

*Answers to Questions and Comments
Raised by South Africa
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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SOUTH AFRICA 1, Page 12 - Planned modernisation: Various safety upgrades have been identified in the "Modernisation Program for Nuclear Power Plant Dukovany". Further elaboration is requested on the detail of the status and schedules for these upgrades and the identification of difficulties experienced in implementing the upgrades.

The program of modernization and upgrading at the Dukovany NPP, called MORAVA, contains a series of actions incorporated into the program from various resources (IAEA missions recommendations, audits results, safety analyses results, other analyses results, etc.). Every such action was scrutinised, assigned with priority and preliminary time schedule of execution. At present, a summary documentation is being prepared at the Dukovany NPP, to be a safety concept of modernisation and „Feasibility Study“ in its nature.

The main part of this modernization program rests in solution of the so-called IAEA „Safety Issues“.

The below table gives the terms of resolution of individual IAEA „Safety Issues“ (IAEA-EBP-WWER-03 publication).

Progress of the IAEA „Safety Issues“ resolution

Year	Numbers of findings	Count per year	Total	I	II	III
cont.	AA1 (II), AA2 (I), AA3 (II), AA10 (I)	4	4	2	2	-
by 1998	G3 (II), CI1 (II), CI2 (III), CI4 (II), CI5 (II), CI6 (I), S6 (II), S7 (II), S8 (I), IaC8 (II), EI1 (I), C3 (II), C4 (II), C5 (I), IH1 (II), IH5 (I), AA4 (I), AA7 (II), AA12 (I), AA13 (I), AA14 (I), AA15 (I), IH8 (I), EH3 (III)	24	28	11	11	2
1998	G1 (II), S15 (II), IH3 (II)	3	31	-	2	-
1999	AA5 (I), AA8 (II), G2 (III), EH1 (III)	4	35	1	1	2
2000	S12 (I), EI5 (II), IH4 (II), AA11 (I), S1 (II), S4 (II), S5 (III), S13 (III), C2 (II), IH2 (III)	10	45	2	5	3
2001	S11 (I), S16 (II), RC1(II)	3	48	1	2	-
2002	S3 (II), S9 (II), S10 (II), S17 (II), IaC11 (I), EI2 (I), EI3 (I), EI4 (I), AA6 (II), IH7 (III)	10	58	4	5	1
2003	IaC10 (II), IaC6 (I), IaC7 (II),	3	61	1	2	-
2004	CI3 (II)	1	62	-	1	-
2006	S14 (II)	1	63	-	1	-
2007	S2 (II), IaC1 (II), IaC2 (I), IaC3 (II), IaC4 (II), IaC5 (II), C1 (II)	7	70	1	5	-
2009	IaC9 (II)	1	71	-	1	-
2010	AA9 (I)	1	72	1	-	-
not planned	IH6 (I), EH2 (I),	2	74	2	-	-

By the Moscow WANO centre a so-called Users Club of VVER 440/213 came to life in 1991. The members are organisations operating the NPPs of this type, including the Lovissa NPP.

Still before the IAEA-EBP WWER-03 was put into words, a so-called Minimum List of Measures to Increase Nuclear Safety of the VVER 440/213 Units had been established within this Club. Since 1992, the members have been exchanging experience from its preparatory and executive phase. In recent years, the members came to exchange of experience from preparatory and executive phase of the entire scope of IAEA Safety Issues. Regarding the agreements between the individual nuclear power plants, the individual members are handing over to one another the technical information on the accepted technical solutions and procedures of realisation. A good routine in handing over this information makes it possible to cope with the IAEA Safety Issues without any major problems.

In its preliminary phase of modernisation, the Dukovany NPP is also making use its experience from a multitude of Western NPPs. For example within the PHARE PH1.01/94 project, a group of NPP Dukovany specialists visited a series of upgraded units in United Kingdom. A variety of visits had been accomplished to the NPPs in Germany (partner NPP Obrigheim), in France (partner NPP at St. Alban), in Switzerland, Spain, and Holland.

With use of the above experience the upgrading measures are successfully being put in practice without any substantial problems.

SOUTH AFRICA 2, Page 38, Paragraph 6.1.3 : It is stated that the SUJB grants authorisations to competent persons to carry out certain activities, upon an application by the licensee. Could you supply details of the categories of personnel covered by such authorisations e.g. Control Room Operators; Radiation Protection Officers, Maintenance Technicians, etc.

In this respect the National Report mentions the Regulation No. 146/1997 Coll. "on Special Professional Qualification of Selected Personnel from viewpoint of Nuclear Safety and Radiation Protection. Article 3 of this Regulation defines working activities directly related to nuclear safety and working activities important from viewpoint of radiation protection:

1) The working activities directly related to the nuclear safety there are understood the working activities executed in:

a) the nuclear power installation:

1. The manipulation in the main control room and in the emergency control room, including the reactor shutdown, the control and supervision of start-up, and the operation of whole nuclear power installation, (e.g. "Shift Supervisor")
2. The manipulation in the main control room and the emergency control room, including the reactor shutdown, the control and supervision of start-up, and the operation of the unit, (e.g. "Unit Supervisor")
3. The manipulation in the main control room and the emergency control room, including the reactor shutdown, the control and supervision of start-up, and the operation of primary circuit, (e.g. "Reactor operator")
4. The manipulation in the main control room and the emergency control room, and the control and supervision of start-up, and the operation of secondary circuit, („Turbine operator“)
5. The direct supervision of execution of individual steps of physical and power start-up tests in the main control room, (e.g. "Inspecting physicist“)
6. The control and supervision of handling with the individual fuel assemblies inside the reactor unit, off-side the fresh fuel storage, (e.g. „Supervisor over fuel management“)

b) The research nuclear installation:

1. The manipulation in the control room, and direct supervision over execution of individual steps of physical and power start-up tests of the reactor, and the control and supervision of start-up works, (e.g. "Supervisor of Start-up Group")
2. The manipulation in the control room and the supervision and control of fuel handling in the reactor core, and the control and supervision of shift activities, (e.g. "Shift Supervisor")

3. The supervision and the control of set-up and figure of reactor core, the realisation of physical measurements during the physical and power start-up of the reactor, and the control and supervision of basic critical test, (e.g. “Inspecting physicist“, or „Supervisor over fuel management“)

4. The manipulation in the control room, and the control and supervision of the reactor start-up and of the reactor operation, (e.g. “Reactor operator”)

2) The working activities, especially important from the viewpoint of radiation protection there are understood:

a) The control of works with that ionising radiation sources that may not be handled without the necessary licence,

b) The execution of systematic supervision over the adherence to the radiation protection requirements,

c) The control of tests and services in the domain of radiation protection:

1. The execution of tests of ionising radiation sources for the type approval (§ 23 par. 3 of the Law),

2. The verification of coincidence of properties and parameters of ionising radiation sources with the approved type (§ 23 par 4 and 5 of the Law),

3. The execution of acceptance tests [1],

4. The execution of tests of long-term stability [1],

5. The execution of services of personal dosimetry [1],

6. The measurement and the evaluation of occurrence of radon and radon daughter products in the pieces of land and in the constructions [1],

7. The measurement and the evaluation of natural radionuclides content in building materials and in water (§ 6 para 3 of the Law).

SOUTH AFRICA 3, Page 38, Paragraph 6.1.3, penultimate paragraph: Regarding the professional training of selected personnel of nuclear installations, the SUJB may issue licences to natural or jurist persons. Examples are requested of the entities to which the SUJB has granted such licences.

SONS (SUJB) has granted licence for training of the nuclear installations selected personnel to:

- **Czech Power Company (CEZ) - Central Training Centre** for theoretical training of NPP Dukovany and NPP Temelín selected personnel,
- **Czech Power Company (CEZ) - Training Centre of NPP Dukovany** for practical training of NPP Dukovany selected personnel,
- **Czech Power Company (CEZ) - Training Centre of NPP Temelín** for practical training of NPP Temelín selected personnel,
- **Czech Power Company (CEZ) - Training Centre of NPP Temelín** for display-based simulator (VVER 1000) training of NPP Temelín selected personnel,
- **Nuclear Research Institute (UJV Rez)** - for theoretical and practical training of NRI selected personnel,
- **Czech Technical University - Faculty of Nuclear Sciences and Physical Engineering (Department of Nuclear Reactors - Training Reactor VR-1)** - for theoretical and practical training of selected personnel of Training Reactor VR-1.

SOUTH AFRICA 4, Page 48, Paragraph 7.1.2 - second paragraph: Further information is requested regarding the mechanism through which the SUJB provides input to the State and Expert Examination Commission regarding those activities that it deems important for nuclear safety and radiation protection. For example, what is the representation upon such bodies, what is the range of activities referred to, and how are curricula influenced by the SUJB.

Act No. 18/1997 Coll. on Peaceful Utilisation of Nuclear Energy and Ionising Radiation (the Atomic Act) gives SUJB competence and power to establish:

- State examination commission for verification of special professional competence of selected personnel from viewpoint of nuclear safety, and
- Professional examination commission for verification of special professional competence of selected personnel from viewpoint of radiation protection.

Special professional competence, within the meaning of this Act, means skills and expertise of natural persons, as verified by a State examination commission and required for activities directly affecting nuclear safety of nuclear installations.

Members of commissions are both inspectors of SUJB and other senior experts, Chairman is one of the SUJB inspectors. They are appointed and recalled by the Chairman of the SUJB.

The activity of the State Examination Commission and Professional Examination Commission, the way of performance and evaluation of examinations and other details are codified the Statutes of these commissions issued by SUJB.

SOUTH AFRICA 5, Page 54, Paragraph 8.1.5 : To what extent does SUJB implement a formalised QA system upon itself ?

The SÚJB has not formally introduced a formal system of quality upon itself. However, SÚJB is using in this field of activity some principles of good practice, mainly e.g. the following tools: self assessment, peer review, planning, training and examination of personnel, system of records (like e.g. the safety evaluation reports), compilation of the documented rules for inspections and examination activities.

The SÚJB is building its quality system from the second level of documentation at first, i.e. making all necessary directives with inclusion of the most vital elements. Since the year 1993 the 2nd level documentation has been handled; the documentation involves 35 internal directives and one inspection manual at present. The documentation covers namely the following areas:

- organisation and responsibilities
- qualification and training of personnel
- documentation and records
- inspections
- information systems
- activities of emergency response centre
- licensing
- administrative proceedings and penalties
- economy
- communication with public

This year, the post of manager for quality has been established, being directly subordinate to the SUJB chairman; one of the main tasks of him is quality system elaboration, maintenance, and improvement.

The quality system has been put together according to the individual needs of specialised departments.

SOUTH AFRICA 6, Pages 57 - 60, Paragraph 9.1.2: Further information regarding the process of safety assessment conducted by the regulatory body is requested, as follows :

- *Are the Operational Safety Analysis Reports updated on a continuous basis - for example to reflect the safety significance of continuing modifications to the plant outside the broader modernisation program ?*
- *Where are the deterministic standards, against which the installations are evaluated, set down ?*
- *What percentage of its technical professional staff does the SUJB assign to conducting safety assessments as opposed to inspections ?*
- *What methodology is applied to address Article 4(2) of Act No. 18/1997 Coll. of 24 January 1997 ?*

Are the Operational Safety Analysis Reports updated on a continuous basis - for example to reflect the safety significance of continuing modifications to the plant outside the broader modernization program?

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 meet 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 a 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 substantial parts (fuel system design, nuclear design, thermal and hydraulic design, accident analysis) reflects introduction of the new (advanced) Russian fuel.

- **Where are the deterministic standards, against which the installations are matched, set down?**

The requirements are set out in Regulations and Technical Standards.

The Atomic Law (Act of 24 January 1997 of Peaceful Utilisation of Nuclear Energy and Ionising Radiation) itself sets only general requirements to protect public health and safety but according to this Law (§47, (7)) the State Regulatory Body (State Office for Nuclear Safety) issues decrees to implement requirements of the Law (specifically to § 2, 3, 4, 6, 7, 8, 9, 13, 18, 20, 22, 23, 24, 34 and items A.I.1, A.I.2 and B.I.1 of the Appendix).

The plant systems and components have to be designed according to the accurately defined legislation framework i.e. according to the Czech (former Czechoslovak) and, where applicable, also Russian (former Soviet) and US regulations and standards. All subjects to be

covered during the design phase are summarised in the list of contents of the standard safety analysis report. The detail requirements of all important domains are codified by technical standards (Technical Standards of ČSN)

The basic document on nuclear safety assurance during designing, permission or licence issuance and construction of nuclear power facilities is Regulation No 2 of the Czechoslovak Atomic Energy Commission (of October 27, 1978). It establishes requirements for the nuclear power installations with the objective to apply principles of the standard state technical policy in the sectors of construction and environment's protection (§ 88, Para 2 of the Regulation N 83/1976 Coll. on the overall technical requirements to construction projects).

Regulation No. 106/1998 Coll. of the State Office for Nuclear Safety on Nuclear Safety and Radiation Protection Assurance during Commissioning and Operation of Nuclear Installations determines the stages of the nuclear installation commissioning, the technical and organisational conditions for assurance of the nuclear installations nuclear safety during their commissioning and their operation, re-commissioning the nuclear reactor into the criticality after the replacement of nuclear fuel, the extent and the manner of approved documentation for the license delivery for the individual stages of commissioning and the operation of nuclear installation, and the procedure for the submission and assessment of documentation for the license to the re-commissioning the nuclear reactor into the criticality after the change of nuclear fuel.

From the set of the SÚJB Regulations:

- Regulation No. 184 / 1997 Coll. Of The State Office For Nuclear Safety, On Requirements On Assurance Of Radiation Protection
- Regulation No. 214/1997 Coll. Of The State Office For Nuclear Safety Of August 15, 1997, On Quality Assurance During Activities Connected With The Use Of Nuclear Energy And Activities Leading To Radiation Exposure And On Stipulation Of Criteria For Ranking And Distribution Of Selected Equipment Into Safety Classes
- Regulation No. 215/1997 Coll. Of The State Office For Nuclear Safety, On Criteria For Siting Nuclear Installations And Workplaces With Very Significant Ionising Radiation Sources
- Regulation No. 219/1997 Coll. Of The State Office For Nuclear Safety, On Particulars For Assurance Of Emergency Preparedness Of Nuclear Installations And Workplaces With Ionising Radiation Sources And On Requirements For Content Of On-Site Emergency Plan And The Emergency Code

IAEA Standards and Guidelines are also considered e.g.:

- IAEA 50-C-S: Code On The Safety Of Nuclear Power Plants: Siting: A Publication Within The NUSS Program.
- IAEA 50-SG-D11: General Design Safety Principles For Nuclear Power Plants: A Safety Guide.
- IAEA 50-SG-D12: Design Of The Reactor Containment Systems In Nuclear Power Plants: A Safety Guide.
- IAEA 50-SG-D15: Seismic Design And Qualification For Nuclear Power Plants: A Safety Guide: A Publication Within The NUSS Program.
- IAEA 50-SG-D5: External Man-Induced Events In Relation To Nuclear Power Plant Design: A Safety Guide: A Publication Within The NUSS Program Corrigenda 1996.
- IAEA 50-SG-D4: Protection Against Internally Generated Projectiles And Their Secondary Effects On Nuclear Power Plants: A Safety Guide.

- IAEA 50-C-O: Code On The Safety Of Nuclear Power Plants: Operation: A Publication Within The NUSS Program.
- IAEA, 50-C-S (1978): Safety In Nuclear Power Plant Siting. A Code Of Practice.
- IAEA, 50-SG-S8 (1986): Safety Aspects Of Foundations Of Nuclear Power Plants.
- IAEA, 50-SG-S1 (1991): Earthquakes And Associated Topics In Relation To Nuclear Power Plant Siting. IAEA, Vienna.
- IAEA, 50-SG-S9 (1984): Site Survey For Nuclear Power Plants.
- IAEA, 50-SG-S7 (1984): Nuclear Power Plant Siting: Hydrogeologic Aspects.
- IAEA 50-SG-S3 (1980): Atmospheric Dispersion In Nuclear Power Plant Siting. A Safety Guide.
- IAEA-EBP-WWER-05 (1996): Safety Issues And Their Ranking For WWER-1000 Model 320 Nuclear Power Plants.

- **What percentage of its technical professional staff does the SUJB assign to conducting safety assessments as opposed to inspections?**

It is hard to divide staff conducting inspection from that dealing with the assessment. Mostly, the experts are involved in both activities.

- **What methodology is applied to address Article 4(2) of Act No. 18/1997 Coll. of 24 January 1997?**

Article 4(2) of Act No. 18/1997 Coll. (Atomic Act) is related to justification of the practice. It should take place before the introduction of the class or type of practice and as early as possible to reduce the influence of the already incurred costs in balancing economic and social factors against health detriment. Compliance with this justification principle can be safely assumed for existing classes of practices in respect to the general overview of results of radiation protection. This methodology and techniques for judging is used also for energy production in NPPs.

SOUTH AFRICA 7, Page 84, Paragraph 11.1.3: To what extent are emergency exercises held to test the integrated aspects of the emergency plan ?

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 Authorities. 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 extraordinary event) 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 units, 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 exercises like those of INEX 2, Hexagant, etc.