

*Answers to Questions and Comments  
Raised by the United Kingdom  
on the  
National Report of the Czech Republic*



prepared for the purposes of the  
**First Review Meeting of Contracting Parties**  
to the  
**Convention on Nuclear Safety**  
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***UNITED KINGDOM 1: The report has been well prepared. However, for a country constructing a nuclear installation, Article 18 is limited: more detail would have added to the overall picture.***

The National Report of the Czech Republic structure, including the Chapter relevant to the Article 18, follows the recommendations approved at the preparatory meeting of parties to the Convention in September 1995 and published as "Guidelines Regarding National Reports under the Convention on Nuclear Safety". More detailed information on NPP Temelín design changes would considerably extend the Report. Nevertheless, we would be very pleased to answer any specific question you have to this subject anytime. Additional information on design changes implementation is also included in our answer to UK question related to the status of resolution of IAEA Safety Issues.

***UNITED KINGDOM 2, Page 26: Predominant international practice is not to make penalties and sanctions against individual employees (unless gross negligence can be shown) but make the nuclear installation operating organisation responsible for safety. This helps to provide a safety culture of "no blame" where individuals are encouraged to report poor safety practices knowing that they will not be held responsible. What approach is used in the Czech Republic?***

The new Atomic Act (and its predecessor No. 28/1984 Coll.) really makes it possible to penalise both individuals and corporate bodies for their breaching it. Obviously, both of these standards have a variety of tools designed to enforce the requirements of the Law and related regulations (see the wording of the Atomic Act, Head VI).

In practice, however, the penalties have just been rarely imposed on the individual persons. During the last ten years, it has actually been in one case only when an individual person was penalised. The rationale was in breaking the rules of game repeatedly. Thus, the SÚJB adheres to the above „no blame“ principle, mainly in matters of the nuclear power plant operating personnel.

***UNITED KINGDOM 3, Page 29: Can an update be provided on the current position on the Advisory Groups of independent experts for nuclear safety and radiation protection, and their role in relation to the SUJB and the licensees of the installations?***

SUJB Chairman has established in 1998 two Advisory Committees:

- for nuclear safety, chaired by Prof. Klik, and
- for radiation protection, chaired by Prof. Klener.

RAMG mission (organised in the frame of PHARE programme) and IAEA also recommended Creation of such advisory bodies. Advisory Committees do not have any legal power, the only purpose is to provide independent attitudes and advises to the SUJB Chairman.

Both committees consist of recognised senior experts involved in peaceful use of nuclear energy and ionising radiation. In addition to domestic experts each committee includes two experts from abroad to bring about more independent insights into different subjects.

Both Committees work under conditions and rules given in written Statute. The SUJB Chairman gives working programme and tasks. This includes main issues being solved by the Office. During one year of operation both Advisory Committees were asked to declare their position to:

- new Regulations which implements Atomic Act,
- status of R&D in area of nuclear safety,
- Safety Evaluation Report prepared by SUJB experts on basis of NPP Temelín PSAR,
- and some other issues.

***UNITED KINGDOM 4, Page 32: Do the licensees have their own safety organisation could an explanation be given on how this operates?***

**ČEZ, a.s. - corporate level**

The joint-stock Company of ČEZ has declared its „Safety Strategy in Nuclear Activities“. In this Strategy, the safety-related commitments of the ČEZ, a.s. management in the field of nuclear energy utilisation within the company is rooted.

In among the safety specifics of nuclear activities related to the nuclear energy exploitation, the following is included: nuclear safety, radiation protection, mechanical protection of nuclear materials and nuclear installations, and emergency readiness.

The ČEZ, a.s. as a licensee is legally responsible (by the Atomic Act and its executive regulations) for safety in making use of nuclear energy and ionising radiation.

The role of company's statutory authority being legally responsible for nuclear safety, radiation protection, mechanical protection, and emergency readiness belongs to the company's Board of Directors.

The company's Board of Director is delegating its authorities in the field of nuclear safety management, radiation protection, mechanical protection, and emergency readiness to its managing director and executive management of the company.

The company's Board of Directors holds this management responsible for the state of safety of the predefined safety items within the areas under control:

- Power generation in NPP Dukovany,
- Personnel agenda,
- Development,
- NPP Temelín construction.

Down from the level of executive management the powers are delegated to specific managing staff members of corporate level and individual organisational units - nuclear power plants.

For the functional management of nuclear activities within the ČEZ, a.s. the corporate sectional director for safety and quality holds the responsibility.

The relevant directors of the individual organisational units of NPP Dukovany and NPP Temelín must report for safety of nuclear activities within the particular organisational units to the managing director. As an example, the case of Dukovany Nuclear Power Plant is below stated.

**NPP Dukovany**

Such is the organisation chart of the safety division in the NPP Dukovany, that the nuclear and radiation safety issues are approached as independent on the operation of the facility itself, being assigned with the top priorities. At the head of this safety division, there is an deputy director for nuclear safety and technology. Apart from others, the departments of nuclear safety and radiation safety report to this division head.

As a prime advisory authority in the technological issues, the Technical Safety Group (TSG) is available to the technical director, with an ALARA Committee as its part. This group is holding its meetings at least once quarterly. In these regular meetings the safety aspects of the Dukovany NPP are being discussed and the relevant recommendations for the technical director prepared.

Assessment of the proceedings over the safety-related major events is included in the agenda of the Fault Commission being called up on regular basis, once a month. Not only that this Commission is reviewing the internal safety issues, but is also concerned in the events occurred abroad, recommending the remedial and preventive actions, watching also, how these remedial actions are executed.

A weekly information is subject to regular discussions headed by the NPP Dukovany. A monthly summary information on the state of nuclear safety is subject to assessment and approval by the NPP Dukovany management. The Annual Summary Report on the state of safety is placed under discussions by the TSG.

The state supervisory authority must be advised on the results from the NPP Dukovany evaluation and about the events that could have happened there, on regular basis (at least once a month).

***UNITED KINGDOM 5, Page 33, paragraph 5.1.2: Responsibility for safety should reside with the senior managers within the nuclear installation operating organisation. How do these managers demonstrate their commitment to safety to the regulator?***

The Board of the organisation operating the nuclear power plants in the Czech Republic (ČEZ, a.s.) has declared its commitment to be fully responsible for nuclear safety and radiation protection in its document called „ČEZ, a.s. Nuclear Safety Policy“ (1995). In this document, the nuclear safety is defined as the top priority within the company, prevailing over any other needs and design purposes.

In this document, the company undertakes to meet the nuclear safety targets in all of the aspects in relation to any nuclear installations, ensuring thus protection to personnel, equipment, and environment from potential radiation accidents and emergencies, and reducing thus their consequences if any of these events really occurs. These targets are and will be ensured within the company through a high reliability of equipment, its effort to lower the likelihood of such accidents, and with use of the supporting goals in their safety aspects reaching into the operation of nuclear power plants (such as fire safety, ecology, etc.).

Closely linked with the „ČEZ, a.s. Nuclear Safety Policy“ is analogous documents available in the individual nuclear power plants, including the specifics of each of them.

In this context, the Nuclear Safety Policy is expressed in more details in the Nuclear Safety Rules of the ČEZ a.s.

In order that the targets are really met within the nuclear power plants, this is evaluated on regular basis with use of the pre-defined measurable indicators in the presence of the company management and representatives of the Nuclear Safety State Supervision.

A licensee shall demonstrate his commitment to nuclear safety in the Quality Assurance Program the existence of which is subject to the SÚJB licence issue.

***UNITED KINGDOM 6, Page 37, paragraph 6.1.2: The report indicates that financial provision is being made for decommissioning and radioactive waste management. How does the Czech Republic ensure that adequate financial provisions will be available to deal with decommissioning and radioactive waste management at the end of the nuclear installations' operational life ?***

- Radioactive waste management

According to [article 25](#) of the Atomic Act and under the conditions defined therein the liability for safe depositing of all radioactive waste, including all monitoring and inspection of the deposit dumps, belongs to state even after these dumps are closed. To provide the necessary background to the activities themselves that that are bound with this radioactive waste management a state-owned organisation called the Administration of Radioactive Waste Depositing Dumps has been established to comply with the law.

A core financial resource from which the activities within the radioactive waste management can be funded is a so-called „Nuclear Account,, opened consistent with the Atomic Act. All those giving rise to radioactive waste [are obligated to pay their contributions](#) to this account from where the radioactive waste management costs [that have incurred or will incur would](#) then be reimbursed. The particular [amount](#) of these compulsory contributions shall be ordered by government in its decree ([nowadays the Government Decree from 19. September 1997 / 224 Coll.](#)) [according to proposal given](#) by the Minister of Industry and Trade. To be able to prepare his proposal, the Minister of Industry and Trade has a recommendation of the Counselling Board of the Administration of Radioactive Waste Depositing Dumps at his disposal. For calculation of the particular amount of these contributions the annual, three-year, and long-term plans are taken as basis.

As the above Counselling Board consists of the state authority representatives, those who give rise to radioactive waste, and wide public, being thus under public control, it is justifiable to anticipate that the proposed amount of contributions to the Nuclear Account will be prepared with all responsibility, so that the necessary funds were available in line with up-to-date knowledge and adequately in advance. At the same time the calculations were based on a very conservative assumption of 1% excess above the expected inflation rate. [At present](#) the contributors running the NPPs (i.e. ÈEZ, a.s. as well) pay CZK 50.- for every output MWh from the NPPs.

Even though, in theory, the Minister of Industry and Trade does not need to respect the recommendation of the Counselling Board concerning the particular amount of contributions to the [Nuclear Account](#), and the same applied to the government which is not obliged to accept the Minister's proposal, the common routine is that the Board's recommendation is always accepted. As the government can [change](#), in its decree, the level of contributions [whenever necessary \(practically for every year\)](#), an adequate flexibility has been provided in this respect even when the conditions may change.

According to the Atomic Act, the [Nuclear Account](#) is a part of the state-owned active and passive assets, its particular funds [do](#) not belong to any state [budget](#) revenue. Their exploitation is, by law, subject to the governmental decision [exclusively](#) and at the same time these funds cannot be used otherwise, than determined by the Atomic Act. Therefore, there is no threat, that the funds could be used for any other purposes.



The Nuclear Account is managed by the Ministry of Finance having a statutory mandate to invest its funds in the safe instruments within the financial market. The profits from these investment activities also belong to the income items of the Nuclear Account whose funds are thus raised in value over time.

As an auxiliary source, even the funds from the state budget or from other state assets can be provided, regardless of whether in form of returnable loans or non-returnable allocation.

- Nuclear Installations Plant Decommissioning

Obedient to the Atomic Act and aware of the need to decommission the nuclear installation or site with a significant or very significant source of ionising radiation, every licensee is obliged to build up continuously a financial reserve, so that the fund would be available to satisfy the need of any decommissioning, doing so timely and at the level required and in compliance with the manner of decommissioning approved by the Office.

Unlike the Nuclear Account is owned by state, the above mentioned financial reserve is an accounting reserve composing a special part of licensee's liabilities. The law does not require to deposit these funds on any special banking account. The reserve, however, is covered by the licensee's assets and, according to the Atomic Act, in the case of licensee's property becomes a subject of competition due to bankruptcy, the assets corresponding the level of this reserve must be excluded from this subject.

The need of funds and related accumulation of the reserve is specified in the documentation saying in what way such a nuclear installation will be decommissioned as it is prescribed by the Atomic Act and being subject to approval by the Office. If necessary, the Office can also order the documentation to be revised. If a licensee fails to meet the statutory obligation to keep the decommissioning reserve, a penalty of up to CZK 10 millions can be levied on him by the Office pursuant to the Atomic Act.

The scope of activities included in the term of „nuclear installation decommissioning,, meaning those that can be funded from the reserve has already been defined under article 2, letter n) and under article 18, letter h) of the Atomic Act. The details of this reserve utilisation to fund the individual decommissioning activities will be specified in the SÚJB Regulation „On Decommissioning of the Nuclear Installations or Sites with Sources of Ionising Radiation,, being now prepared.

***UNITED KINGDOM 7, Page 40, paragraph 6.1.3: How will the use of the Training Centre at VÚJE Trnava in the Slovak Republic be maintained for the future, is there an inter-state agreement to ensure continuity of access to the facility?***

The Training Centre (TC) at VÚJE Trnava is used by the ČEZ, a.s. for training of the operations staff of NPP Dukovany using the VVER 440 full-scope simulator. This training has a form of:

- basic course (part of the basic preparation of the new employees before the authorisation of SÚJB is awarded to them),
- periodic course (for the staff members active as control operators), and
- re-qualification course (being a part of education on transition between the individual posts within the operative control staff. The obligation to take this training is rooted in the applicable Czech legislation (SÚJB Regulation 146/1997 Coll.).

In its scope and contents the training programs prepared at the VÚJE Training Centre define the training. These training programs form a part of the training programs for basic and periodic courses of the operations personnel made up by the educational guardian - Training and Exercise Centre Brno, and approved by the SÚJB. They are subject to regular innovations and extensions with respect to the ČEZ, a.s. needs and requirements, as well as the training scenarios of simulated tasks from the areas of normal, abnormal and emergency conditions to include a feedback from the operational events with human factor involved. Recently, for example, a basic innovation has been accomplished in the training programs with regard to introduction of the new Emergency Operating Procedure.

NPP Dukovany and VÚJE Trnava Training Centre, striving to ensure the operations staff training on the full-scope simulator, have entered their contract of work for the time infinite with the notice period as agreed. Periodically, the ČEZ, a.s. is submitting the new or updated NPP operating and technical documentation to the training centre (VÚJE TC), who will make use of it to prepare and accomplish the training on the full-scope simulator (including elaboration of the training materials and documentation - plans, programs, scenarios, etc.). Within the limits of such contract, the quality audits are carried out.

Once the training on the VVER 440 multipurpose simulator is started in 2nd half of 1999 and with legislative requirements fulfilled (see the Law 18/1997 Coll., and SÚJB Regulation 146/1997 Coll.), a part of this basic training will be transferred to this facility. The ČEZ, a.s., however, does not assume any other use of the VÚJE Training Centre from the 3rd quarter of 2001, when erection of the VVER 440 full-scope simulator is finished.

***UNITED KINGDOM 8, Page 45, paragraph 6.1.3: What role does the licensee have in managing and supervising the activities relevant to safety of external suppliers who work on the licensed sites?***

In the field of quality, the potential contractors are reviewed, supervised, and evaluated in line with the requirements of the SÚJB Regulation No. 214/1997 Coll., incorporated into licensee's corporate QA Program and the ones of individual power plants (Dukovany and Temelín).

According to nuclear safety relevance of the items to be delivered, the above activities are approached graded levels of seriousness.

Prior to the contract, a potential contractor is reviewed through a quality audit. These audits are accomplished in line with the appropriate plans, according to the checklists pre-prepared by the auditors.

At the end of such an external quality audit with affirmative results, a potential contractor is either included in the List of Approved Contractors. The validity of certificate is limited (not more than 3 years).

Even if the contract is awarded, the contractor is subject to supervision during the course of manufacturing, deliveries, installation, commissioning, and operation. Such supervisions rest in systematic inspection of the supplied items (products, equipment, services) for their quality and checking that they are in compliance with the checking and testing plans or inspection plans, prepared in writing. The supervision may be entrusted to the qualified staff of the relevant power plant specialised departments or to a contract partner authorised by them. The individual stages of contract must be reviewed, with their continuation being subject to affirmative results of checking and tests.

Quality and reliability of the items supplied are placed under considerations and the contractors are rated accordingly. The comprehensive rating and information on contractors in the field of quality form a part of the ČEZ, a. s. central database of business partners.

The results of this screening, supervision and evaluation of the contracted are presented to the specialised State Supervisory Authority on regular basis.

***UNITED KINGDOM 9: How are modifications to the plant assessed and controlled so that: the safety implications are evaluated; appropriate quality assurance is applied to the work; and the safety analysis report is updated.***

### **NPP Dukovany**

Pursuant to the applicable ČEZ, a.s. program procedures, the safety impacts of every modifications come at first under independent judgement by technical development specialists, by staff members of the Nuclear Safety Department, and by SÚJB site inspectors.

If within this step an impact of the proposed modification on nuclear power plant safety is indicated by some of the persons assigned to judgement, it is necessary further on, in line with the requirements of § 9 of the law 18/97 Coll. on Nuclear Power Peaceful Utilisation..., to have a realisation licence being awarded by SÚJB. Prior to the licensing and licence issue, the safety documentation must be prepared and approved by SÚJB. This documentation must always contain a modification-related Quality Assurance Plan. In this Plan, the requirements are included pertaining to quality assurance in the period of time from preliminary stage to implementation of this modification itself and proofs saying the proposed modification will not have any adverse effect on the nuclear power plant safety. For specification of the particular extent of this safety documentation see Appendix F to the Law 18/97 Coll., and related SÚJB Regulation No. 214/97 Coll.

Otherwise, where no impact of the proposed modification on the plant safety has been indicated in this initial stage of proceeding by any of the persons participated in judgement, the modification, in its preparatory and executive stages at the NPP Dukovany, is subject to the widely acceptable quality assurance tenets. In the field of modification, these rest mainly in a double-stage, independent inspection of all the documents coming to life while the modification is being prepared and in the periodic quality audits at the proposed contractors by ČEZ. a.s.

### **NPP Temelín**

Over its entire length, the NPP Temelín Design Modification Control Process is accomplished in line with the "D3" Quality Assurance Procedure. On the basis of this control documentation the records are kept of the proposed modifications being subjected to judgement by all professions, then to realisation.

In the course of this controlled process every proposed change in the design must be placed under judgement from both points of view: nuclear safety itself and for safety report. The relevant specialised sections carry out these judgements and their opinion must be documented. On the basis of these specialised, documented opinions a decision is made about realisation of every proposed change.

Every accepted and realised change must then be projected to all related design documentation, including the safety report. At the same time, every such change must be included into the relevant starting and operational documentation.

For large extent of the design changes in the case of the Temelín NPP, the licensee has submitted to the SÚJB an Addendum to the Preliminary Safety Analyses Report (being actually a kind of redone Safety Analysis Report), as well as a series of accompanying documentation (such as Topical Reports).

***UNITED KINGDOM 10, Page 56 & 57, paragraph 9.1.1: With time the Safety Analysis Report will require updating for a variety of reasons, for example, plant modifications, new standards etc. How is the evolution of the Station Safety Report controlled so that it is at all times reflects the actual situation at the nuclear installation?***

The first complete reassessment of nuclear safety (innovated Safety Analysis Report) for the Dukovany units was performed after 10 years of operation using advanced state-of-the-art tools and taking into account operational experience and plant modifications. It was prepared by the utility to fulfil one of the conditions of the State Regulatory Body from its decision No. 154 (1991), which established conditions for the 1st unit license for continued operation after 10 years. One of the license conditions requires continuous updating of the ("Living") Operational Safety Analysis Report

"Living" (periodically updated) Operational Safety Analysis Report is now in effect. It documents the state of nuclear safety assurance of the NPP Dukovany units. This report consists of fix invariable part (the same for all 4 NPP Dukovany units) as well as of the parts which are updated regularly once a year, always not later than by the end of the next half-year - at the same time for all units. This safety report is based on the extended "Operational Safety Analysis Report for Nuclear Power Plant Dukovany 1st Unit"

A new revision of Safety Analysis Report is now under review process as the substantial parts (fuel system design, nuclear design, thermal and hydraulic design, accident analysis) reflect introduction of the new (advanced) fuel imported from Russia.

***UNITED KINGDOM 11, Page 59, paragraph 9.1.2: What is the safety significance of the 97 requirements referred to in the 5th paragraph and what programme is in place to ensure that all the requirements are satisfactorily implemented ? When will the implementation be completed ?***

Safety significance of the 97 requirements referred to in the 5<sup>th</sup> paragraph is considerable. Still before the SUJB Decision No. 197/95, the Dukovany Operator had to prepare and submit to SUJB the revision of the Safety Analysis Report after 10 years of operations. This revision has shown some weak aspects in comparison with Nuclear Europe Standard Units. After the SUJB review of revision of the Safety Analysis Report prepared The SUJB decision No. 197/95. The aim of the SUJB Decision No. 197/95 was to specify and require to resolve this situation in order to achieve the Dukovany Units to Europe Nuclear Standard Units.

All of the 97 conditions of the SÚJB Resolution No. 197/95 can be broken down into about 3 equally sized subgroups. The first part of the conditions requires of the operating organisation to complete or clarify a part of the Operational Safety Analyses Report for the 1st unit in NPP Dukovany after ten year of operation, and this has been executed without any debts and within the defined deadlines, i.e. within about one year. In their second part, the conditions require of the operating agent to submit regularly, within pre-defined terms, to SÚJB various operation-related information. These conditions mostly have permanent term of validity. Concerning the nuclear safety, the remaining third group seemed to be most vital, being based on the results of the Operational Safety Analyses Report prepared for the 1st unit of NPP Dukovany after ten years of its operation. The operating organisation, obedient to nuclear safety requirements, must accordingly take remedial measures sorting out this way the weak points at the NPP Dukovany. This identification has moreover taken the IAEA materials as a basis, called "Safety Issues and their Ranking for WWER-440 Model 213 NPP". (The SÚJB has ordered here, for example, to solve the problems connected with modernisation of the Instrumentation and Control System, transversal corridor room at the level of +14,7 m, problems of the super emergency feedwater pumps routes separation, problems of cabling, etc.). Due to the perplexity of the problems with resolution of these conditions, the terms of their fulfilment are graded accordingly to their complexity and priority. They are continuously executed and SÚJB reviews the progression.

All of 97 requirements of decision SUJB No. 197/95 have their individual deadline for implementation. SUJB inspectors continuously check implementation itself.

***UNITED KINGDOM 12, Page 63, paragraph 9.1.4: How much of the pre-planned regulatory inspection programme is known to the licensee in advance, that is, is there any element of "surprise" to ensure that the true situation is inspected?***

The inspection programme of the pre-planned regulatory inspection is announced to the licensee in advance in general term only. The utility is informed (by fax) which activities, procedures would be controlled so that licensee have good opportunities to prepare people and materials properly. The licensee does not know the details of the inspection programme.

The pre-planned inspections are only one segment of overall inspection activities - see Chapter 9.1.4 of the National Report. SÚJB performs also "ad-hoc" inspections to verify the status of nuclear safety and radiation protection in licensee organisation.



***UNITED KINGDOM 13, Page 64 to 67, paragraph 10.1.1: The report mentions the link between the Czech regulations in the area of radiation protection and relevant European Union Directives. To what extent are all the provisions contained in the European Community Directives relevant to radiation protection incorporated into Czech legislation and into actual practice at nuclear installations?***

Current Czech legislation regulating radiation protection was prepared in the years 1993-1997 with intention to be harmonised with the relevant European Union Directives. It is based, like the EU Directives, on the recent ICRP Recommendation No. 60 and incorporates all basic radiation protection principles – justification, optimisation and limitation – with the same dose limits as in EU Directives. At the present, slight differences still exist and the Czech legislation will need minor changes and amendments accordingly. The main differences do not pertain to nuclear installations but to medical exposures, exposure due to natural radiation sources and control of contaminated foodstuffs.

***UNITED KINGDOM 14, Page 64 to 67, paragraph 10.1.1: Under the current legislation is the licensee required to restrict exposure by engineered controls (for example, by shielding, containment and ventilation), so far as reasonably achievable, before relying on systems of work or personal protective equipment? What are the arrangements at the nuclear installation during operation for the control and supervision of activities to ensure that the necessary precautions to restrict exposure to staff and contractors are taken?***

The modifications accomplished during the operation for control and supervision over the activities, aimed at the necessary measures taken to restrict exposition of the NPP Dukovany personnel and contractors:

- Upgrade of the radiation monitoring system designed to monitor the radiation status on technology and in working zones, including the hermetic one;
- Restriction of the permissible doses per individual staff member (either of the NPP Dukovany or contractors) and one shift to 1 mGy; higher doses can be permitted only in line with an approved program;
- Immediate and permanent supervision over the indoor works or those carried out in the vicinity of the highly powerful sources of radiation (reactor, steam generator, etc.) during main overhauls on the units (performed by the staff of NPP radiation inspection).

***UNITED KINGDOM 15, Page 80: What are the criteria for using counter measures for the protection of the public and the environment?***

The criteria for using counter measures for protection of the public and the environment are shown in the Appendix.

**Intervention levels for immediate protective actions (urgent measures)  
to protect the public**

Immediate protective actions are always regarded as justifiable if exposition of any individual could result in a damage to health, therefore, immediate protective actions are always implemented if it is expected that the equivalent dose could, within less than two days, for any single person exceed the intervention levels given in table. 1

**Table 1**  
**Intervention Levels of Dose for Acute exposure**

Organ or tissue	Projected absorbed dose to organ or tissue in less than 2 days (Gy)
Whole body (bone marrow)	1 <sup>a)</sup>
Lungs	6
Skin	3
Thyroid	5
Lens of the eye	2
Gonads	1

**Note:** <sup>a)</sup>The possibility of deterministic effects for doses greater than about 0,1 Gy (delivered for less than 2 days) to the foetus should be taken into account in considering the justification and optimisation of actual intervention levels for immediate protective action.

If immediate protective actions could, for a maximum period of 7 days, avert or reduce irradiation in a critical group of inhabitants, to an extent exceeding bottom values of guide values of intervention levels stipulated in table. 2, then the realisation of protective actions depends on the extent, feasibility and cost of actions and their eventual consequences; if top levels are exceeded then protective actions are always implemented.

**Table 2**  
**Generic intervention levels for urgent protective actions**

Protective action	Extent of doses	
	Effective doses	Equivalent doses in individual organs and tissues
Sheltering and the iodine prophylaxis	5 mSv to 50 mSv	50 mSv to 500 mSv
Evacuation of inhabitants	50 mSv to 500 mSv	500 mSv to 5000 mSv

For realisation and evaluation of the extent to which the immediate protective actions are to be taken the guide values of averted dose, listed in Table 3, are applicable.

**Table 3**  
**Guidance values of averted dose**

Protective action	Generic intervention level (dose avertable by protective action)
Sheltering	10 mSv <sup>a)</sup>
Iodine prophylaxis	100 mSv <sup>b)</sup>
Evacuation	100 mSv <sup>c)</sup>

**Notes:**

- a) for a sheltering period not longer than two days,
- b) avertable committed equivalent dose to the thyroid due to radio iodine,
- c) for evacuation period not longer than one week.

For the decision on relocation the following guidance values of intervention levels are used:

- a) for initiation of temporary relocation, an averted effective dose of 30 mSv for a period of one month,
- b) for conclusion of temporary relocation, expected effective dose of 10 mSv for a period of one month. If it is found that, during one or two years, effective doses for one month have not fallen down below the intervention level for concluding temporary relocation then permanent relocation must be considered,
- c) for permanent relocation, the expected lifetime effective dose of 1 Sv.

***UNITED KINGDOM 16, Page 78 to 84, paragraph 11.1.2: Is there a programme of emergency training exercises involving: the site; the site and other organisations; and the site and the full governmental response? How frequently are the different levels of response demonstrated and who judges their acceptability?***

Exercises held to verify the state of readiness to radiation accidents are organised here in the Czech Republic on the following levels:

- Licensee,
- District Offices with their territories within the zones of emergency planning,
- Specified components of industries and organisations,
- National,
- International.

To most extent, the aspects of the accident preparedness are exercised directly at the Dukovany nuclear power plant. For these exercises the plans are being prepared on yearly basis and submitted to the ČEZ Headquarters and State Supervisory Authority. Within the system of these exercises, the shift emergency staff must mainly be trained, as well as the individual response groups of the NPP emergency organisation. At least one exercise a year must involve the external organisations specified in the on-site emergency plan. On regular basis the availability of the shift emergency staff must be verified (must be ready within 60 minutes of the simulated emergency announcement). Within the action to call up the shift emergency staff the knowledge of emergency procedures is examined at the individual partial components of the on-site emergency organisation.

Obedient to legislation, the nuclear power plant must conduct its comprehensive on-site exercises for the case of nuclear accident (3rd level) once in two years. In line with the Dukovany NPP plan, such an exercise is to take place in this November with involvement of the authorities and organisations on district and national level. Certain components of the state administration authorities do their exercises according to their annual plans, such as fire brigade formations, mobile groups of the radiation monitoring network, etc. On the national level, the activity of these authorities and organisations is scrutinised within the Czech Republic involvement in the international accident oriented exercised like those of INEX 2, Hexagran, etc. Two other accident oriented exercised are being prepared to be held still in 1999, both based on the Government Commission for Radiation Accidents decisions and with focus on:

- Co-ordination and co-operation between the District Offices with their territories in the Dukovany NPP zone of emergency planning for the case of the 2nd level extraordinary event declaration with possible escalation into the 3rd level -general emergency,
- Verification of the national notification scheme for the case of suspected or actual radiation accident at the Dukovany NPP.

The inherent programmes (scenarios) of the co-operation aimed exercises must be discussed with the external organisations (such as police, fire brigade units, District Offices, SÚJB, and others) having a share on the exercise. For independent judgement, the arbiters and observers are invited from the NPP Temelín, nuclear power plants of the Slovak Republic (Bohunice, Mochovce) and from other external organisations (Civil Defence, SÚJB, District Office and other organisations if necessary and according to the topics exercised).

***UNITED KINGDOM 17, Pages 88 (Dukovany) & 91 (Temelín): The sites are isolated and the environmental impact and external hazards studies have been carried out. Do the assessments of the sites geographic positions concerning local population, and do the requirements of SÚJB No 215/1997 Coll. provide for population growth, and man made factors (such as industrial developments) monitored throughout the life of the nuclear power plant, as required under paragraph 304 of IAEA 'Code on the Safety of Nuclear Power Plants' 50-C-S (Rev 1)?***

In case of the Dukovany NPP, evaluation of natural and man induced factors in this domain having a bearing on nuclear safety and radiation protection was re-done in the new Safety Analyses Report prepared after ten years of operation in 1995. From this time, relevant changes of these factors, population growth and distribution are monitored in the „living" Safety Analyses Report“. In addition, the population growth and distribution is being periodically reassessed for emergency planning purposes too. The appropriate measures shall be taken if required.

Concerning the NPP Temelín, evaluation of natural and man induced factors in this domain having a bearing on nuclear safety and radiation protection is included in the Preliminary SAR. Again, the population growth and distribution is being also assessed in the Emergency plan, which is under preparation for NPP Temelín.

Approach is the same for both NPPs and corresponds to the requirements from p. 304 of the IAEA document mentioned in the question.

***UNITED KINGDOM 18, Pages 89 The safe shutdown earthquake, for Dukovany, is very small. Would the plant safely withstand the minimum 0.1g safe shutdown recommended for new plant in IAEA-50-SG-S1 (Rev 1)?***

The problems of seismic resistance were allowed for when the localities were selected and the NPP with the VVER 440 reactors was under design and later under construction itself (in the original design of NPP Dukovany the acceleration value of 0.06 g was taken as a basis).

It is shown in the NPP Dukovany Pre-operational Safety Analysis Report, Rev. 1 that the macro-seismic intensity of 5.8 MSK will not be exceeded in the time horizon of 10,000 years, even with use of the most conservative approach. The acceleration of 0.1 g corresponds here to the intensity of 7 MSK-64.

After construction of the Dukovany NPP, the experimental dynamic measurement has been carried out on the main generating unit in 1984.

Now, when the Dukovany NPP is being upgraded, the power plant seismic resistance is under revision. Within the works (started in 1995) on qualification of the Dukovany NPP equipment, the components and constructional objects are being re-qualified to 0,1 g. Results of the qualification itself are documented in the Qualification Protocols.



***UNITED KINGDOM 19, Page 100, paragraph 13.1.3: How will the design and construction of Temelín be proven by experience or qualified by testing and analysis***

Equipment qualification is one of the other methods used to prevent damage to the redundant systems due to the malfunctions arisen from a common cause given by the environmental conditions.

The Program of the Temelín NPP Equipment Qualification is divided into three stages fulfilled continuously. Due to the late commencement of this program in line with current international standards and practice, actually only towards the end of the power plant construction, the entire Program is assumed to finish within several years of operation.

The only exception is the equipment of the I&C system within the scope of the WELCO company supplies. In this case, the Qualification Program shall be fully finished by the start of commercial operation in the Temelín NPP.

Such a state is to be understood under finished program, when the current state of qualification is assessed, i.e. the required characteristics of the qualified equipment demonstrated on the basis of the qualification methods, type tests, qualification based on operational experience, and qualification by analysis. Further on, a stage will follow to ensure that the obtained state of qualification would remain applicable up to the end of the qualified service life of an equipment and nuclear power plant.

Within the first stage of qualification, the safety functions and principles must be determined for selection of the equipment, on the basis of which a subsequent selection of the safety systems facilities will be done, being the subject of Qualification Program.

Within the second stage, the design parameters of the environment must be determined for which the equipment qualification shall be ensured, i.e. the parameters with which the equipment being subject of the qualification must perform the required safety function. Furthermore, the equipment will be grouped into the individual qualification groups with respect to its type and relevant ambient parameters, and for these groups the methodology and procedures for pertinent qualification will be determined individually.

Within the third stage, the Qualification Program itself shall be carried out on the equipment together with the decision making process about remedial measured for the equipment that could not be qualified.

***UNITED KINGDOM 20, Page 105, paragraph 14.1.2: What guidance is given to the plant operators on deviations from the Limits and Conditions that must be reported to the licensing authorities?***

How the events are to be reported in the case of their occurrence, it is stated under 4.5 of the LaP-A04 and in the Limits and Conditions for URAO, ZRAO, and MSVP. The particular manner of submission is rooted in the NPP Dukovany current legislation - Operational Instruction 118/98 and is in compliance with the current legislative requirements - Law 18/1997 Coll. of Jan. 24, 1997 (Atomic Act). On working days the SÚJB is reported on state of operation.

***UNITED KINGDOM 21, Page 106, paragraph 14.1.3: How are the "selected personnel" in operations, engineering and technical support selected and what are the limits on the authorisation they have ?***

The selected staff members do the activities with immediate effect on nuclear safety or the top important activities from the radiation protection point of view as they are set down in the current legislation (see the SÚJB Regulation No. 146/1997 Coll.). In the conditions of ČEZ, a.s. they are the employees active in the posts of the control operating personnel, inspection and operational physicists, and selected positions in the field of radiation safety and radiation monitoring.

For being active in the control operating personnel or as a physicist the pre-requisite is graduation from a technical/natural scientific university, basic specialised education in the field of NA (in the group beta) and required level of bodily and mental health. The reactor unit manager must have one-year practice at both operating posts, the shift engineer must have two years of practice at the post of reactor unit manager. For the secondary circuit operators a specialised secondary education is adequate in technical branch together with 4-year practice in one of the related posts. The selected staff members working with the sources of ionising radiation must have graduated from a technical or natural-scientific university, must be professionally prepared in the field of NA (in particular in those of radiation safety and radiation inspections, chemistry, or NPP primary section, must have 1-year practice in handling the sources of ionising radiation, and must have taken a continuation specialised education in the group pee and meet the required level of bodily and mental health. The staff members with secondary technical education only can do the activities connected with direct work with the ionisation sources.

For some selected NA posts, the staff members are recruited by the OJ which will, on this occasion, define the acceptance criteria (they must contain the above pre-requisites). Within the acceptance procedure the bodily and mental aptness of the candidates for these special posts at nuclear installations must be verified. The same applies to those who will operate the ionising radiation sources.

If all the above requirements imposed on the selected staff activity are met and if a candidate passes the examination designed to verify the special vocational aptness required for the selected staff and taken at the examination board appointed by the State Supervisory Authority being in charge of the nuclear safety, the candidate, employee, is awarded with the SÚJB certificate authorising him to do the activity for 2-4 year in the case of a control operating personnel, or for 2-5 years in the case of those set apart to work with the ionising radiation sources. To keep their certification in force, the selected staff members must take the periodic training courses having the form of training days in the case of nuclear installations (the control operating personnel shall also undergo a periodic training on the full-scope simulator) and in the case of the ionising radiation sources, the candidates shall undergo a further professional training held on periodic basis in the group of pee. For this purpose, the necessary condition is to remain in the relevant post of control operating personnel with a break not in excess of 6 months, while for the physicists, the longest acceptable break is 18 months.

***UNITED KINGDOM 22, Page 109 When will the Emergency Instruction referred to in the second paragraph be completed and implemented?***

The instructions assessed as most important for emergency event annunciation, mobilisation of an on-site emergency organisation and NPP Dukovany links with surrounding environment (shift engineer emergency instructions, communicating manual for the shift emergency staff, and for electric control room operators) have already been finalised. The further emergency instructions for members of the shift emergency staff are now in their final stage of completion and authorisation and should expectedly be in force during the first half of 1999. The general procedures (instructions) for all the employees in the NPP Dukovany areas form, however, a part of the on-site emergency plan, being applicable, and all employees have been conclusively made familiar with them. Their contents form a part of the annual periodic training.

***UNITED KINGDOM 23, Page 111, paragraph 14.1.6: Arrangements for safety should evolve in response to events and circumstances, and organisations should be striving for continuous improvement. Do licensees review their overall safety performance to improve their arrangements for safety?***

The operating organisation is constantly striving to enhance the nuclear safety and this can be documented on the example of the Dukovany NPP.

As it is rooted in the National Report already, the Evaluation Reports are being prepared on regular basis as follows:

- Weekly,
- Monthly,
- Yearly,
- Once a decade.

The individual indicators showing the unavailability of safety systems must be re-calculated and the agreed safety indicators (as agreed with the State Supervisory Authority and based on international recommendations) must be recorded and re-assessed. Their trends are permanently monitored and interpreted. On the basis of these observations the development trends are then placed under consideration together with the possibilities of affecting the values. The acquired values are matched against those presented by other power plants. The results are monitored at all levels of the nuclear power plant control up to the plant management. On the basis of specialised recommendations and opinion expressed either by internal staff or external experts the measures are taken to improve the conditions of operation and equipment maintenance or, where necessary, the safety aspects of these operations.

All of this is done by the NPP Dukovany internal staff active in various sections and departments (mainly in that of Nuclear Safety and Technology), communicating information via their managers up to the top level of management.

**UNITED KINGDOM 24: Annex 2 sets out the documentation required for various licences. Would it be possible to have an example of such licences, for example, for nuclear installation commissioning?**

Since the new Atomic Act came in to force only in mid of 1997, there was no license issued by the SÚJB for nuclear power installation commissioning according this new procedure. As an example of a SUJB decision, please find attached original of SÚJB Decision No. 362/98 for the four years operation of the 4<sup>th</sup> unit of NPP Dukovany approval. This approval (license) was issued in accordance with § 9 d) of the Atomic Act (see National Report Annex 2). The document is presented in original (Czech) language to keep the format of such act. Translation of the most important part of the document - conditions (requirements), under which the approval was issued - is provided below.

Decision SUJB No. 368/98 approves the four years operation of the 4<sup>th</sup> unit of NPP Dukovany. The decision includes 12 conditions:

- 1) A program on I&C spare parts assurance shall be prepared and submitted to the SUJB including the list of component equivalents and procedure for their selection and approval;  

(Deadline: 31.10.1998)
- 2) A list of components and systems subject to environmental and seismic qualification shall be submitted to the SUJB (for electrical and I&C components including the EMC qualification);  

(Deadline: 30.9.1998)
- 3) Measures shall be taken within the secondary circuit systems to allow cooling down the primary circuit in case the steam generator relief valve is open.  

(Deadline: 31.12.1999)
- 4) Remedial actions should be implemented to avoid safety system pumps intake and spray systems clogging.  

(Deadline: 31.12.2000)
- 5) Following item 2) of this Decision, Qualification Program shall be elaborated for components and systems environmental and seismic qualification (for electrical and I&C components including the EMC qualification);  

(Deadline: 31.12.2001)

- 6) Remedial measures minimising the risk, resp. minimising the consequences, of the high energy line break at the level of +14.7 m shall be designed and implemented.  
(Deadline: 31.12.2002)
- 7) RPV joint plane horizontality measurement shall be performed henceforth in time of fuel re-loading. Results of this measurement shall be submitted to the SUJB together with periodical In-service Inspections Results Evaluation Report.  
(Deadline: continuously)
- 8) I&C safety related components and systems failures shall be collected, evaluated and analysed and results shall be submitted to the SÚJB on quarterly basis, not later than on 15<sup>th</sup> day of following month.  
(Deadline: continuously)
- 9) Following the item 1) of this Decision, a system of spare parts management for the existing I&C systems shall be implemented.  
(Deadline: continuously)
- 10) Not later than on 15<sup>th</sup> day of following month a Quarterly Report shall be submitted to the SÚJB, giving the information on I&C systems modernization project progress.  
(Deadline: continuously)
- 11) Applicant shall submit application for new Operation Approval in accordance to the § 9 d) of the Atomic Act not later than 30.9.2002.
- 12) Validity of this Decision is limited by the new Decision for operation approval issuance pursuant to item 11). In case that no application will be submitted, validity of this Decision is limited by 31.12.2002.

***UNITED KINGDOM 25, Annex 3, pages 27 to 30: These pages show bar charts of activity in gaseous effluents. What are the authorised limits for these discharges?***

Appropriate authorised limits for gaseous effluents from Dukovany plant are in text related to the figures, especially in Annex 3 page 14. These yearly limits are as follows:

- 4100 TBq for activity of noble gases
- 180 TBq for activity of aerosols
- 440 TBq for activity of iodine.