CONVENTION ON NUCLEAR SAFETY
3rd REVIEW PROCESS in 2005

ANSWERS

to

QUESTIONS
on the National Report of the Czech Republic

ARTICLE 6

QUESTION:

Is Temelin 1 still under a "trial operation license"? Why has a license for permanent operation not been issued?

ANSWER:

The Czech National Report was prepared at the time when the application for operational license for Temelín Unit 1 and Unit 2 was in progress. The required documentation was assessed and the license in accordance with the Atomic Act for operation of the Temelín 1+2 units was issued in October 2004. Time unlimited license for operation of the Temelín NPP based on the Civil Structure Act is planed to be issued in second half of 2005.

QUESTION:

The follow-up OSART mission at the Dukovany NPP in 2003 found that many of the findings of their first mission (2001) were fully resolved. What are the findings of the OSART mission that are still in progress, what is their status according to the safety of the NPP and what is the time schedule for their completion?

ANSWER: There is in just one suggestion in progress- 8.3(2): A faster process should be considered to account for missing plant personnel. The suggestion is solved by the modification "Installation of readers of identification cards at the entrances to shelters". The planned date of implementation is 2006. The other suggestions and recommendations are fully resolved.

QUESTION:

The annex 2 of the Czech CNS report 2004 contains a table with the IAEA safety recommendations. What is the time schedule envisaged for the implementation of the IAEA safety recommendations?

ANSWER:

Safety Issues NPP Dukovany – Proposed Time Schedule
Ident.; Name of Safety Issues; State; Implementation
G02; Qualification of equipment; 3; 2010
CI03; Primary pipe whip restraints; 3; 2007
S03; Reactor coolant pump seal cooling system; 3; 2010
S10; Steam generator safety and relief valves performance at low pressure; 3; 2010
S14; Main control room ventilation system; 3; 2009
S16; Primary circuit venting under accident conditions; 4; Solved in 12/2004
S17; Essential service water system; 3; 2006-2007
I&C01; I&C reliability; 3; 2006-2007
I&C02; Safety system actuation design; 3; 2005
I&C04; Human engineering of control rooms; 3; 2010
I&C05; Physical and functional separation between the main and emergency control rooms; 3; 2010
I&C06; Condition monitoring for the mechanical equipment; 3; 2006
I&C09; Accident monitoring instrumentation; 3; 2010
I&C10; Technical support centre; 3; 2006
C01; Bubbler condenser strength behavior at max. pressure difference possible under LOCA;

3; 2007-2008
IH03**;** Fire detection and extinguishing; 3; 2010
IH04**;** Mitigation of fire effects; 3; 2010
IH06**;** Turbine missiles; 4; Solved in 12/2004
IH07**;** Internal hazards due to high energy pipe breaks; 3; 2008
EH01; Seismic design ; 3; 2007
AA01; Scope and methodology of accident analysis; 4; Solved in 12/2004
AA06**;** Overcooling transients related to pressurized thermal shock; 4; Solved in 12/2004

Safety Issues NPP Temelin – Proposed Time Schedule
Ident.; Name of Safety Issues; State; Implementation
G02; Qualification of equipment; 3; 2005
CI02; Non-destructive testing; 3; 2005
CI03; Primary pipe whip restraints; 3; 2005
AA06**;** Overcooling transients related to pressurized thermal shock; 4; Solved in 12/2004

QUESTION:

Specific recommendations of AQG in relation to Dukovany NPP (bubbler system). Which modifications derived in the BCEQ projects concerning metal structure properties are under preparation and which measures have already been implemented by the NPP?

ANSWER:

The necessary improvement measures identified by the BCEQ (Bubble Condenser Experimental Qualification) project from their assessment of the testing at VUEZ (Research Institute of Energy Equipment, Levice, Slovakia) test facilities are:

- Vertical stiffening of the bottom tray by adding additional columns between I-beams 600 of the first and second tray (Dukovany Modification No. 5083 – Modification of Bubble Condenser – implementation in 2005)
- Strengthening the face and backside of tray level 12 (Dukovany Modification 5154 - Strengthening the face and sidewalls of tray level 12 – implementation in 2005– implementation 2007 until 2008).

Regulator Body Protocol confirms that specific recommendations of AQG (Atomic Question Group) are fulfilled, and recommendations of the BCEQ project are addressed.

QUESTION:

Have all major conclusions of the analyses related to the improvement of the bubbler system been addressed?

Have the recommendations of PHARE PR/TS/17 concerning the methods to verify the function of the bubbler system been considered?

ANSWER:

In contrast to the approach used in the BCEQ project (PHARE PH 2.13/95), PHARE PR/TS/17 project has concluded that the findings from the thermal-hydraulic experiments at the EREC (Electrogorsk Research and Engineering Centre on NPP Safety, Russia) test facility cannot be directly transferred to the NPPs. Therefore, the Technical Support Organizations have validated the COCOSYS computer code against the EREC test results. COCOSYS was then used to analyze NPP accident scenarios. These analyses indicated the conservative character of earlier performed thermal-hydraulic calculations.

It was concluded in the final report of the BCEQ project, that the integrity of the Bubble

Condenser Containment is confirmed for large pipe breaks and that for most trays the structural integrity was demonstrated. However, the top and bottom trays need strengthening measures.

QUESTION:

Temelin site was prepared for 4 units. Are there any plans to build in the future units 3 and 4?

ANSWER:

In 2004 the Government of the Czech Republic agreed an updated Energy Policy which considers all suitable alternatives of electricity generation. In the energy mix, nuclear energy usage is expected. In the past several sites were thoroughly examined and selected in accordance with the Czech legislation criteria. It is logical that the remaining space in Temelín is one of them and could be used with several advantages. But at the present time there are no plans to start any NPP construction. Others problems have to be solved, such as the growing age of coal power plants and their reconstruction, or construction of new coal plants. A number of renewable sources are also to be built in accordance with the same policy.

In the field of nuclear energy the Czech Republic is monitoring a technical development and all activities are just at the level of feasibility studies.

QUESTION:

What were the main results of the assessment by insurance pools at Dukovany NPP?

ANSWER:

(from the Insurance Pool Report): The programs and practices reviewed at EDU generally met or exceeded Nuclear Pool expectations with respect to Pool guidelines, consensus standards, regulatory requirements and commonly observed good or best nuclear industry practices.

Physical conditions observed during the facility tour were favorable. The apparent material condition of all inspected areas was positive. Accessibility, housekeeping, postings, equipment labeling, equipment leakage and radiological conditions were favorable.

It was evident that the management has developed and enforced high standards with respect to the nuclear safety culture which have resulted in a favorable plant safety and operational record as well as a favorable nuclear insurance risk.

QUESTION:

What is the period of time to update technical documentation and full-scale simulator models after modernisation of NPP systems (equipment)?

ANSWER:

All changes are evaluated according to QA documentation dedicated to modifications (e.g. “Maintaining conformity of the simulator with conditions of technology and documentation”). Simulator staff (instructors) and control room staff have to have the necessary information about modifications in advance, before these are fully implemented in the unit. The time period of full-scope simulator modification depends on the safety importance of the unit modifications. It means that, for example, important changes (with high human failure risk), e.g. in the protection and emergency systems or in the main control systems, are implemented as soon as it is technically possible according to plant internal procedures. The staff is then trained before the modification is implemented. The less important changes, or those which have no essential impact on personnel simulator training, are implemented in the time frame of planned periodical updating or upgrades of the plant simulator model. But the control room and technical support staff are still informed and trained via classroom “training days”.

ARTICLE 7

QUESTION:

What is the legal status of recommendations and guidelines published by SÚJB. Are these regulations mandatory to license holders?

ANSWER:

The legal framework of the Czech regulatory system consists of the Atomic Act, No. 18/1997 Coll., and 17 implementation Decrees, which were issued by the SÚJB (State Office for Nuclear Safety) and cover all aspects of nuclear safety, radiation protection and emergency preparedness. No other Decree is required by law. The majority of Decrees is of a generic nature and comply with IAEA recommendations. It means that they are not detailed. The issued Decrees are mandatory for all applicants /licensees.

The legislation doesn't recognize the system of Regulatory Guides. In 1975 the former regulator, CZAEC, initiated the issuance of an editorial series – Safety of nuclear installations ("blue series") – in which the SÚJB has been continuing.

During the period 1975-2005 more than one hundred issues have been published in the above-mentioned series. Some of the issues have the character of a Regulatory Guide ("blue with green belt") and this is indicated by the foreword of the Regulatory Body.

Serving as the latest example is the Regulatory Guide on Safety of Nuclear Research Facilities (4/2004). It was confirmed by the IRRT mission in 2001 that the current legal basis for safety regulations in the Czech Republic is complete and fully comparable with that of developed countries.

QUESTION:

The Report describes that the licence holder has the main responsibility for nuclear safety. How is nuclear safety assured in cases when the licence holder fails to comply with the requirements of the Atomic Act and what are the consequences?

ANSWER:

Execution of the state supervision of peaceful utilization of nuclear energy and ionizing radiation is laid out in the Atomic Act and comprises: inspection activities of the SÚJB (Section 39), remedial measures (Section 40) and penalties (Sections 41 and 42).

In the case that the Inspector of the SÚJB identifies deficiencies on the premises of an inspected person, s/he is authorized to require remedy, compel the inspected person to perform technical inspections, reviews or testing of operating condition of the installations. S/he has the authority to withdraw the special professional competence authorization issued to an employee of the inspected person. In the case there is a risk of delay, the SÚJB is authorized to impose the obligation to reduce the power output or to suspend operation of the nuclear installation.

For violation of a legal obligation established in the Atomic Act, the SÚJB shall impose a penalty up to the sum of:

CZK 100 million (about EUR 3 million) on those who violate the prohibition on nuclear energy utilization for other than peaceful purposes.

CZK 50 million (about EUR 1.5 million) on a person performing activities without a license for particular practices, such as, for example, siting and construction of a nuclear installation; particular stages of nuclear installation commissioning; operation of a nuclear installation; restart of a nuclear reactor to criticality following a fuel reload; reconstruction or other

changes affecting nuclear safety, radiation protection, physical protection and emergency preparedness of a nuclear installation).
CZK 10 million (about EUR 0.3 million) on a licensee violating an obligation under Sections 17 to 20 of the Atomic Act, such as, for example, general obligations of licensees; obligations from the view of nuclear safety, radiation protection, physical protection and emergency preparedness.
Natural persons of statutory bodies could be fined up to CZK 200,000 (about EUR 6,600) and employees up to CZK 100,000 (about EUR 3,300) for distortion or concealment of facts important for performance of an inspection or for non-cooperation during an inspection.
If a natural person commits an offence, s/he could be the subject of criminal proceedings.

QUESTION:

Since the Act n. 100/2001 imposed the requirement of an Environmental Impact Study, including public participation, after the Dukovany has been constructed, what was done to adapt the situation to the new requirements?

ANSWER:

Dukovany NPP was commissioned in the following years: Unit 1 - 1985, Unit 2 - 1986, Unit 3 - 1987, Unit 4 - 1987. Act No. 100/2001 Coll., on environmental impact assessment, regulates the assessment of impacts on the environment and on public health and the procedure for natural and legal persons, administrative authorities and territorial self-governing units (municipalities and regions) in this assessment. Subject to environmental impact assessment are projects and conceptions as specified in this Act whose implementation could significantly affect the environment.

This Act came into force on January 1, 2002 and did not have a retroactive effect. It was not possible for public participation, as a very important part of this Act, to be applied in the case of Dukovany NPP. The assessment of the impact on the environment and on the public is subject to the intensive evaluation of, for example, FSAR after 20 years of Unit 1 operation.

QUESTION:

Has SUJB ever used penalties as a mechanism of enforcement for the nuclear power plants? In which cases?

ANSWER:

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CZK 100 million (about EUR 3 million) on those who violate the prohibition on nuclear energy utilization for other than peaceful purposes.
CZK 50 million (about EUR 1.5 million) on a person performing activities without a license

for particular practices, such as, for example, siting and construction of a nuclear installation; particular stages of nuclear installation commissioning; operation of a nuclear installation; restart of a nuclear reactor to criticality following a fuel reload; reconstruction or other changes affecting nuclear safety, radiation protection, physical protection and emergency preparedness of a nuclear installation).
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If a natural person commits an offence s/he could be the subject of criminal proceedings.

QUESTION:

It is stated that the most significant amendment was effected by Act No. 13/2002 Coll., which was particularly adopted in connection with preparation for accession to the European Union. In addition, provisions related to radiation protection were amended in particular for assuring compatibility with the respective European directives. It is understood that the Czech nuclear power plants were sited, designed, constructed and operated according to the Acts and decrees that were later amended as described above. Please outline the significant amendments and subsequent modifications in the plant hardware or procedures.

ANSWER:
Based on requirements Act No. 13/2002 Coll. old decrees have been amended and new once elaborated.
Significant amendments affected by Act No. 13/2002 Coll.:
Decree No. 307/2002 Coll. - on Radiation Protection,
Decree No 315/2002 Coll. - Activities Directly Affecting Nuclear Safety and Activities Especially Important from Radiation Protection Viewpoint,
Decree No. 145/1997 Coll. - Accounting for and Control of Nuclear Materials and Their Detailed Specification,
Decree No. 317/2002 Coll. - Type Approval of Packaging Assemblies for Transport, Storage and Disposal of Nuclear Materials and Radioactive Substances,
Decree No. 318/2002 Coll. - Details of Emergency Preparedness of Nuclear Facilities and Workplaces with Ionizing Radiation Sources and on Requirements on the Content of On-Site Emergency Plan and Emergency Rule,
Decree No. 319/2002 Coll. - Performance and Management of the National Radiation Network,
Decree No. 179/2002 Coll. - List of Selected Items and Dual Use Items in Nuclear Sector,
Decree No. 419/2002 Coll. - Personal Radiation Passports.
Amendments to the Atomic Act (No. 13/2002 Coll.) have caused no equipment modification. A number of safety-significant modifications had been implemented by 2004, but they were not evoked by amendments (see Czech Republic National Report, Annex 1).

QUESTION:

The Czech nuclear legislation and regulations seem to be very detailed and, as such, very prescriptive. Please describe in more detail the regulatory guide system you have. Do you have plans to further develop the structure of your nuclear legal document system, perhaps to the direction of a more performance based and guiding system?

ANSWER:
The legal framework of the Czech regulatory system consists of the Atomic Act, No. 18/1997 Coll., and 17 implementation Decrees, which were issued by the SÚJB and cover all aspects of nuclear safety, radiation protection and emergency preparedness. No other Decree is required by law. The majority of Decrees is of a generic nature and comply with IAEA recommendations. It means that they are not detailed. The issued Decrees are mandatory for all applicants /licensees.
The legislation doesn't recognize the system of Regulatory Guides. In 1975 the former regulator, CZAEC, initiated the issuance of an editorial series - Safety of nuclear installations ("blue series") - in which the SÚJB has been continuing.
During the period 1975-2005 more than one hundred issues were published in the above-mentioned series. Some of the issues have the character of a Regulatory Guide ("blue with green belt") and this is indicated by the foreword of the Regulatory Body.
Serving as the latest example is the Regulatory Guide on Safety of Nuclear Research Facilities (4/2004). It was confirmed by the IRRT mission in 2001 that the current legal basis for safety regulation in the Czech Republic is complete and fully comparable with that of developed countries. New guidance is being prepared in line with the SÚJB long-term strategy.

ARTICLE 8

QUESTION:

The Report states that advisory groups of independent experts provide expert support for the SÚJB. What are the main missions of such advisory groups in combination with the experts at the SÚJB and how is the independence of these experts ensured?

ANSWER:

The requirement to establish standing Advisory Groups to the regulatory body is not expressed in the legislation (law, decrees). In compliance with the international regulatory practice and IAEA recommendations, two Advisory Groups were established by the chairperson of SÚJB in 1998:
Advisory Group on nuclear safety and Advisory Group on radiation protection.

Both groups consist of 12-15 members, who are appointed for 3 years by the chairperson of the regulatory body. The members are leading experts from the Czech Republic and abroad. They are from research institutes, universities, foreign regulatory bodies etc.
The main goal of the Advisory Groups is to prepare highly qualified independent recommendations or views for the chairperson of the SÚJB. Both Advisory Groups have their own Statute and meet as a rule 1-2 times annually.

Independence of Advisory Groups is satisfied by their own statutes and members come from different fields of interest in nuclear safety, personally separated from SUJB activities.

QUESTION:

A license issued by SUBJ is required for:

...

s) adding of radioactive substances into consumer products during their manufacturing or preparation or import or export of such products.
Which types of products are concerned? What is the 'justification' (according to the ICRP philosophy) for such a practice?

ANSWER:

This type of license was added to the Czech Atomic Act in 2002 so as to achieve full compatibility with Council Directive 29/1996/Euratom. It is intended for ionization chamber smoke detectors, radioluminous devices, consumer products containing gaseous tritium light sources, thoriated gas mantles and similar products. In the past, the Czech Republic used a general type of license for manufacturing such sources with some special provisions (guidance) for users. To date, the Czech Republic has very limited practical experience with this new type of license.

Justification for a practice with a consumer product containing radioactive substances means, like for other practices, that there is a positive net benefit from the introduction of the practice. The determination of whether or not there is a positive net benefit from the practice is a complex matter. There are benefits and costs, including the detrimental costs to manufacturers, suppliers and the public. The SÚJB in its consideration of applications for a license has decided to restrict itself to the benefit to the consumer and the radiation doses that arise as a consequence of the use, misuse and disposal of the product.

The SÚJB considers that at low levels of radiation hazard it would be unreasonable to refuse or to approve a product containing a radioactive substance solely on the grounds that there were non-radioactive alternatives. But some products are deemed unacceptable in principle and are prohibited directly by the law, especially toys, personal ornaments and cosmetics.

QUESTION:

(refer also to Art.13, pag.56). What is SUJB doing regarding Quality Assurance of the Regulatory Body?

ANSWER:

Since its creation the SÚJB has evolved and matured as a regulator, with a clear separation of its activities as a regulator from those organizations promoting and using nuclear energy. In general it operates according to good international practices and methodologies and benefits from relevant experience of other countries.

Basic elements of a good management system enabling the SÚJB to perform its activities in a systematic and consistent manner were put in place from the very beginning of the establishment of the organization in 1993. In line with the recent developments in the field of regulatory quality management world wide, the SÚJB performed an internal Quality Assurance (QA) audit in 1999 to assess the effectiveness of its management system.

Based on the report from the 1999 audit and taking into consideration IAEA TECDOC – 1090- "Quality Assurance Within Regulatory Bodies“ as well as Czech standard CSN EN 45004 "General criteria for activities of different inspections offices“, a strategy for the gradual development and implementation of the SÚJB QA system was developed.

During the IRRT 2001 mission this strategy was reviewed in detail and was found to be in line with good international practices. In the expert’s opinion, good progress has been made in the area and the QA documentation has been reviewed by the SÚJB and revised to meet the relevant QA requirements. The experts recognized that further effort is planned to organize periodic review of the QA documentation and to then effectively implement the QA management system. It is part of the SÚJB management strategy to continue to communicate with, motivate and encourage the regulatory body staff in the acceptance and implementation of the QA system.

To complement the development of a QA system a systematic approach is being taken to implement an electronic system to control the documentation flow. Several databases have been developed to document and facilitate the inspection and decision making activities. The use of electronic databases is understood by the SÚJB management as an important development for improving regulatory effectiveness.

QUESTION:

Comment: It is mentioned in Chapter 3.1.4 that several Advisory Groups are available to support SUJB. Please provide us with the names of them and describe the compositions, duties and competencies of them. Are these committees permanent or working only as ad-hoc committees?

ANSWER:

The requirement to establish standing Advisory Groups to the regulatory body is not expressed in the legislation (law, decrees). In compliance with the international regulatory practice and IAEA recommendations two Advisory Groups were established by the chairperson of SÚJB in 1998: Advisory Group on nuclear safety and Advisory Group on radiation protection. The Advisory Group of the SÚJB chairperson for nuclear safety was established by a decision of the SÚJB chairperson in 1998. Both the composition and functioning of the Advisory Group are regulated by the Statute of the Advisory Group, which is approved by the SÚJB chairperson. The task of the body is to discuss current and potential problems of utilization of ionizing radiation in the Czech Republic and to prepare recommendations for the SÚJB chairperson, based on the conclusions of topic discussions. Independence of Advisory groups is satisfied by its own statute and members come from different field of their interest on nuclear safety, personally separated on SÚJB activities.

The Group consists of 12-15 members, who are appointed for 3 years. The members are leading experts from the Czech Republic and abroad. They are from research institutes, universities, foreign regulatory bodies etc. Independence of Advisory Groups is satisfied by their own statutes and members come from different fields of interest in nuclear safety, personally separated on SÚJB activities.

The head of the Advisory Group is appointed by the chairperson of SÚJB Members of the Advisory Group are required to be personally present at its meetings and are entitled to submit proposals for discussion topics.

The meetings of the Group are organized by the chairperson of the committee and are usually held once or twice a year. If required, other experts specialized in currently discussed problems, may be invited to the meeting. The voting quorum for the meeting conclusions is 2/3 of the designated members of the Advisory Group and final conclusions have to be adopted by an absolute majority of the members present. In the case of fundamental professional disagreement in Group members' opinions, the minority opinion is added to the final conclusions with justification. The Advisory Group submits the final conclusions of the meeting to the SÚJB chairperson in written form.

The Advisory Group of the SÚJB chairperson for radiation protection was also formed by decision of the SÚJB chairperson in 1998, based on the Statute of Advisory Group. This Group has identical competences, rights, duties, organization and forms of operation to the above-mentioned Advisory Group for nuclear safety. The personnel composition is different, since the Advisory Group for radiation protection consists of experts in the field of radiation protection. The subjects of the Group's activities are contemporary and perspective problems of nuclear safety of the nuclear facilities in the Czech Republic.

QUESTION:

Please describe the constitution of the advisory bodies to the SUJB Chairperson.

ANSWER:

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QUESTION:

The penultimate paragraph on this page refers to the ability of the regulatory body, SUJB, to issue a "provisional measure" imposing obligations on the "inspected person" to reduce power or suspend operation of the nuclear installation. What is meant by the word "provisional"? Does the measure have immediate legal force? By whom could the measure be challenged or countermanded? If measures issued by SUBJ are not considered final and absolute, how can the regulatory body be said to have the necessary authority and separation from other bodies and organizations, as required by this Article?

ANSWER:

As specified on page 29, the SÚJB is authorized to require remedial measures that shall compel the license holder to correct non-compliances. In special situations that are stated in the Atomic Act, the legal procedure is open to issuance of the Decision on a provisional measure According to Czech legislation the meaning of a provisional measure is specified in the Administration Act. The provisional measure is the first step to compel a given person to do something and has immediate, absolute legal force. The right for appeal has no suspensory effect. The legal procedure performance afterwards opens the discussion and the final decision shall be issued (confirmation or withdrawal of the measure).

QUESTION:

The report describes quite extensively the structure of the regulatory body in relation with its various missions, however the description of human resources is rather limited. Could the Czech Republic provide some more information about the qualification of the staff, the various degrees in inspector's qualification, the training programme for inspectors, the policy for replacing retiring staff, etc?

ANSWER:

The structure of the SÚJB staff and their qualifications is determined by the requirement for effective and modern administration in the area of nuclear safety, radiation protection and related fields. To attain this objective it is necessary to secure a sufficient quantity of qualified inspectors carrying out the supervisory and regulatory functions of the SÚJB and also enough staff carrying out the standard administrative and support activities. Furthermore many experts in economics, human resources management and internal security participate in the realization of tasks within the competence of the SÚJB. The SÚJB currently employs 196 persons. 147 of them have university education and 49 of them have secondary education. The SÚJB staff has to have the necessary education level and competencies according to the grading and specialization of individual workers. According to the requirements for qualification of inspectors stated in paragraph 39.2 of the Act No. 18/1997 Coll., on Peaceful Use of Nuclear Energy and Ionizing Radiation (the Atomic Act), inspectors are obliged to have university level education in the appropriate technical specialization and at least 3 years´ experience. Qualification of employees, including inspectors, is maintained and increased by further training.

The basic forms of further training for inspectors and other SÚJB staff are identical. An unified system of maintaining and increasing the competencies of SÚJB staff is regulated by internal rules of the SÚJB ("System of employees training", Internal Procedure No. 039) in accordance with uniform governmental policy ("System of employee training in public administration", Government Decision No. 814 of 23. 8. 2000). Preparation and training of employees is based on an Individual plan for increasing personal capabilities (IPIPC). Various training modules are created with regard to the requirements of general and specialized education of individual employees. The objective of permanent preparation and training of employees is to attain the qualification and specialization necessary for the performance of their responsibilities. Permanent increasing qualifications and participation in training are among the basic duties of SÚJB staff.

Preparation of inspectors is carried out by means of lectures, seminars, training courses (also international), special training (i.e. on a full-scale nuclear power plant simulator), consultations, exercises and self study. The training is based on IPIPC that is individually developed for each employee in cooperation with the department of preparation and training (Chancellery, SÚJB Office). The IPIPC differentiates the preparation of inspectors according to their level of education, practice and specialization. The IPIPC is created for a 3 -year span and its fulfillment is evaluated by the employee and his seniors after the expiration of this period.

For the purpose of training the SÚJB staff are divided into 4 groups corresponding to 3 grades of preparation and training:

- group A - novices (the 1st grade of training, providing basic information about the SÚJB and particular departments),
- group B - employees with permanent employment in SÚJB (including inspectors),
- group B1 – assistant inspectors (employees with permanent employment in SÚJB who are preparing for the inspector's examination),
- Groups B and B1 pass through the 2nd grade of training - lifelong training.
- group C - middle and high management

The 2nd grade of training also aims at deepening the knowledge in fields that are not included in acquired qualification. The training is based on the level and type of the employee's education (secondary, masters, postgraduate). Lifelong training of inspectors is divided into several modules:

- inspectors' preparation for the performance of administrative activities,

- module for knowledge development in domestic atomic law and international nuclear safety law, physical protection, radiation protection and emergency planning (according to the inspector's qualification and job title),
- module of technical disciplines, according to the inspector's specialization and qualification. The design of this module (in IPIPC) is based on the analysis of the SÚJB´s current requirements' and the inspector's knowledge. The forms of training in this module are: seminars, lectures, workshops, activities in working and advisory groups and technical committees, etc,
- module of study stay and visits to nuclear facilities and in information centers of nuclear power plants, SURO (National Radiation Protection Institute), SUJCHBO (National Authority for Nuclear, Biological and Chemical Protection). This module is important for gaining experience with contemporary operational trends of nuclear facilities (The module is necessary for assistant inspectors during their preparation for the inspector's examination.),
- special training on a full scale nuclear power plant simulator (for inspectors working in an SÚJB office located in a nuclear power plant),
- language training.

For inspectors in senior positions there is also applied the 3rd grade of training for middle and higher management, which is designed to maintain and develop managerial and communication abilities.

The qualification of inspectors is determined primarily by their education, technical practice and training in the course of their SÚJB employment. The level of education determines the initial qualification of inspectors. Higher levels of qualification are supposed to be reached through further training, fulfillment of working tasks and selfstudy provided by educational institutions (including governmental educational institutions). These higher levels of inspectors' qualification are not formally recognized although they can serve as an indicator for the placement of an inspector into the SÚJB organizational structure.

Two grades of qualification can be distinguished in inspectors‘ training: assistant inspector (group B1) and inspector (group B). These grades are separated by the passing of an inspector's examination. An assistant inspector is systematically prepared for the inspector's examination in the forms of lifelong training with regard to the special requirements of the examination. The training plan of assistant inspectors emphasizes study stay in and visits to nuclear facilities, participation in inspections and negotiations with other offices and organizations. The practical part of the training culminates in a prescribed inspection. An assistant inspector proves the attainment of the required level of qualification for an inspector's work by successfully passing the inspector's examination.

Retirement and other changes influencing the total level of the SÚJB human resources qualification entail the necessity of replacement of qualified staff. The replacement takes place according to actual needs of the SÚJB and within the limits of SÚJB budgetary incomes. Appropriate candidates for SÚJB employment are chosen on the basis of results of a complexly structured selection procedure from graduates or experienced professionals. New personnel are recruited mainly from institutes, universities and industry.

QUESTION:

The report mentions also that the regulatory body comprises both central inspectors and resident inspectors (see also §4.1 p. 36). Could the Czech Republic indicate the relative proportion of central inspectors to resident inspectors and clarify the share of the inspection work between these two kinds of staff?

ANSWER:

In both operated NPP the SÚJB has a resident inspectorate. The Dukovany NPP resident inspectorate has 4 resident inspectors (1 per unit including the head of the inspectorate); the Temelín NPP resident inspectorate has 3 resident inspectors (1 per unit plus the head of the inspectorate). The nuclear safety section has in the headquarters 29 nuclear safety inspectors.

Resident inspectors carry out routine daily inspections. The results of the routine inspections serve as one of the bases for planning of specialized system inspections. Internal QA documents relevant to inspections state which activities are covered by resident inspectors and which by inspectors- specialists from headquarters. Quantifying the share of resident inspectors and headquarter inspectors in overall SÚJB inspection activities is difficult because resident inspectors activities support the activities of inspectors from headquarters in the manner state above.

QUESTION:

How does SUJB obtain independent expertise if the corresponding TSO also works for the industry?

ANSWER:

The independence of expertise provided by Technical Support Organizations for the SÚJB is satisfied in compliance with the requirements of Decree No. 214/1997 Coll., which means that the persons who perform independent verification or independent evaluation shall not directly participate in the processes or items which are the subject of verification, nor shall they have the authority to control these processes or items, and shall have sufficient authority to give the results and reports about their own verification or evaluation to representatives of a high level of management where the verification or evaluation is performed.

These requirements are satisfied in the SÚJB for the purposes of assessment of safety documentation and additional documentation requested by the SÚJB from a licensee by means of different approaches. For long-term purposes there are self-reliant sections organized in the supporting organizations, functionally and personally separated, carrying out only expertise and analyses ordered and financed by the SÚJB. Other component assessments and expertise are assigned to specialists not participating in assessed activities (processes, items) for the industry.

The level of the external assessments and expertise independence is verified internally by SÚJB experts. If there are any doubts, these experts are obliged to require an additional independent expert opinion.

If any additional expertise is required from a licensee by the SÚJB, it shall be carried out in compliance with Decree No. 214/1997 Coll.

ARTICLE 9

no question.

ARTICLE 10

QUESTION:

What were the basic principles for the determination of indicators that characterize trends of the nuclear safety level by the license holder and was the State Office stipulating this for Nuclear Safety (SÚJB)? Which sets of safety indicators have been implemented, with what major findings up to now?

ANSWER:

The basic principle for determination of indicators which are included in the SÚJB's set was to: accurately and objectively measure plant safety performance, allocate regulatory body inspection resources, provide basis for regulatory actions, accurately communicate to the safety performance to industry and the public.

The indicators have to have a simple definition, easily get to input data and the results must not be manipulated, they have to sufficiently describe the situation in a specific area of NPP operation. Four areas of NPP operation were chosen as characteristic for assessment of nuclear safety: Significant Events, Safety System Performance, Barriers Integrity, and Radiation Protection.

These rules were also applied during the negotiations with the licensee for establishing a so-called "common" set of indicators. Common in this case means that the indicators with the same definition, input data and calculating procedure are independently evaluated by the regulator and the licensee.

The whole set of SÚJB indicators is included in Annex 6 to the CNS Report 2004.

Based on the results of the Safety Performance Indicators evaluation we can state that the hitherto high level of nuclear and radiation safety in power generation in Dukovany NPP was confirmed.

QUESTION:

What is the composition of the Civil Safety Commission? Give examples of some of its decisions or recommendations.

ANSWER:

The Civil Safety Commission (CSC) operates in EDU surroundings. The CSC consists of village citizens from a 20 kilometers zone in the neighborhood of Dukovany NPP. The CSC has 6 members nominated by local authorities.

The CSC does not give decisions or recommendations. The CSC in principle presents only so-called "communication connection" between the NPP and the population. Information is given to the CSC from the NPP, in order that the CSC is able to interpret events at the NPP further on and well (operation, events, outages, safety, modifications etc).

QUESTION:

Which actions have been taken to improve safety management since the CNS report 2002? Which indicators and additional tools are used for the monitoring of safety management performance? Is there a wider use of direct and indirect safety performance indicators by the regulator?

ANSWER:

The structure of the SÚJB's Inspection Department was changed in compliance with the transition of Temelín NPP from start-up mode to operation mode in 2004. The department has a unit for feedback and a unit of system engineers. The main purpose of this change was to improve the effectivity of the SÚJB's inspection activities by feedback from inspection findings.

Both power plants use at common set of safety indicators for the monitoring of safety performance derived from TECDOC 1141.

The safety indicators evaluate:

- fluency of operation (unplanned power reduction, unplanned start-up of safety systems, tightness of the barriers),
- risk of operation (safety system unavailability, SS failures at start-up and during operation, emergency events, TS violations , risk based indicators)
- approach to safety (significant events, human factor, radiation protection, fire protection, security protection, waste).

Both power plants use the software application INDI (Indicator Display System) for evaluation and monitoring. Evaluation results are given monthly in the Reports on the safety status.

The SÚJB has its own set of Safety Performance Indicators, which were developed in the early 90s, and are still innovative on the experience-gained basis. The subset of indicators creates so-called "common" indicators set for the regulator and the licensee. The results of evaluation are in Annex 6 to CNS Report 2004. The SÚJB has no set of direct indicators in use.

ARTICLE 11

QUESTION:

Feedback on experience should be integrated into training activities at the nuclear power plants. What are the measures taken to incorporate this knowledge into training programs without undue delay?

ANSWER:

Feedback of operational experience is integrated into training activities at the nuclear power plants during the following kinds of training:

a) basic training (for authorization, for certification, for entry into the control area, general employ training)
b) periodic training (simulator training, training days, follow up of important transient or events training, training and tests for entry into the control area)
c) contractor training

Feedback on experience is integrated into training programs immediately after the corrective action (UNO) related to human failure is issued by the Failure Commission (PRK).

QUESTION:

What is the frequency for retraining of personnel from the main control room?

ANSWER:

The forms and frequency of periodic retraining and examinations of MCR personnel follow the state regulation requirements, or the company's internal obligatory rules which define the qualification standards for each job. For instance the state examinations (written, oral and practical - on the simulator) to renew control room operator authorization have the period of 2-8 years (depending on the decision of the examination committee in accordance with the results of exams and the duration of a participant's practice). The minimum scope of periodic training on a full-scale simulator is 10 days a year. A regular all-day so-called "training day" (which includes topical information from NPP operation and maintenance) is organized at least 8 times a year. Repeated training and examination of knowledge of industrial safety, fire protection, emergency preparedness, radiation protection, etc is also organized with the period of 1 year as a rule.

QUESTION:

The second paragraph of this section says that the licensee's "quality assurance system includes the commitment to arrange for sufficient financial resources… for assurance of the safe operation of the company's nuclear power plants" and that this "has been described in detail in the relevant control documents." It is unclear from this paragraph, and also from the later section 8.1.3 of the National Report, whether the regulatory body would approve these documents. In the light of increasing competition in electricity supply markets, it is important that the regulatory body is fully aware in advance of any proposals by the licensee to make cuts in the financial provision available for the safe operation of his nuclear installations. Does the Czech regulatory body have the necessary prior information and the powers to prevent organisational changes, possibly including reductions in the numbers and/or competences of the licensee's staff, which it considered could have an adverse effect on safety?

ANSWER:
The organizational form of the licensee is in light of the security of separate elements of the quality system described in the Quality assurance programs, which are approved by the Regulatory Body. Organizational changes must be introduced to the Regulatory Body for approval in the form of Quality assurance program revision (each change must, according to Atomic Act be approved by the Regulatory Body).
Organizational changes influencing safety (changes affecting activities which have an exciting influence on nuclear safety and activities especially important for radiation protection – explicit specification is listed in Czech legislation) must be approved by the Regulatory Body.
Organizational changes without an influence on activities with an exciting influence on nuclear safety and on activities especially important for radiation protection, but with an influence on activities important for nuclear safety are reported to the Regulatory Body.
Organizational changes, which have no references to nuclear safety, radiation protection, physical protection or emergency preparedness, are not approved by the Regulatory Body and do not need to be reported to the Regulatory Body.
The assessment of organizational changes´ effect on with respect to nuclear safety, radiation protection, physical protection or emergency preparedness is performed by the licensee according to the licensee rule which is handed over to the Regulatory Body (the procedure "Classification of organizational changes influencing safety").
If the Regulatory Body finds out that during organizational changes a licensee deviated from his duties established by the Atomic Act, it is within its capacity to cancel the license or to impose significant fines.
The Regulatory Body has available information about organizational changes prior to their realization and has the competence to prevent their realization if they could be deemed to have negative impact on nuclear safety, radiation protection, physical protection or emergency preparedness. The Regulatory Body also has during organizational changes adequate competences for reparation enforcement, eventually for termination of license.

QUESTION:

The final line of the third paragraph in this section says "Funding of individual projects is provided from the company's unrestricted sources." What does this mean? In what sense does the licensee have "unrestricted sources"?

ANSWER: It is probably an incorrect translation. So-called "dissolute" (not unrestricted) sources are basically a non-purpose loan, which means available financial resources.

QUESTION:

In the second paragraph, it is unclear whether the liability or the operator is set at 6 billion CZK or 1.5 billion CZK.

ANSWER:

The liability of a licensee for nuclear damage caused by each single nuclear event shall be limited in the case of major nuclear installations (nuclear installations used for power generation purposes, storage facilities and repositories of spent nuclear fuel assigned to these installations, or nuclear materials generated by processing of this fuel), to the sum of CZK 6 billion (about EUR 200 million). This amount defines the liability of the operator. No less than CZK 1.5 billion (about EUR 50 million) of this amount must be covered by insurance.

ARTICLE 12

QUESTION:

The Report states that a significant portion of the operational events at the NPPs where caused by human failure. What were the main root causes for such events during the reporting period and which measures have generally been taken by the regulatory body and the operators to reduce the number and the consequences of such events?

ANSWER:

Recently the number of events caused by human failure has decreased. The root cause analyses of the events caused by human failure define four major categories of such events: (1) events caused by incomplete information in operating instructions; (2) events caused by insufficient personnel training; (3) events caused by failure in activities coordination and (4) events caused by inadequate personnel self-control. Based on the root cause analyses of the events caused by human failure the following general corrective actions were specified: (1) actions to increase the status of operating instructions so as to facilitate the usage of instructions, and (2) actions to increase the level of personnel training at the full scope simulator.

Regulator body carries on periodic inspections of way and completeness of the-licensee investigation of the safety significant events root causes and only in the singular cases it calls for completion of other corrective measures than proposed by the licensee.

QUESTION:

What is the criterion to decide in the length of the period of the authorization (2 to 8 years?) granted to "selected personnel"?

ANSWER:

The Atomic Act and SÚJB Decree No. 146/1997 Coll. (Specifying Activities Directly Affecting Nuclear Safety and Activities Especially Important from Radiation Protection Viewpoint, Requirements on Qualification and Professional Training, on Method to be used for Verification of Special Professional Competency and for Issue Authorizations to Selected Personnel and the Form of Documentation to be Approved for the Licensing of Expert Training of Selected Personnel) set a period of two to eight years.

These legislation requirements are developed in the Statute of the State Examination Commission for Verification of Special Professional Competence of Selected Personnel of Nuclear Installations:

1/ Should the authorization be awarded for the first time, its term is 2 years long.

2/ Should the authorization be awarded on a repeated basis, each time covering the same activities, the State Examination Body, with the evaluation results from the oral part of the examination at hand and on the basis of the faultless performance (work results) in this field of activities and the recommendations of the license holder, can recommend that the authorization for "Reactor Operator" and "Turbine Operator" should be awarded for the duration of up to four years.

3/ Should the authorization be awarded on a repeated basis, each time covering the same activities, the State Examination Body, with the evaluation results from the oral part of the examination at hand and on the basis of the faultless performance (work results) in this field of activities and of the recommendations of the license holder, can recommend that the authorization for "Shift Supervisor", "Unit Supervisor" and for "Physicists" should be awarded for the duration of up to eight years in the following sequence: a/ authorization to be awarded repeatedly for the first time – 4 years, b/ authorization to be awarded repeatedly for the second time – 6 years, c/ authorization to be awarded repeatedly for the third or more times – 8 years.

QUESTION:

The description of the measures taken to analyse the causes of events, and to use human factors considerations in the selection of staff is commendable. However, there is no mention of the use of the full-scale simulators which are available at each of the nuclear power plants as a mean of testing new procedures, checking them for lack of ambiguity, so that any deficiencies in the new procedures can be corrected before they are issued for use on the real plant. Are the simulators at the plants used to test new procedures, as well as for operator selection and training?

ANSWER:

Yes for all the above-mentioned purposes the simulators are used.

The important design modifications are tested on the simulator before they are implemented. For example the unit control and protection systems are adjusted or modified in accordance with the tests results as well as the operational procedures.

The operational events are analyzed on the full-scope simulator in order to identify differences between real processes and design requirements in case of important transients.

For the refresher training, non-standard training programs are prepared to satisfy the actual needs of the operational department. In this way there is a possibility to prepare a special training before a new operational mode or abnormal action on the real unit is carried out. This includes the new procedure testing to be corrected before non-standard training for operation staff starts.

When some mistakes are found in procedures during the simulator training, their authors are required to make corrections .The training programs are run by the operational department, human resources department and supervised by the department of nuclear safety.

Representatives of the training department (HR) are on the NPP Failure Committee. The Failure Committee analyzes all events or accidents, including evaluation of the potential human factor. Corrective action and recommendations given by the Failure Committee are immediately implemented in training programs. The feedback from training is given to the Failure Committee.

ARTICLE 13

QUESTION:

The Report mentions that the quality assurance system has been incorporated in the Atomic Act and in the SÚJB Decree No. 214/1997. Which national and international codes, standards, rules and regulations were taken into consideration in the legislation process?

ANSWER:

National regulations: Decree No. 436/1990 Coll., Quality Assurance of Classified Equipment in Light of Nuclear Safety of Nuclear Installation

International standards: Safety Series NO. 50-C/SG-Q, Quality Assurance for Safety in Nuclear Power Plants and Other Nuclear Installations

Basic law and duties in the sphere of quality are defined by the Atomic Act (No. 18/1997 Coll.) and the creation of new rules of practice is connected with it.

QUESTION:

Please explain how do you assure the quality of the regulatory work. Do you apply any quality management system at your organisation? Which one? Is the QA system certified? Do you measure effectiveness/efficiency of regulatory work? At which success? Which criteria do you apply? Are the measured/evaluated trends positive?

ANSWER:

Quality assurance during government administration and supervision is part of the method of SÚJB management that is stipulated by the Rules of Organization and the sequential internal documentation of the Office. The Rules of Organization determine the mission, tasks, organizational structure, basic working methods and basic division of responsibilities and competences of persons who manage, carry out, evaluate and verify activities during fulfillment of the tasks set by the Office. The Rules of Organization set down the types and characteristics of the Office's issued internal documents, which are the following: Decrees of the Chairperson of the Office; Directives; Methodological instructions; Information containing facts important for the Office's operation; Budgetary measures.

Thus, the internal documentation forms a system ensuring that the activities described in this documentation are planned, managed, carried out and evaluated by competent persons (management, nuclear safety inspectors etc) and have set down documentation outputs. The internal documentation of the Office is managed, i.e. proposed, agreed and approved, by assigned persons and is subject to change procedure control. Documentation outputs are managed in an analogous manner and duly archived. Important documentation outputs are kept in both paper and electronic form. Execution of operations according to the respective decrees, directives and methodological instructions is subject to an internal control system (independent audit). Consequently, the manner of SÚJB management partially meets the requirements for a quality system which, however, is not certified.

We do not use the direct regulatory indicators to measure regulatory effectiveness and efficiency. To ensure the effectiveness/efficiency of the regulatory work, we have implemented internal QA documents for main activities, especially for inspection activities. These documents set rules for planning, performing, evaluating inspection activities and feedback from results of inspections. The results of the Regulatory Body activities are regularly assessed by the management of SÚJB and regularly discussed with the management of the licensee.

QUESTION:

This section describes the organization of quality assurance documents into three levels, I, II and III. It also states that Quality Assurance Programs are approved by SUJB, but it is not clear whether SUBJ approves all three levels of documents. The section goes on to say that "more than 100 Quality Assurance Programs have been developed and approved for NPD," but it is unclear whether these approvals are internally given by the licensee, CEZ, or by the regulator, SUJB. National Report Ref 8.1.5 also refers to approvals by SUJB, but does not make it clear which level of document is approved by the regulator. Could this please be clarified? This question is related to that on Financial and Human Resources in Ref 6.1.1.

ANSWER:

Pursuant to Section 2, paragraph 5 of SÚJB Decree No. 214/1997 Coll., the quality system for permitted activities must be documented in the form of quality assurance programs (hereinafter referred to as "QAP"), sequential documentation on quality assurance (i.e. documentation of level 1, 2 and 3) and records. Pursuant to Section 32, paragraph g) of the same decree, QAP must contain a list of sequential documentation on quality assurance with unambiguous identification of quality. Thus, approval of QAP from the level of SÚJB means indirect approval of sequential documentation of level 1 to 3. The requirement for completeness of this documentation in a list contained in QAP can due to the extension of the documentation or in the case of extension of the changes made to this documentation (e.g. in the case of significant changes in the organizational structure) be applied by SÚJB adequately. However, fulfillment of Section 3, paragraph c) and Section 5, paragraph a) of the above-mentioned Decree must be ensured, stipulating that there is always determined, documented and implemented valid quality assurance documentation prior to commencing and carrying out activities related to the utilization of nuclear energy and operations leading to radiation. The SÚJB does not independently approve sequential documentation and its modifications. A valid document which is a part of the sequential quality assurance documentation must always be available upon the SÚJB's request.

Chapter 8.1.3 of the National Report contains data on the drawing up and approval of more than 100 QAP for holders of ČEZ, a.s. licenses. It concerns QAP that have been approved by the SÚJB as a precondition for issuance of a license for carrying out reconstruction or other modifications affecting nuclear safety, radiation protection, physical protection and accident preparedness of a nuclear facility or workplace of category III or IV. This precondition is stipulated in Section 13, paragraph 5 of the Atomic Act.

The Annex to the Atomic Act defines the extent of the documentation required for issuance of a license for individual activities pursuant to Section 13, paragraph 3, letter d) of this Act, stating the documentation approved by the SÚJB.

QUESTION:

The Manager for Control and External Relations is said to be "responsible for the development of the quality system within the Nuclear Power Division.....as well as for the improvement of productivity…" Could there be a potential conflict of interest which might make this manager reluctant to argue for the resources needed to develop and implement the Quality Assurance system?

ANSWER:

There is no conflict of interest in this function commutation and the current practice does not give any signal that this is the case. But the following fact is important. As of April 1, 2005 there will be a change of the Production Division organization in which among other things QA and Controlling will be separated from External Relations.

ARTICLE 14

QUESTION:

The Report states that independent inspections in compliance with additional requirements are performed during outages. Who is accomplishing these inspections and to whom are the findings of inspectors reported?

ANSWER:

Independent verifications/inspections of all safety-related activities (including those performed during outages) are carried out by the staff of the Safety Section. Their findings are reported to the Plant Managers Committee via monthly Reports on Plants Safety Status.

QUESTION:

The Report states that the safety analysis (PSA) Level 1 for the Temelin NPP was completed in 2003. Are low power operation aspects regarded in this PSA and what are the further plans for performing a PSA Level 2 like at the Dukovany NPP?

ANSWER:

The original Temelín NPP PSA Project was developed from 1993 to 1996 and subsequently all plant-specific models were updated from 2001 to 2003 to reflect the ultimate design, latest procedure changes as well as the limited operational experience status at the time of the plant's commissioning. It has to be noted that since the 1993-1995 period significant safety enhancements have been made to the original Russian design of the plant affecting most of the PSA task areas, starting from the new Westinghouse core and digital I&C, changes in the design, symptom-based EOPs and many other areas. The scope of the original, as well as the updated, PSA projects also included Low Power and Shutdown PSA (LSPSA) and Level 2 as published many times in the previous National Reports and at various international forum. This fact is also stated in this National Safety Report, see Probabilistic safety assessment of Temelín NPP.

Currently there are no further plans to perform Temelín PSA Level 2 like for Dukovany NPP as the Temelín Level 2 PSA has been developed since 1995 as an integral part of the original Temelín PSA Project and updated for the ultimate design.

QUESTION:

The Report states that ÈEZ plans an application with SUJB for life time extension of ten years for all NPPs. According to SUJB, which special requirements does the license holder have to fulfil to get the license for further operation of the NPPs?

ANSWER:

The Czech legislation has no special requirements in the lifetime extension area. The license holder has to declare sufficient nuclear safety of the NPP. In respect of the nuclear safety, aging of a power plant finds its reflection mainly in the reduced “NPP safety margin” as a result of some worn-out systems, components, and buildings. It must therefore be reliably proved, that this residual “NPP safety margin” is high enough and acceptable. With respect to the lifetime extension the SÚJB is taking care mainly about areas as follows:

- consumption of the design service life of the components, systems, and buildings, controlled ageing programs,

- solution to departures from the applicable international standards and application of the operational experience,

- compliance with SÚJB requirements, e.g. derived from inspections results

- innovation programs

The Czech Republic has also participated in the IAEA "Safety Aspects of Long Time Operation of Water Moderated Reactors" (SALTO) project and it intendeds to implement its results into SÚJB practices.

QUESTION:

It is stated that the FSAR of Dukovany is updated regularly according requirements of US NRC Reg. Guide 1.70. This guide however has not been updated since 1978. US NRC is now using the Standard Review Plan (NUREG 800) as a reference. Has this document been used by the plant to update its FSAR? Has a Chapter 18 on Human Factors been introduced in the FSAR?

ANSWER:

The structure of the FSAR of Dukovany NPP was worked out according to US NRC Reg. Guide 1.70 regarding the criteria defined in the Standard Review Plan (NUREG 800). This document is issued for the purpose of license renewal after 20 years of Unit 1 operation. Chapter 18 Human Factors has been introduced.

The licensee decided to keep this report in so-called live state, which means updating it not only for the above purpose but also for the case of all changes important in terms of safety (design, procedures or equipment modifications).

QUESTION:

It seems strange that the CDF for power operation for modern plant as Temelin(1.49E-5) is higher than for Dukovany (1.27E-5). Is there a simple explanation for this discrepancy?

ANSWER:

No, there cannot be, of course, any simple answer to such a question. This seems to be in contradiction at first sight but the likely reasons for it are quite common and explainable. Some of the reasons are itemized below:

- Differences in the design

The two VVER plant types have different safety features inherent in the design (e.g. the older 440 type is equipped with RCS gate valves in RCS loops making Dukovany NPP less vulnerable to primary to secondary leakage in terms of isolation and leaks compared to Temelín NPP, while the opposite is true in the case of sudden boron dilution events during a shutdown).

- Differences across the PSA models

It is clear that even when carrying out the PSA analysis for the same plant, using the same raw reliability data, the same methodology for the analysis and the analytical team having identical experience you could sometimes arrive at wide differences across the model results, which does not necessarily mean the results of one analysis are worse than the others. This is caused by the use of a different approach to the modeling, which means differences in the analysis assumptions, IE definitions, grouping, T/H analyses, approach to CCF and HEP modeling, the approach used in the external events hazard analysis (fire, flood), the scope of back-up and recovery actions modeled, etc.

- Operational experience

Temelín NPP was relatively recently commissioned whereas the Dukovany four-unit plant has been running for almost 20 years. Both the initiating events and component reliability data used for Temelín are therefore generic by nature, mainly using more conservative values (as not proven by the plant specific experience) when compared to Dukovany plant-specific data. For example using the same IE frequencies as for Dukovany, the Temelín CDF would decrease by about 42%. This is the main reason for these stange-looking results.

- Other differences across the PSA models

A brief comparison has been made between the Dukovany and Temelín PSAs showing some differences in IE scope and definitions, different IE frequencies and component reliability data are used, some differences in the CCF and HRA modeling also exist. This, taken together, might be a reason for the discrepancy asked about.

QUESTION:

What is the typical number of inspections carried out by SUJB in each plant every year?

ANSWER:

The number of inspections performed by the SÚJB in 2004 in Dukovany NPP was 157, in Temelín NPP 85. The difference in numbers is caused by the number of NPP reactor units: Dukovany NPP has 4 units, Temelín NPP has 2 units. Most of the inspections are performed according to the annual inspection plan that covers specified safety related areas. Ad-hoc inspections are performed when a safety event occurs. An essential part of annual inspection activities is regular inspections performed monthly by site inspectors in the given NPP and inspections of system preparedness after each reactor refueling before restart to criticality.

QUESTION:

The level 2 PSA study and its revision is mentioned but no details or summary is published. It would be desirable to know at least the main results and possible issues arising from these.

ANSWER:

TEMELÍN NPP: The most important mode resulting from the containment analysis is No Failure. This mode represents two events that could prevent containment failure: cooling debris in-vessel and cooling debris ex-vessel in the long term. Thorough analysis of these phenomena showed that there is a good chance of preventing containment failure if a sufficient amount of cooling water is available in the long term. The frequency of No Failures is 3.67E-06 (24.25 % of CDF).

Late containment failure frequency is 6.88E-06 which is 45.45 % of CDF. This is almost ten times higher than Early Failure Frequency, which conclusion is similar to western PWRs. The dominant mechanism of Late CMTM Failures is late basemat melt through.

Generally, Early Containment Failure frequency makes up only 8.13E-07 (5.37 % of CDF) being dominated by the Loss of CMTM isolation (1.56 % of CDF).

The frequency of Large Early Releases (LERF) was found to be 4.04E-6/year. A comprehensive sensitivity analysis has been carried out to demonstrate the impact of Severe Accident Measures and plant-specific SAMGs developed for Temelín.

DUKOVANY NPP: Main result: Large Early Release Frequency LERF = 2.09E-6/year.

Analyses of sequences with the highest contribution to risk were conducted and sensitivity analyses were conducted too. The benefit of possible mitigation measures was assessed. The results of Level 2 PSA were used for support of SAMG development.

QUESTION:

The final SAR for each NPP is common for all units or each unit has his own SAR?

From the description of the situation with respect to the compliance with the art.14 of the Convention one can learn a lot on different kinds of assessments and verifications to check if the state of the plant and its operation comply with its design, requirements and operational limits and conditions. It is not clear however what is the relationship between Operational Safety Reports, mentioned on page 60 (they seem to be separate for each NPP's unit) and Pre-operational Final Safety Report which seems to be one for whole site (see page 61) despite of number of units? What is the reason for updating Pre-operational FSAR after several years of operation of the plant. Wasn't it updated, separately for each unit, after commissioning and trial operation and then became Operational Safety Reports, subject to further subsequent updates in due time when necessary?

ANSWER:

At present Dukovany's SAR is produce as commonly for all units, thereby, that unit's differences are specified in the document and taken into account. Generally there are not many unit differences and they are mainly caused by the fact that different technical modifications are carried out on individual units at different times and further by the fact that every unit has its specific operational history.

Explanation of the relationship between the mentioned reports:

The pre-operational safety report for Dukovany NPP was compiled before the introduction of the 1st unit of Dukovany NPP into operation (in 1984). This report was compiled as a common report for all units of Dukovany NPP. This report wasn't further updated after the introduction of individual units of Dukovany NPP into operation, and concerning the implementation of a different technical set-up and modernization only appendices were produced until 1995. In 1995 full revision of the pre-operational safety report was elaborated as basis for renewal of the operational license for the 1st unit of Dukovany NPP. This report was produced for the 1st unit and in the following years (1996-1997) it was also completed by information relating to the next units. This report is called an "operational safety report" and since 1995 it has been annually updated (in contrast to the situation before 1995 when appendices for the pre-operational safety report were processed). Apart from this annually up-dating there is a regulatory body requirement to compile full revision of the operational safety report after 20 years of operation according to US NRC RG 1.70. This full revision was completed at the end of 2004. It is elaborated as a common report for all units of the NPP with taking into account of unit differences. For the future, annually up-dating is presumed.

QUESTION:

The report indicates that Levels 1 and 2 PSA were performed for Dukovany and Temelin NPPs. The report also indicates that the results of the PSA studies have been used by the licensee to support a more detailed evaluation of human factor, design modifications, development of a new procedure dealing with emergency conditions, etc. As a follow-up to the previous meeting, how does the regulator use risk assessment data; for example in planning inspections, developing inspection procedures, developing NPP technical specifications, and evaluating incidents?

ANSWER:

Regulator currently utilizes the PSA results for analysis and assessment of the risk profile of the NPPs, including risk monitoring by means of SW Safety Monitor v. 3.5. Evaluation of operation events and emergency zone planning are other items for application PSA results in the regulatory activities.

ARTICLE 15

QUESTION:

The Report reads that the effective dose limits for occupational exposure of personnel of categories A and B is the same. Is it the only criterion to be assigned as Category B- to work outside controlled areas despite of level of doses received regularly? Will the category B worker , who receives doses exceeding 6 mSv/y regularly , requalified by management to category A ?

ANSWER:

Exposed workers (the term "radiation workers" is used in the Czech radiation protection law) are classified into category A and B workers for the purposes of monitoring and surveillance. Category A workers are those who are liable to receive an effective dose greater than 6 mSv per year or an equivalent dose greater than 3/10 of the dose limits for the lens of the eye, skin and extremities. Category B workers are those who are not classified as exposed category A workers. Classification has to be done (and re-evaluated, if working conditions change) by the operator (licensee) and the list of all category A workers has to be sent to the regulatory authority. Individual monitoring and periodic reviews of health shall be systematic for category A workers.

Classification is based on typical working conditions and the likelihood of receiving higher doses and not on individual doses really receive, but real doses may be the input for re-evaluation of the classification. Classification of exposed workers is not directly linked to the fact that they are working in a controlled area or not.

QUESTION:

The Report refers to the procedure to determine a reasonably achievable level of radiation protection (according to the ALARA principle). Are there regulatory documents, recommendations or guidelines for the cost-benefit analysis?

ANSWER:

Section 17 paragraph 3 of Decree No. 307/2002 Coll. says that a reasonably achievable level of radiation protection shall be considered to be proved and remedial measures need not be implemented if the costs are higher than the benefits of such remedial measures. The benefits of remedial measures shall be calculated in such a manner that a reduction of collective effective dose for an assessment group is multiplied by the relevant factor

a) 0.5 million CZK / Sv for radiation activities when an average effective dose to individuals shall not exceed one tenth of the appropriate exposure limits;

b) 1 million CZK / Sv for radiation activities when an average effective dose to individuals shall exceed one tenth of appropriate exposure limits but not three tenths of the appropriate exposure limits;

c) 2.5 million CZK / Sv for radiation activities when an average effective dose to individuals shall exceed three tenths of appropriate exposure limits;

d) 1 million CZK / Sv for medical exposures;

e) 0.5 million CZK / Sv for exposure to natural radionuclides which are not intentionally utilized; and

f) 2.5 million CZK / Sv for emergency exposure.

A reasonably achievable level of radiation protection is not only based on cost-benefit analysis, but economic and social factors also have to be taken into account. Some specific dose constraints are set down, especially for nuclear power collective effective dose not exceeding 4 Sv per year for each GW being installed in the nuclear power facility related to the exposure of all workers who undergo personal monitoring in compliance with the monitoring program.

According to Section 17 paragraph 4 of the same Decree, a reasonably achievable level of radiation protection shall be considered in the case that an annual effective dose does not exceed 1 mSv for each exposed worker and 50 μSv for each individual from public and a collective effective dose at a category IV workplace does not exceed 1 Sv. This is used for trivial exposure situations, not for NPPs. Every NPP has additionally its own actual documentation based on the requirements of Decree No. 307/2002 Coll.

QUESTION:

The Report indicates the optimised limit of the collective dose per GW of the installed capacity for a calendar year for personnel. How is this limit applied in practice? Does it identify the value to be achieved by NPP, or it is the value below which radiation protection is considered to be optimal?

ANSWER:

The optimized limit is defined by Decree No.307/2002 Coll., Section 17 as “a dose constraint” and it means the upper limit of potential collective dose of all radiation workers - 4 Sv per year for each installed gigawatt at the nuclear site. This value is stipulated by Decree No. 307/2002 Coll. Section 17 and represents the value below which radiation protection of all radiation workers at the nuclear site is optimal.

QUESTION:

The report says that dose rates in the vicinity of Dukovany and Temelin are continuously monitored by a system operated by each power plant, and that there is also at least one point of an independent national early warning network close to each plant. It is unclear what use such independent points close to the plant would be, unless the wind happened to be from a particular direction. Would it not be better to duplicate the results from the systems operated by each power plant in the same monitoring control room used for the national early warning network?

ANSWER:

The early warning network (EWN) as at part of the Czech Radiation Monitoring Network (RMN) consists of 54 measuring points throughout country (including mentioned points in the vicinity of NPP´s) and of futher 24 measuring points (TDS) around both NPPs. All measuring points are operated in continuous automatic mode with transfer of measured values to the SÚJB. The TDS is operated by NPP´s, the EWN by the Regulatory Authority (SÚJB), which is responsible for the RMN management.

There is no special relation between NPP operators and regulatory dose rate measurement point. The main purpose of the NPP operators dose rate measurements in the vicinity of the NPP is to ensure, that there is not any uncontrolled gaseous release from the plant. Results from these measuring points are sent to the Center of the National Radiation Monitoring Network because they represent part of the national early warning monitoring point.

ARTICLE 16

QUESTION:

Is the off site emergency planning in the Czech Republic considering insights of probabilistic evaluation of accidents sequences and expected release categories? Are you prepared to share those information with your neighboring states in order to enable optimization of their (i.e. neighbor's) emergency preparedness for nuclear accidents?

ANSWER:

Emergency sequences leading to the fastest damage or deep envelopment of containment and for maximum possible radiation consequences on the neighborhood were used for determination of the size of site emergency planning in ETE, in spite of the frequency of appearance of these beyond design basis sequences are extremely small (under 1E-10/year). For example PSA Level 2 ETE was used for identification and confirmation of the fact that there doesn't exist any further possibility of beyond design basis emergency scenarios (whose frequency damage of the core is higher than 10^{-7}/year), which would have had the same or more serious radiation consequences and were at the same time more probable. On the PSA Level 2 ETE basis it is possible to state that there are not known any emergency scenarios that would represent a higher hazard of escape of radioactive matter to the bigger neighborhood than the scenarios originally analyzed for determination of the size of site emergency planning.

This information was shared with the Austrian party in terms of information exchange by the "Melk act" appointment on experts' discussion for beyond design basis accidents and emergency planning in 2003 in Prague.

For Dukovany NPP, the EPZ has been established in a different way.

QUESTION:

Apart from the notification of an accident as required by the Convention on Early notification will the Czech emergency authorities and/or NPPs in the Czech Republic be able to provide estimates of expected source term before the release (i.e. during an accident, when a release becomes imminent) as well as actual source term and the local weather data at the time of release?

ANSWER:

Both NPPs are able to estimate possible radiological consequences still in the phase of incident progress before a real leak occurs. For this purpose there are quantified expected source terms for accident sequences leading to at severe accident, which have a relatively high probability of appearance or high radiological consequences. Such source terms are inserted into the computer code, which (on the basis of current meteorological conditions designates possible radiological impacts on the neighborhood). These prognoses are used for determination of pertinent preventive measures for the population.

QUESTION:

The structures of Shift Emergency Headquarters (SEH) and Technical Support Centers (TSC) are different for Dukovany and Temelin.

This is not the ideal situation in crisis when rapidity and automatisms are keywords.

The structures of Shift Emergency Headquarters (SEH) and Technical Support Centers (TSC) are different for Dukovany and Temelin.

Couldn't this be a source of problems in during crisis situation where rapidity and automatisms are keywords?

ANSWER:

Different structures cannot cause any problem, because for the case of an emergency event Temelín and Dukovany NPPs prepared for separate and independent management, which is the subject of multiple drills. Nevertheless at the present time the unified structure of SEH and TSC is being processed, which will bring both structures nearer.

QUESTION:

The emergency notification channels could be better described emphasizing the foreseen redundancy.

Is there a early notification channel with neighbouring countries foreseen beside the international ones in the framework of the ENAC-ENATOM and ECURIE conventions?

ANSWER:

The structure of emergency notification channels is as follow:

- messages are sent by fax or by telephone; the receipt of all messages must be confirmed by the receiver otherwise the delivery must be repeated,
- in addition, it is possible to use e-mail after previous notification by telephone
- In the case of a radiation accident occurrence in the territory of the Czech Republic, the SÚJB Emergency Headquarters ensures notification of:
- the IAEA according to the "Convention on Early Notification of a Nuclear Accident" and the "Convention on Assistance in the Case of a Nuclear and Radiation Accident"
- the EU within the meaning of Council Decision No. 87/600/Euratom.
- contact points of the countries based on the relevant bilateral agreements. Bilateral agreements concerning notification in the case of a radiation accident have been signed by the Czech with Austria, Germany, Hungary and Slovakia. The bilateral agreement with Poland is under preparation at present.

QUESTION:

Are there a pre-established arrangement for technical support form the designers and vendor (Westinghouse) in case of an emergency?

ANSWER:

Yes, Temelín NPP and also Dukovany NPP together with Westinghouse prepared EOPs and also SAMGs . In addition an emergency drill scenario was prepared, but we have not though over further support because the scope of transfer of technology is of such an extent that it is not necessary.

QUESTION:

What are the qualifications of the "Safety Engineer" who in case of extraordinary event occurrence at Dukovany NPP will become the chief of liquidation of the extraordinary event on the affected unit?

ANSWER:

The Safety Engineer is at specialist with the same qualification as the unit shift supervisor and the shift supervisor of the plant. In addition, he is educated in severe accident phenomena and analyses methods and results.

QUESTION:

Among the duties of SÚJB Emergency Headquarters an obligation is mentioned - on "notification of the ...contact points of the countries based on the closed international bilateral agreements". However, those agreements are not listed in the Report. With which Countries the Czech Republic has such agreements?

ANSWER:

The Czech Republic has concluded agreements concerning notification in the case radiation accident with Austria, Germany, Hungary and Slovakia. The bilateral agreement with Poland is under preparation at present.

QUESTION:

Please explain how do you determine the emergency planning zone around the nuclear facilities. What is the basis for the zone specification? Which criteria do you apply to specify the zone area? Do you use/accept any probabilistic arguments to determine the zone area?

ANSWER:

Czech legislation is fully harmonized with the EU radiation protection acquis communautaire. The same principles for intervention and implementation of countermeasures as in the other EU member states are used to eliminate a radiation accident´s consequences; the intervention optimizing principle will be strictly followed according to the international practice and requirements of the Czech legislation.

The primary responsibility of the NPP operator for the area of emergency planning and response is to prevent or reduce the uncontrolled release of radioactive material and exposure of both the employees and the public. There is a requirement to implement protective measures/actions using basic radiation principles – justification and optimization. For the majority of accident types, the emergency response shall take place in two distinct areas:

- On-site area – the area surrounding the NPP within the security perimeter, fence or another designed property earmark; this area is under the immediate control of the NPP operator;
- Off-site area – the area of planning zones – Precautionary action zone (PAZ), Urgent protective action planning zone (UPZ), Long-term protective action planning zone (LPZ).

The criteria based on the international recommendations (e.g. IAEA-TECDOC-955/1997 and IAEA-TECDOC-953/1997) concerning the determination of the Emergency Planning Zone (hereinafter referred to as EPZ) are implemented in the following Czech law or regulations:

- Decree No. 307/2002 Coll. - laying down the requirements for radiation protection, the methods and scope of radiation protection during interventions to mitigate irradiation as a consequence to radiation accidents (including response levels for the individual types of protective measures),
- Government Order No. 11/1999 Coll. addressing the requirements for determination of an EPZ. Pursuant to this Order, a proposal to determine an EPZ must primarily include the following:
  - List of stipulated radiation accidents with occurrence probability for the particular NPP higher or equal to 10^{-7}/year,
  - Description of the anticipated development and course of radiation accidents (the estimated point of radionuclide leakage would be determined during the radiation accident, time course of the radiation accident etc),
  - List of stipulated accident consequences, including the assessment of potential individual exposure and the potential for exceeding the intervention levels for urgent measures.

EPZs of the NPPs in the Czech Republic were determined on the basis of the methodology of the Slovak Nuclear Power Plants Research Institute (VUJE) Trnava and the Czech Nuclear Research Institute of Rez (UJV) using the internationally accepted codes and standards (NUREG-0771 Regulatory Impact of Nuclear Accident Source Term Assumptions, RG 1.4 Assumptions used for evaluating the potential radiological consequences of a loss of coolant accident for PWR and Government Order No.11/1999 Coll.). Based on the conservative deterministic approach applied beyond the scope of IAEA recommendations and the Czech legal requirements (using results of the PSA level I and II), there were many source terms analyzed and accident scenarios calculated. These scenarios were selected according to the following two criteria:

- Sequence with the highest frequency, *i.e. with the highest probability of occurrence, and*
- Sequence with the highest significance, *i.e. with the highest source term related to frequency.*

QUESTION:

What is the reason for the large difference between the Dukovany and the Temelin in terms of the radii for their emergency planning zones (20km and 13km) and the evacuation zones (10km and 5km), respectively? The results for the PSAs for the two plants given on pages 61/125 and 63/125 show a total CDF only about 50% greater at Dukovany. Are the calculated release fractions very different for the two designs?

ANSWER:

In the case of Temelín NPP as against Dukovany NPP it was possible to reduce the extent of the EPZ from 20 to 13 km for the following reasons:

- Design of robust containment and a higher order of assurance of its integrity defined by the permanent value of containment non-integrity at the level of 0,1% of weight/24 hours
- Higher quality of the protection level (under the terminology INSAG 3 and 12), both the technological equipment and the instrumentation and control system and last but not least, for the reason of implementation of Emergency Response Facilities and the Emergency Information System.

The size of the Temelín NPP EPZ corresponds to the size of EPZ of other PWR in the world. And we can say that the EPZ of Temelín NPP was determined quite conservatively (France 5 and 10 km, Germany 10 km, Japan 8 – 10 km, Spain 4 and 10 km, China 5 and 10 km, Sweden 12-15 km). In the USA and in Switzerland, in some cases UPZ reaches longer distances.

The source terms used for analysis of consequences both for ETE and for EDU are naturally different, regarding he type of reactor, the quantity and structure of fittings of the core. The different sizes of emergency planning zones have nothing to do with the frequency of damage of the core (CDF), but more likely with the size of radiation consequences on the neighborhood, also for scenarios with extremely low probability, as well as, naturally, with legislative recommendations and requirements. The release fractions are similar.

QUESTION:

The report says that the utility is responsible for a significant part of emergency preparedness.

Please clarify the competences of utilities and authorities in this area.

ANSWER:

The main competences of the utilities and authorities in the field of emergency preparedness are established by Czech legislation, especially by the Atomic Act. The main competences of the SÚJB (regulatory body) are introduced on page 75 of the Czech National Report, i.e.:

- approves on-site emergency plans and their modifications after discussion of the relations to off-site emergency plans; the approval of on-site emergency plans is one of the conditions for obtaining a permit for the commissioning of the installation and its operation,
- establishes an emergency planning zone, based on the licensee's request,
- oversee the activity of the National Radiation Monitoring Network and performs the activities of its head office,
- ensures the activities of the Emergency Response Center and international information exchange on the radiation situation,
- ensures, by means of the National Radiation Monitoring Network and based on assessment of the radiation situation, the background information necessary to take decisions aimed at reducing or averting exposure in the case of a radiation accident,
- is obliged to provide the public with adequate information concerning the results of its activities, unless they are state, professional or business secrets, and to publish once a year a report on its activities and to submit the report to the Government of the Czech Republic and to the public.
- The main competences of the utilities (licensee) are introduced on page 76 of the Czech National Report, i.e.:
- to monitor, measure, evaluate, verify and record values, parameters and facts important for emergency preparedness, to the extent laid down by implementing regulations,
- to keep and archive records of ionizing radiation sources, facilities, materials, activities, quantities, parameters and other facts important from the emergency preparedness point of view, and to submit the recorded data to the SÚJB in the manner laid down in an implementing regulation,
- to ensure systematic supervision of observance of emergency preparedness, including its verification.

The provision of Section 19 of the Atomic Act establish as one of the obligations of the licensee in the event of a radiation incident, to the extent and in the manner determined by the on-site emergency plan approved by the SÚJB, to:

- notify immediately the relevant District Authorities, the SÚJB and other relevant bodies specified in the on-site emergency plan of the occurrence or suspected occurrence of a radiation accident,
- ensure immediate warning of the public within the emergency planning zone in the case of a radiation accident,
- ensure immediately that the consequences of the radiation incident are dealt with on the premises where the activities are performed and to take measures to protect employees and other persons from the effects of ionizing radiation,
- ensure the monitoring of exposures of employees and other persons, and prevent any release of radionuclides and ionizing radiation into the environment,
- inform the relevant bodies, in particular of the monitoring results, the factual and expected development of the situation, the interventions taken to protect employees and the public, and the measures taken to deal with the radiation accident and also the factual and expected exposure of people,
- control and regulate exposure of employees and other persons participating in the radiation incident mitigation within the premises where the licensee performs his activities,
- cooperate in dealing with the consequences of the radiation incident which occurred on his premises,

- participate, in the case of radiation accident, in the activities of the National Radiation Monitoring Network.

In addition, the same Article also establishes the obligation of the licensee to submit to the appropriate District Authority and to the relevant Municipal Offices with extended competence background documents so as to prepare the off-site emergency plan and to co-operate with the authority in order to ensure emergency preparedness within the emergency planning zone.

Government Order No. 11/1999 Coll.*,* defines for the licensee the following requirements:

- the elaboration of a proposal for establishing an emergency planning zone for those nuclear facilities or workplaces with a significant source of ionizing radiation (in accordance with Section 17 of the Atomic Act the licensee shall submit this proposal to the SÚJB for the determination of the emergency planning zone size),
- ensuring the activity of the National Radiation Monitoring Network in the emergency planning zone,
- the provision of the population in the emergency planning zone with antidotes,
- ensuring the press and information campaign for the population in the emergency planning zone for the cases of radiation accident,
- the notification system of involved bodies about occurrence or suspected occurrence of a radiation accident,
- for ensuring the warning system of the population in the emergency planning zone.

QUESTION:

How is it assured that the safety engineer can fulfil all tasks dedicated to him?

ANSWER:

A safety engineer is at specialist with the same qualifications as the unit shift supervisor and the shift supervisor of the plant. In addition, he is educated in severe accident phenomena and analyses methods and results. Safety engineers are prepared for their duties during emergencies by regular training and practice, they have to keep specified qualification and knowledge and operational experience. Their knowledge is checked several times a year at emergency drills, i.e. within a scenario unknown advance (in cooperation with the simulator).

QUESTION:

In 11.1.2 "Implementation of emergency preparedness measures including role of the State Supervision Body and other departments", "Warning of the public within the emergency planning zone", it is stated that "Warning of the public is assured within the whole emergency planning, zone, formed by a territory 20 km around the Dukovany NPP and 13 km around the Temelin NPP."

Could you explain the reason about the difference of the emergency planning zone between the Dukovany NPP and the Temelin NPP?

Dose it depend on the power of NPP , or another factor?

How the emergency planning zone is decided?

ANSWER:

In the case of Temelín NPP as against Dukovany NPP it was possible to reduce the extent of the EPZ from 20 to 13 km for the following reasons:

- Design of robust containment and a higher order of assurance of its integrity defined by the permanent value of containment non-integrity at the level of 0.1% of weight/24 hours

- Higher quality of the protection level (under the terminology INSAG 3 and 12), both the technological equipment and the instrumentation and control system and last but not least, for the reason of implementation of Emergency Response Facilities and the Emergency Information System.

The size of the Temelín NPP EPZ corresponds to the size of EPZs of other PWR in the world. And we can say that the EPZ of Temelín NPP was determined quite conservatively (France 5 and 10 km, Germany 10 km, Japan 8 – 10 km, Spain 4 and 10 km, China 5 and 10 km, Sweden 12-15 km). In the USA and in Switzerland, in some cases UPZ reaches longer distances.

The source terms used for analysis of consequences both for ETE and for EDU are naturally different, regarding the type of reactor, the quantity and structure of fittings of the core. The different sizes of emergency planning zones have nothing to do with the frequency of damage of the core (CDF), but more likely with size of radiation consequences on the neighborhood also for scenarios with extremely low probability, as well as, naturally, with legislative recommendations and requirements. The release fractions are similar.

The EPZ (size) is not primary dependent on the NPPs power. The purpose of determination of the UPZ is to ensure urgent protective measures which are planned to be taken within UPZ. Distribution of potassium iodide is ensured for all families within the UPZ. Further urgent measures – sheltering of the population, preparation of evacuation are implemented on the basis of the development of the particular radiation accident and the results of monitoring beyond the boundary of the UPZ. The existing system of emergency preparedness and warning of the public has been designed in a way that implementation of protective measures for population, i.e. evacuation could be performed as early as during the pre-release phase of radiation accident development. Corresponding to this, sophisticated Emergency Response Facilities were built beyond the EPZ. All these measures create the conditions for effective and early implementation of urgent protective measures within the EPZ of NPPs.

ARTICLE 17

QUESTION:

Which reasons have led to the use of two different guidelines for the assessments of the impacts of civil aircraft crashes onto the sites of Dukovany and Temelin?

ANSWER:

In principle the impact of an air-crash on both Dukovany and Temelín NPPs was evaluated according to the IAEA recommendation (NS-G-3.1. External Human Induced Events in Site Evaluation for NPPs, 2002). In the case of Temelín NPP only some comparisons with the ICAO methodology were performed.

The wording in the Temelín NPP part of the National Report should be corrected accordingly.

QUESTION:

Czech Republic experienced exceptionally heavy rains and severe floods in the year 2002. What was the impact of these floods on the operation of the plants? How do the water levels experienced during the flood compare with levels predicted by calculations reported in the safety reports?

ANSWER:

The first regulation on siting was issued in 1980.

The siting of nuclear installations in the Czech Republic, has been regulated by Decree No. 215/1997 Coll., on criteria for siting of nuclear installations and very significant ionising radiation sources. The Decree contains two sets of criteria: exclusion criteria, which make it impossible to use the area for siting, and conditional criteria, which enable utilization of the area for siting provided there is a possible or available technical solution to unfavourable conditions.

The flooding areas belong to the set of conditional criteria. Both Dukovany and Temelín NPPs use rivers (Jihlava, Vltava) as an ultimate heat sink, but are located in an elevated area about 5-10 km from the rivers. The floods in 2002 did not have serious impact on the operation of the plants. In the area of Dukovany NPP (south-west Moravia) there weren't any floods at all, there wasn't even any water level increase. Neither was Temelín NPP (south Bohemia) in flood danger. The power plant area is situated about 135 m above the Hněvkovice hydroelectric plant level, which is part of the Vltava's cascade channel. During the floods in the year 2002 Temelín NPP operated normally and safely.

The research reactors in the Czech Republic at NRI Rez (LVR-15, LR-0) and the Czech Technical University (VR-1) are located near the Vltava river and have been protected against 100-year floods. Since the 2002 floods have been estimated as being 500-years floods, the research reactors were mildly affected. But during the 2002 floods the nuclear safety and radiation protection of all research reactors was fully maintained.

QUESTION:

It is stated that the nearest permanently inhabited locality is the village of Temelin-at a distance of 2 km in northwest direction from Temelin NPP. What is the population (now and at the end of projected plant life) of this locality and what emergency preparedness measures are foreseen in case of design basis and beyond design basis accidents for localities so close to the plant?

ANSWER:
There is no need to calculate variations in the population of this village, the number of the population will probably be the same at the end of the project plant life as it is at this time.
The same protection measures are prepared in advance for the inhabitants of this village by the regional office and the regional head office of the fire-fighting rescue staff, as well as for others villages in the zone of emergency planning-sheltering, iodine prophylaxis, and evacuation.

QUESTION:
There is a military airport named Namest 10Km far away from Dukovany NPP. The fly-forbidden area for NPP is 2 Km in radial and 1.5 Km in height. Is it allowed to fly within 2 Km radius but the height beyond 1.5 Km?
In addition, as for Temelin NPP as mentioned in section 12.1.2.2, is it allowed to fly within 2 radius Km but the height beyond 1.5 Km?

ANSWER:
Yes, this is possible. Flights above 1.5 km are not considered dangerous for the NPPs.
The power plant vicinity is permanent checked, in the case of Dukovany NPP by the military air base Namest nad Oslavou, in the case of Temelín NPP by National Vectoring Station.
As far as airplane approximate at the distance of less than 20 km in the radial direction are concerned, the monitoring stations communicate with the airplanes and observe whether they are flying over the granted airspace. Military planes intervene against flight in the prohibited area; they have for this case an exception for prohibited flight space.

ARTICLE 18

no question

ARTICLE 19

QUESTION:
How does the regulatory body ensure that the existing licensees' procedures for the feedback on external and internal events are objective and take into account all external events that are reported by international organisations from other installations?

ANSWER:

Assessments of both external hazard and internal events are included in the Safety Analysis Reports. These SAR are periodically reassessed, including consideration of external and internal events. The requirements of the SÚJB are compatible with the IAEA approach with respect to extreme loads. External events are compatible with external events that are reported from other installations.

QUESTION:
Who are the components of the "expert commission" that meets 2 days before start up to judge if the plant is ready for restart? Do SUJB resident inspectors participate in this commission?

ANSWER:
The members are:
- A representative of ITI (Institute of Technical Inspections)
- SÚJB resident inspectors
- A representative of the NPP's Maintenance Management Section
- A representative of NPP's Technical Inspection Section
- A representative of Contractors

QUESTION:
Do you implement (or plan to implement) risk-informed regulation (RIR)? Do you allow a performance of the scheduled maintenance and repair during normal plant operation at full power or it is limited only during shut down of the plant?

ANSWER:
Implementation of risk-informed regulation started two years ago. The regulator considers it long-term process. At present, the legislative framework is under development and the following activities are in progress:
a) review PSA last version of both plants (including PSA applicability for respective PSA applications)
b) determination of the requirements for risk-informed licensee submittals
c) categorizing NPPs' systems with their safety importance according to risk assessment
d) risk-informed inspection process
e) analysis and evaluation of operation events
Completion of the above-mention activities is supposed within approx. three years.
Apart from this, utilities regularly use the PSA results in these two items:
- risk-informed optimization of maintenance activities including Tech Spec. modifications (that means also specification of the conditions for on-line maintenance of selected equipment during full-power NPP operation)
- risk assessment of the NPPs´ operation

The utility also contemplates the following actions:

- risk-informed in-service inspection
- use of risk insights in operator training

Majority of planned maintenance is carried out during period outage.

QUESTION:

It is desirable to obtain information on the experience in implementing the symptom-based emergency operating instructions (EOPs):

a. *What are the main stages in development and implementation of EOPs? What are the issues related to technical aspects of the work that emerged during the project implementation? How were they solved?*

b. *How the regulatory body participates in development and implementation of EOPs ?*

   c Have any guidelines been developed within the project as regards the review of EOPs package? If so, what is the structure and main content of these documents?

ANSWER:

Temelín NPP experience:

a. The EOPs implementation process at Temelín NPP follows the guidance and comprehensive approach of the Institute of Nuclear Power Operations presented in the "Emergency Operating Procedures Implementation Guidelines" (INPO 82-016). The major phases required for the implementation of specific plant EOPs are the following:
   1. Development of symptom-oriented EOPs (on the basis of certain generic emergency operating guidelines)
   2. EOPs verification
   3. EOPs validation
   4. Operating personnel training
   5. EOPs control and experience feedback

   Development of symptom-based emergency operating procedures specific for the Temelín NPP was based on technology and know-how transfer using the Emergency Response Guidelines Methodology developed by the Westinghouse Owners Group.

   After the basic version of emergency operating procedures for the Temelín NPP was completed (September 1995), the independent verification was started immediately. The best-estimate analyses modeling the operator's interventions are of key importance for plant specific EOPs verification. The analyses are performed by Czech research institutes (ÚJV Řež, VÚJE Trnava, etc.), and analyze the accident scenarios affected by the operators interventions using the RELAP code.

   The results of these best-estimated analyses are used to confirm the correctness of the proposed recovery operator actions and also to obtain a feeling for the recovery actions and plant responses timing. Findings from these analyses are collected and documented.

   Validation of the Temelín EOPs was performed on the full-scope simulator for Temelín.

   Plant specific scenarios were prepared for the validation to check the usability and operational correctness of Temelín EOPs on the full-scope simulator. These scenarios are mainly focused on those accidents for which specific or unique recovery strategies for VVER-1000 design were developed.

b. The Czech regulatory body has not participated in development and implementation of EOPs at Temelín NPP.

c. At the moment the Temelín plant has available a set of 40 symptom-based emergency operating procedures. The recovery strategies used for the development of Temelín EOPs are mostly the same as those used in generic guidelines which are generic enough to be applicable for various PWR designs. There are an only several minor differences between the generic guidelines and the Temelín specific EOPs (SGTR without SI, usage of the YR system to eliminate a steam bubble under the upper head during natural circulation cooldown etc). During the development of Temelín EOPs the generic guideline ECA-1.1 was eliminated from the Temelín package. However, later during validation it was recognized that the plant is susceptible to a stuffing of structures in the containment sump and procedure ECA-1.1 was reincluded in the package.

Dukovany NPP experience:

a. The EOPs at Dukovany NPP were implemented on December 1st, 1999. The Dukovany EOPs were developed using Westinghouse Owner Group methodology.

   The main stages of development and implementation are as follows:

1) Preparation phase (1994-1995)
   - calculation of best-estimate analyses to compare the thermohydraulic behavior Dukovany NPP and reference plant,
   - feasibility study
   - training of the customer
   - supplier's familiarization with the Dukovany plant
   - working schedule agreement
2) Development phase:
   - writers guide, common team of developers and reviewers
   - step-by-step creation of plant specific guidelines using generic guidelines and Westinghouse know how (in English)
   - setpoint list document
   - basic version of all plant-specific guidelines in English
   - development of background documents
3) Verification phase :
   - guidelines for testing on the full-scope simulator
   - best estimate analyses to evaluate operator actions
   - independent review done by operators
   - preliminary operators training and familiarization
   - plant-specific procedures (in Czech)
   - users guide
4) Validation phase:
   - plant-specific EOPs validation on the multifunction simulator
   - validation analyses
   - EOPs validation on the full-scope simulator
   - final corrections of Dukovany EOPs
   - approval letter issued by Westinghouse
   - final EOPs version approval and issue
5) Personnel training:
   - continuing training of operators during all phases of development, verification and validation
   - retraining of operators on the simulator
   - plant examination of operators
6) EOPs implementation on December 1st , 1999
7) EOPs maintenance program
   - experience feedback
   - simulator retraining

- PSA study
- annual cooperation with Westinghouse

The main technical aspects related to EOPs implementation are following:

- Installation of PRZR PORV
- Increasing power capacity of Auxiliary Feed water pumps (shut off head pressure > SG SV setpoint)
- Hydroaccumulator nominal pressure decreasing (bellow SG SV)
- Installation of containment level measurement
- Installation of containment pressure measurement (wide range)
- Fire water coupling (to be able to feed the SG trough the emergency feedwater line by mobile fire water pumps)

b. The Czech regulatory body recommended developing symptom-based EOPs for Dukovany NPP. The regulatory body did not really participate but only followed the working schedule observance, required periodical reports and performed several inspections to check the development process. Before implementation the final version of EOPs was presented to regulatory body representatives.

c. At Dukovany NPP there is a set about 45 emergency operating procedures. The original Westinghouse set of generic guidelines was extended by several procedures related to VVER 440-specific design:

- Cooldown without intermediate system TF10 (for RCPs cooling)
- Emergency feedwater cooldown
- Post SGTR cooldown using loop isolation valves

In the context of EOPs development it was necessary to modify and improve some other procedures to create and set the right and correct relationships between procedures: Normal operating procedure, abnormal operating procedure and shutdown procedure.

Finally, following the EOPs implementation SAMG development started (with the same supplier Westinghouse) at Dukovany NPP.

QUESTION:

Can further information be provided on quality assurance and the tests to ensure the reliability of digital I&C?

ANSWER:

I&C systems reliability and testing is subject to rigorous QA procedures which were evolved from Westinghouse practice and recommendations. This area is also covered by the Czech Republic's legal requirements and is subject to detailed regulatory body inspection activities.

For I&C systems supplied by Westinghouse, the detailed reliability analyses were performed by Westinghouse using both FMEA/FBA and FTA methods to demonstrate the reliability of the systems to the Regulatory Body. These were updated prior to commissioning by current operational data from other PWR plants. During the operation the reliability data are collected and evaluated.

Maintenance of the PRPS and DPS is accomplished mainly by replacement of the respective cards. So, it does not impair the plant operation. Partial and division trips for the purposes of maintenance are applied in both the primary reactor protection system PRPS and diverse protection system DPS.

With three redundant divisions in the PRPS RT system, the protection logic changes from two-out-of-three to one-out-of-two logic when one of the three redundant divisions is out of service due to a fault or during maintenance. If during maintenance the failed channel is placed in bypass, then the logic is changed to two-out-of-two.

The protection logic in the DPS changes from two-out-of-three to two-out-of-two logic when one of the three redundant divisions is out of service. This is done to prevent an increased risk of inadvertent reactor trip, since the DPS is a back-up system to the PRPS in the event of a CMF. The amount of time that the DPS can remain in a two-out-of-two redundancy is controlled administratively. After this time either all three divisions are restored to service or the coincident logic is changed to one-out-of-two.

QUESTION:

Does the licensee or the regulator identify early symptoms of emerging problems and is there a procedure to proactively respond to them?

ANSWER:

The management of the operator identifies early symptoms of potential approaching problems in evaluation of the set of safety and operational indicators in periodic reports (monthly, quarterly and yearly) including investigation of causes of operational events. These reports evaluate trends for a number of safety significant events, frequent events, the situation and fulfillment of corrective measures, developments in the area of the human factor, trends of "Low Level" events, reliability of the safety system, exploitation of limits and conditions, persisting problems and others. Particular corrective measures are accepted to realize abnormalities (anomaly) and they are part of the above-mentioned reports.

The regulatory body has established its own file of safety indicators which the operator periodically supports with indications, first of all from areas of investigation of causes of operational events and reliability safety systems. Interpretation of this file would have indicated in time to the regulatory body pertinent approach to the operational and safety problems of the power plant.

QUESTION:

An overview of safety indicators of Dukovany NPP in the years 1998 to 2003 is given in Annex 6 of the report. Section D of Annex 6 states that evaluation of the trend of the reportable events number proved the high level of nuclear and radiation safety achieved in Dukovany NPP. However, Graph 1.A. 1 in Annex 6 of the report shows 43 reportable events in 2003 versus 14 reportable events in 2002 at Dukovany NPP. Please explain this increase of reportable events in 2003.

ANSWER:

The submitted Annex 6 already contained clarification of the effect in Section B on which the conclusion in Section D is based. The clarification is as such:

Group 1.A - Reportable events

The basis for the group 1.A indicators is the evaluation of reportable events according to the NPP Event Specification. The indicator 1.A.1 "Reportable Events" was included in the set of Safety Performance Indicators in 2003 and it superseded the indicator "The Number of Safety Related Events", thus the values shown in the graph in or before 2002 represent only the total number of events evaluated according to the International Nuclear Event Scale (INES), the way the indicator was originally defined. This indicator therefore cannot be evaluated in terms of the trend.

To compare the present time with the previous years, the sub-indicators 1.A.1a and 1.A.1b could be used. The common graph of these sub-indicators shows a sustained decrease in of the number of events evaluated according to the INES for the entire monitored period, when the values for the last three years could be considered stable. One safety significant event according to the INES was recorded at Dukovany NPP in 2003.

The change of monitoring and evaluation methodology for events significant in terms of nuclear safety was also reflected in the indicator "Human Factor" (graph 1.A.2), in particular in its Human Factor Index. This indicator, in comparison with previous years, considerably decreased; however it is caused by a greater number of events related thereto. The state of the absolute number of reportable events with the influence of the Human Factor on their occurrence is relatively steady.