two countries

to formalize the relationship. The mutual cooperation will stress exchange of information on the professional issues of common interest and consultations on possible coordinated actions at multilateral forums. In 2000 there were also technical consultations on legislative issues and assessment of seismicity for nuclear power plants locations.

Hungary

During the general IAEA conference held in Vienna in late September a working meeting was held with representatives of the Hungarian nuclear safety regulatory body. The meeting considered the option to extend technical cooperation between the two bodies, particularly in respect to power plants with VVER 440/213 reactors. In 2000 there were also detailed technical consultations.

Multilateral Cooperation

Similarly as in previous years, in 2000 SÚJB multilateral contacts included international organizations, e.g. IAEA, preparatory committee monitoring adherence to Comprehensive Test Ban Treaty (CTBT) and OECD Nuclear Energy Agency, and fulfillment of obligations from specific international agreements. The SÚJB multilateral relationships also included development of contacts with the European Commission and its advisory bodies, as well as participation in activities of the association of regulatory bodies operating VVER reactors. New working contacts started in 2000 with the Western European Nuclear Regulators Association (WENRA) .

International Atomic Energy Agency

As in the past the priority of SÚJB in cooperation with IAEA was in the professional area. SÚJB provided Czech experts for the advisory IAEA bodies, meetings of technical committees and professional groups.

One of the most important services provided by IAEA to its member states is independent assessment of various fields in nuclear safety and radiation protection. IAEA provides these services to member governments on request, mostly by sending an inspection team of international experts. The inspection teams use a strict methodology and clearly defined assessment criteria. On a request made by the Czech government the State Office for Nuclear Safety was in February 2000 visited by a five-member International Regulatory Review Team (IRRT) from IAEA. The purpose of the mission was to assess efficiency of the state supervision in the Czech Republic, particularly in respect to the approval process of NPP Temelín. The team made the following conclusions:

- there is a clearly defined legislative framework for the licensing process of NPP Temelín and SÚJB issues permissions for each of the defined key stages during its construction and hand-over process,
- SÚJB as a regulatory body has established requirements in respect to the required level of nuclear safety at NPP Temelín and has adopted a flexible approach to assure that the adopted criteria of the inspections and assessment are met,
- SÚJB has a previously developed inspection plan for local and central (Prague) inspectors to review and confirm that the licensee commissions the plant in agreement with the conditions in the respective permits,
- experience and assistance from regulatory bodies in Western Europe and USA have been used to develop an adequate system of state supervision during licensing, surveillance, assessments and inspections at NPP Temelín.

Members of the team found several good methodical procedures in SÚJB practices and recorded them for the purposes of regulatory bodies in other countries. The team also submitted recommendations and suggestions on improvements that are necessary or desirable to strengthen the role of state supervision in the Czech Republic. All the suggestions and recommendations concerned long-term development of the body and were based on the current methodical procedures and achieved results.

The team also concluded that SÚJB put in significant efforts to prepare for the mission. The team members received full support and assistance in technical discussions, and the administrative and organizational support for the mission was excellent. SÚJB employees were open and highly motivated to the new experience while team members appreciated the opportunity to learn things they may use back at home.

Another important SÚJB activity in relation with IAEA is the coordination of Czech participation in the Technical Assistance Program organized for its member states by IAEA in agreement with its statute. The program is divided into the so-called „national" part (separate for each member country) and "regional" part. The following national projects were launched in early 2000:

- study of radiation damage of the power-generating reactor vessel, including an expert system to evaluate reactor internals properties exposed to high fluxes,
- training center for radiation protection workers at the teaching hospital Fakultní nemocnice Motol,
- automated system to collect and process operational and experimental data from the school reactor to train specialists from nuclear power plants and students of ČVUT-Faculty of Nuclear Science and Physical Engineering, and
- common project of three ÚJV Řež, a.s. workplaces dealing with :
  - introduction of both passive and active nondestructive tests of encased low- and medium-active wastes containing transuranium elements,
  - development, implementation and validation of special chemical-analytical methods in the ÚJV Řež, a.s. central laboratory,
  - establishing of a workplace investigating migration parameters of barrier materials used in radioactive waste repositories.

Some earlier-launched national projects were completed in 2000. In this connection we should mention a major event organized by SÚJB together with the permanent CR mission with the international organizations based in Vienna – visit to the PET Center in the Na Homolce hospital for permanent representatives of IAEA member states. The PET center was built in 1997 - 1999 with IAEA assistance and the event was supposed to present the successful project to diplomats from the countries significantly contributing to the Technical Assistance Program budget.

In 2000 SÚJB and other Czech organizations participated in many events within the so-called „regional" part of Technical Assistance Program organized by IAEA. In the reported period there were three specialized workshops, one training course and two technical committee meetings. The focus of the events was very varied, including e.g. physical protection of nuclear installations and nuclear materials, operational safety of nuclear installations and nuclear medicine. More than 50 experts from the Czech Republic were involved in additional activities organized within the regional part of IAEA Technical

Assistance Program, particularly aimed at safety of power plants with VVER reactors, radiation protection and emergency preparedness.

The Czech Republic has been involved in the IAEA Technical Assistance Program not only as a recipient but also as a country contributing to the projects for other countries.

In 2000 the Czech Republic made a contribution of 2 million CZK to complete a Technical Assistance Program project in Ukraine, with the objective to build in 1998 – 2000 a capacity for non-destructive inspections of VVER-1000/320 reactor vessels. Additional 1,8 million CZK went to the launched Technical Assistance Program in Armenia, focusing on the integrity analyses of the primary circuit at NPP Medzamor with a VVER 440 reactor. In 2000 the technical cooperation between IAEA and SÚJB continued in organization and professional provision of scholarship stays and the so-called short scientific sojourns for specialist from Central and Eastern Europe, Asia and Africa. In 2000 this cooperation with IAEA made it possible to provide training to 65 workers – specialists in radiation protection, nuclear medicine, nuclear safety, radioactive waste management, state supervision, legislation, emergency planning etc. The annual IAEA contribution in 2000 amounted to $86 870.

OECD/NEA

In 2000 SÚJB continued to cooperate with OECD/NEA. SÚJB representatives attended regular sessions of the permanent Committee for Nuclear Regulatory Activities and activities organized by other permanent NEA committees, e.g. the Committee for Radiation Protection and Public Health dealing with the development of national exposure registers.

European Commission and its Advisory Bodies, PHARE program

In 2000 SÚJB established an independent "Euro" workplace, directly reporting to the Office Chairwoman, coordinating activities of the Office connected with preparations of the Czech Republic to join the European Union and processing the documents required in this sphere by the European Commission or ministries in charge of summary development of such documents. SÚJB defined its short-term and medium-term priorities in the preparatory stage (2000 - 2002) in the national program to prepare accession of the Czech Republic to EU – in chapters on the energy industry and on the environment. Apart from harmonization of the Czech and Community law in radiation protection and guarantees, the efforts concentrated on preparation of EC regulations implementation. In radiation protection 12 implementation plans have been developed which contain gradual steps in the implementation of EC regulations requirements in individual areas. Along with other plans from the environmental sphere the documents were handed over in September 2000 by the Minster of the Environment, M. Kužvart, to EC commissioner Ms. Wallström. Another SÚJB priority in the preparatory period, based on the Accession Partnership and the 1999 Regular Report, was the gradual increase in the number of SÚJB employees to assure fulfillment of new tasks due to implementation of new EC regulations and requirements in nuclear safety supervision. In this connection the number of SÚJB employees increased by 10 people.

In cooperation with the CR governmental office – the compatibility department – 22 EC regulations were translated and reviewed. Late in the year an internal EU web site was posted on the SÚJB intranet, available to the employees in charge of EC regulations database, as well as implementation plans and other information relating to EU.

In December 1999, in connection with the negotiations on the energy industry chapter, additional information was handed over to the European Commission on NPP Temelín and modernization of NPP Dukovany. The information materials on NPP Temelín licensing and commissioning were transmitted to the Commission on quarterly basis. In cooperation with

the Ministry of Industry and Trade SÚJB prepared an information material on the fulfillment of EU Council conclusions concerning nuclear safety issues; the material was reviewed by the Czech government and transmitted to the European Commission. SÚJB continually monitored and, if practicable, attended meetings of working groups of the European Commission on the approach to assessment of nuclear safety in the candidate countries.

As part of negotiations about the environmental chapter additional information was transmitted to the European Commission, mainly concerning implementation methods for some EC regulations, particularly article 37 in the agreement establishing Euratom (radioactive waste management and repositories in the Czech Republic).

In the course of the preparatory process of the Czech Republic accession to the European Union SÚJB was involved both in activities coordinated by the Ministry of Foreign Affairs and in the structured dialogue with the respective general directorates of the European Commission (DG ENV and DG TREN). Within this dialogue SÚJB representatives attended regular events organized throughout the year. The events included regular meetings of the CONCERT group, a platform for experience exchange and harmonization of practices used by regulatory bodies in EU countries and countries of Central and Eastern Europe, and also sessions of the permanent advisory group of regulatory bodies from EU countries – the Nuclear Regulatory Working Group. A SÚJB representative has been elected into the four-member presidium of a newly set-up advisory group dealing with safety of European nuclear installations – the European Nuclear Installations Safety Group (ENIS-G). The purpose of these efforts is to enable the broadest possible involvement of the candidate countries into the common EU activities in nuclear safety of nuclear installations, which is not governed by the Community law.

Ms. Jackson, Chairwoman of the European Parliament committee in charge of the environment, public health and consumer policy, invited SÚJB Chairwoman to attended its session held in June 2000. SÚJB Chairwoman presented to the committee's public hearing her contribution on "Nuclear Safety".

In connection with the nuclear safety issues at NPP Temelín raised by the Austrian party as a EU member SÚJB Chairwoman had a meeting with the head of EU delegation in the Czech Republic, Mr. R. Cibrian.

Activities within the supranational PHARE program „nuclear safety " were in 2000 mostly limited to completion of the on-going projects. Only in the program part dedicated to technical support organizations the following two new projects have been launched focusing on:

- licensing of NPP Dukovany modernization,
- study of serious accidents management.

In connection with a transfer of competence the European Commission is currently evaluating efficiency of this part of the PHARE program and developing a new strategy to support the accession process of candidate countries to EU.

CTBTO Preparatory Committee

In 2000 SÚJB continued to function as a national agency under the Comprehensive Test Ban Treaty. In the reported period SÚJB representatives attended meetings of the Treaty working bodies and in the joint effort with the Earth Physics Institute in Brno provided for the fulfillment of Czech Republic's commitments under the said Treaty.

Western European Nuclear Regulators Associations

In 2000 SÚJB Chairwoman took part in three informal consultations organized by WENRA with representatives of regulatory bodies from the EU candidate countries. The main issue on the agenda was nuclear safety of nuclear installations in the context of EU enlargement. One significant activity of the Association is a regular independent evaluation of nuclear safety and radiation protection at nuclear power plants in the candidate countries. At the end of October the Association issued its second report summarizing the current situation in the individual candidate countries in this area. SÚJB has found the report objective and well-balanced, describing the actual situation in legislative and regulatory fields and also at the two nuclear power plants.

Other Multilateral Activities

SÚJB is a founding member of the Forum of Regulatory Bodies of Countries Operating VVER Reactors, established in 1993 to support nuclear safety and radiation protection by sharing experience, exchanging information and coordinating efforts in this field. In 2000 SÚJB representatives attended a regular annual summit of the Forum organized by Ukraine to conclude its one-year presidency. In the reported period leading Czech specialists continued their working efforts in the Forum groups (e.g. in the group dealing with the fuel cycle end).

9. DISCLOSURE OF INFORMATION UNDER ACT No. 106/1999 COLL., ON UNRESTRICTED ACCESS TO INFORMATION

In 2000 the State Office for Nuclear Safety received 326 requests for information filed by natural and legal persons under the quoted Act. In three cases the information was denied by SÚJB resolutions while applicants appealed against the resolutions. In two cases the appeal was acceded to by the respective commission and the denied information was provided. In the third case the appeal was not acceded to due to a mistake on the applicant's side and the latter subsequently withdrew the request. Neither appeal was subject of further legal steps and no judgment was issued by any court for lack of compliance with the quoted Act.

The information was requested (and also provided) using all forms of application forms acceptable under the law: oral requests delivered in person or by phone, e-mails and hard copy applications. In terms of topics, the applications may be divided as follows:

a) issues relating to NPP Temelín commissioning (217 requests);
b) radiation protection and radiation situation monitoring on the Czech Republic's territory (56 requests);
c) amended Atomic Act (12 requests);
d) import of the so-called radioactive watches made by Carefour (8 requests);
e) other (23 applications).

To complement the information provided in the mentioned manner SÚJB uses its external Internet page (www.sujb.cz). The number of visitors has not yet been monitored. Due to the increasing requirements for information disclosure, particularly in connection with NPP Temelín commissioning, the service will be activated in 2001.

Contacts with and information provided to non-governmental agencies were monitored separately, with the key role played by Greenpeace, Jihočeské matky (South Bohemian Mothers), Calla and organizations represented by Radek Pavlovec, the Upper Austrian governmental representative for nuclear installations in border regions. These organizations were very active in communication with SÚJB and required intense provision of information

under Act No. 106/1999 Coll. To illustrate the situation a summary of information exchange with Greenpeace in 2000 has been provided bellow:

Meeting on 21 June with Greenpeace representatives - on 20 June Mr. Tutter, the executive director of Greenpeace branch in CR, made a telephone call to inform SÚJB Chairwoman that Greenpeace possessed information casting significant doubts on safety of NPP Temelín and requested an urgent meeting. The meeting was attended by SÚJB Chairwoman and her deputy for nuclear safety and the issues discussed concerned in general the licensing process of NPP Temelín, course of individual tests and the plant's current condition. Despite being invited to do so the Greenpeace representatives failed to provide any specific suggestions. SÚJB assured Greenpeace of its willingness to communicate in the future.

Greenpeace letter of 23 June inquiring about SÚJB requirements in respect to the license for fuel loading to NPP Temelín Unit 1 and expressing concerns about SÚJB authority in respect to ČEZ (suspicion that ČEZ will attempt to load fuel without the license).

Greenpeace fax message of 29 June requesting copies of documents with the evaluation of the tests "reactor cavity transport equipment and its capability of safe operation" and results of the emergency core cooling system tests.

SÚJB response of 29 June referring to the telephone conversation between SÚJB Chairwoman Ing. Drábová, and Greenpeace director Mr. Tutter and between SÚJB deputy director Ing. Krs and Greenpeace advisor Mr. Haverkamp, and confirming that SÚJB did not find any indication of ČEZ efforts to load fuel without SÚJB permission and assuring that SÚJB workers always duly review documents supporting applications for licenses.

Greenpeace letter of 3 July containing a statement that NPP Temelín violates nuclear safety culture and asking SÚJB not to issue the license for fuel loading until all inconsistencies identified by Greenpeace are checked and until ČEZ discloses to general public the evaluation of tests and the protocol on preparedness for active testing. A press release was enclosed to the letter on the nuclear safety culture at NPP Temelín and a list of main identified problems ("provisional items put into operation "- e.g. the refueling machine, non-standard execution of some prescribed tests – e.g. tests of the emergency core cooling system).

Greenpeace fax of 4 July referring to previous talks and requesting immediate information on whether SÚJB was informed by ČEZ about the problems with tightness and integrity of the reactor vessel.

Greenpeace press conference on 12 July where in a material submitted to the press Greenpeace criticized SÚJB for issuing the license to load fuel to NPP Temelín Unit 1 and questioned sufficient SÚJB awareness of the problems at NPP Temelín (damaged reactor lid, provisional operation of the refueling machine, containment sprinkling tests – emergency core cooling system), and required the license for fuel loading to be suspended, the related documents to be disclosed and a request to be sent to ČEZ to declassify its final reports.

Greenpeace letter of 12 July requesting SÚJB to immediately suspend the license for fuel loading on the grounds of technical deficiencies of NPP Temelín, to make available all materials relating to safety problems mentioned in the Greenpeace press report and to declassify reports received by SÚJB for the purposes of the license for fuel loading. The letter contained a warning of possible SÚJB liability for negligence if no action is taken immediately.

SÚJB letter of 1 August containing its position on Greenpeace comments in the press materials of 12 July.

SÚJB letter of 2 August informing that the request to withdraw the license to start active tests has been transmitted to an analytical commission.

Greenpeace letter of 24 July requesting participation in the administrative procedure to issue the SÚJB license for fuel activation in NPP Temelín Unit 1.

SÚJB letter of 28 July informing Greenpeace that the Atomic Act does not grant to Greenpeace a participant status in the procedure and that Act No. 114/1992 Coll., on protection of nature and landscape, does not apply to the procedure. SÚJB also stated that it reported all its major steps to the media and recommended to use the Act No. 106/1999 Coll., on unrestricted access to information.

Greenpeace letter of 9 August appealing against the denied participation in the administrative procedure and containing a memorandum against the SÚJB resolution. Greenpeace insisted on its participation in the administrative procedure under § 70 of Act No. 114/1992 Coll., a special act in respect to the Atomic Act.

SÚJB letter of 21 August informing that Greenpeace cannot be a party in the administrative procedure to issue a license for fuel activation since no such independent procedure is started. Moreover, it is impossible to apply § 14 of the Code of Administration as its application is excluded for procedures under the Atomic Act. SÚJB also informed that participation in the procedures subject to § 70 of Act No. 114/1992 Coll. was considered for other simultaneously filed petitions and the results would be reported to Greenpeace.

Greenpeace letter of 9 August requiring, based on the SÚJB letter of 2 August, SÚJB not to issue a license for fuel activation until conclusions of the analytical commission are known.

SÚJB letter of 17 August informing Greenpeace that every resolution issued by the Office is based on a comprehensive evaluation of the application and that the Greenpeace letter of 9 August will be included into the file for the analytical commission.

Greenpeace letter of 10 August asking SÚJB whether it was informed about repairs of the impulse piping gradient (beginning of reconstruction, approval of respective documents, discrepancy between the as-built condition and the design) and about the installation defect on the 850 mm piping to the reactor vessel.

Greenpeace letter of 14 August requiring SÚJB to investigate whether ČEZ violated the Atomic Act in the course of developing and transmitting reports relating to the application for the license to load fuel.

Greenpeace letter of 25 August informing SÚJB that Greenpeace has asked members of the government to postpone fuel activation. The letter also informed SÚJB about a testimony by a ČEZ worker about an incorrect procedure during repair of 850 mm piping installation and again pointed to the incorrect gradient of the impulse piping and its clogging with waste material. Greenpeace also urgently required an immediate order to stop any activities at NPP Temelín leading to fuel activation and to establish an inspection team to investigate the mentioned information. Greenpeace also requested an immediate response about the adopted measures.

SÚJB letter of 25 August responding to questions in the Greenpeace letter of 10 August (to the effect that SÚJB performed an investigation of the impulse piping issues, failed to find any shortcomings and was properly informed about the installation and repair of the 850 mm piping/DN 850); to the letter of 14 August (to the effect that SÚJB has stated that ČEZ met all prescribed requirements) and to the suggestion in the Greenpeace letter of 25 August (SÚJB failed to find any reason to stop activities at NPP Temelín leading to fuel activation).

The letter again invited Greenpeace to hold a joint meeting and to discuss in person the raised comments.

Greenpeace letter of 25 August to thank for explanations on the impulse piping and DN 850 and its welds and requesting documents on welds on the DN 850 piping and inclusion of this issue on the agenda of discussions with SÚJB experts.

Greenpeace letter of 28 August informing that an action has been brought against unknown offender for incorrect installation of the coolant piping in the Unit 1 primary circuit. Greenpeace also requested supporting documents in this matter from SÚJB and agreed to hold a meeting with SÚJB experts on 29 August; Greenpeace again requested immediate suspension of all activities at NPP Temelín leading to fuel activation. The letter contained a warning that unless the requirements made by Greenpeace in the letter were met a similar action would be brought against "responsible individuals" from SÚJB.

SÚJB letter of 28 August confirming its willingness to hold the meeting on 29 August.

On 29 August a meeting was held in SÚJB building, attended by SÚJB and Greenpeace representatives. The subject matter of the meeting was the gradient and passability of the impulse piping and repairs of DN 850 piping installation. Both parties produced their own minutes from the meeting.

Greenpeace letter of 8 September referring to a previous notice that documents concerning repair of DN 850 were fake and requesting SÚJB Chairwoman to order immediate expert examination of the weld and to provide information to Greenpeace what measures will be taken by the Office in this matter. The letter also informed that Greenpeace had requested an action from the district public prosecutor's department in České Budějovice.

Reply to the letter of 12 September 2000 to the Ministry of Health concerning cooperation with Greenpeace and monitoring of shortcomings reported by Greenpeace.

Letter from the Greenpeace Swiss branch of 7 September 2000 delivered via the CR embassy in Switzerland. Referring to the GRS report, the letter raises objections against DN 850 piping and impulse piping.

SÚJB reply sent by fax of 29 September to the Greenpeace letter of 1 September saying that no information may be provided by SÚJB on the DN 850 piping issue as there is a police investigation under way.

Greenpeace letter of 5 October 2000 (14) remainder to respond to the letter of 8 September, requiring that documents about DN 850 piping are transmitted

SÚJB letter of 5 October 2000 responding to the Greenpeace letter of 8 September 2000 and informing again that no additional information will be provided on DN 850 piping as long as the police investigation is under way.

Greenpeace fax of 25 October 2000 requesting a meeting with SÚJB representatives to discuss the DN 850 piping.

SÚJB fax of 26 October 2000 responding to the Greenpeace letter of 25 October, refusing the proposed meeting and inviting Greenpeace to submit their questions in written.

Greenpeace letter of 23 November 2000 containing a list of questions for SÚJB concerning the welding issue (documents and the performed inspection) and the imposed fine (its substantiation and amount).

On 19 December 2000 the parties agreed in a telephone conversation to extend a deadline for the reply to the Greenpeace letter of 23 November 2000 by 20 days.

SÚJB letter of 9 January 2001 containing a reply to the Greenpeace letter of 23 November 2000.

Despite a relatively intense media campaign on the failure to provide information to the Austrian party the list of information provided in 2000 positively speaks to the contrary. Apart from a petition filed by Radek Pavlovec SÚJB in 2000 (since the effective date of Act No.106/1999 Coll.) received only three requests for information from the Austrian public, while three were requested by registered legal entities and none by individual persons.

LIST OF ABBREVIATIONS

A) Bodies and Organizations

ČHMÚ	Czech Hydrometeorology Institute
EK	European Commission
FJFI	Faculty of Nuclear Science and Physical Engineering, Czech Technical University in Prague
HÚCO ČR	Main Office of Civil Defense in CR
KKC	Emergency Response Center
LRKO	Laboratory monitoring radiation in surroundings of the nuclear power plant
IAEA	International Atomic Energy Agency
NEA/OECD	OECD Nuclear Energy Agency
RC	Regional Center
SÚJCHBO	State Institute for Nuclear, Chemical and Biological Protection
SÚRAO	Administration of Radioactive Waste Repositories
SÚRO	State Institute for Radiation Protection
ÚEŘMS	Institute for Expert Opinions and Dealing with Extraordinary Events
ÚJV Řež, a.s.	Nuclear Research Institute in Řež, joint-stock company
US DOE	US Department of Energy
US NRC	US Nuclear Regulatory Commission
VKRH	Governmental commission for radiation accidents
WEC	Westinghouse Electric Corporation
WENRA	Western European Nuclear Regulators Association

B) Technical Equipment, Systems, Documents and Activities

ASŘTP	Instrumentation and Control systems of technological processes
CRPO	Central Register of Professional Exposures
DG(S)	Dieselgenerator (station)
DKP	Lower end position
DPZJ	Partial quality assurance program
NPP Dukovany	ČEZ a.s. – NPP Dukovany

NPP Temelín	ČEZ a.s. – NPP Temelín
EZS	Electronic security system
FRO	Film rotating evaporator
FS	Physical start-up
HO	Emergency protection
HRK	Control rod
INES	International Nuclear Event Scale
IPV KO	Pulse safety valve on the pressurizer
MBA	Material Balance Area
MMKO	Measuring points of air contamination
MSVP	Interim storage of spent fuel
NPT	Treaty on Non-proliferation of Nuclear Weapons
ORZ	Unsealed radionuclide source
PCO	Control board of central protection
PERIZ	Periodic integral sealed tightness tests
PoZJ	Quality assurance program
PpBZ	Preoperational safety report
RAO	Radioactive wastes
RČA	Quick –acting valve
RMS	Radiation monitoring network
RO	Radiation protection
ROR	Reactor trip
RZV	Quick-closing valve
SKŘ	Instrumentation and control system
SVZ	Early warning network
TLD	Thermoluminiscent dosimeter
TSFO	Technical system of physical protection
URAO	Radioactive waste repository
URZ	Sealed radionuclide source
VAO	High-active wastes
VHP	Internal emergency plan

ORGANIZATIONAL CHART OF THE STATE OFFICE FOR NUCLEAR SAFETY