

Position of the Czech Republic on the recommendations formulated in the AQG Report on Nuclear Safety in the Context of Enlargement

The Czech Republic submits its position on the recommendations formulated in the Report on Nuclear Safety in the Context of Enlargement, which was developed under the auspices of the Atomic Question Group of the Council (AQG) (hereinafter referred as the Report). The present Additional Information replaces the document CONF-CZ 42/01 of 17 July 2001.

The Czech Republic acknowledged the Report as one of the most important external inputs to the process of continuous enhancement of nuclear safety of nuclear facilities operating on its territory and the safe management of radioactive waste. As a part of this regular process all recommendations formulated in the Report have been screened with respect to the licensing basis of specific activities related to peaceful use of nuclear energy and ionising radiation. Following text summarises results of this screening and where appropriate, details on how specific recommendations are being addressed are given. Based on results of analyses appropriate necessary measures will be taken to enhance nuclear safety of the Czech nuclear installations.

The CR is prepared to provide all necessary information for the purposes of the so-called „Peer Review“ mechanism envisaged in the European Commission’s letter of 11 July 2001 (CONF-CZ 41/01)

With regard to the first general recommendation - type I:

“All Candidate States with nuclear power plants should complete their plant-specific safety improvement programmes according to the presented plans”

The position of the Czech Republic is as follows:

In case of the Dukovany plant, the State Office for Nuclear Safety (SUJB – Regulatory Authority in the Czech Republic) will continue to monitor the execution of set of upgrading/refurbishment projects assembled in modernisation and safety improvement programme MORAVA. As declared in information already provided to the European Commission and to the competent bodies of the Council, all improvement measures that are important to safety are planned for completion till the end of 2004, except replacement of instrumentation and control (I&C) system. The whole project is scheduled to be finished by 2009. This large scope I&C refurbishment project was contracted to consortium led by French companies Framatome and Schneider Electric in 2000. Project is structured to several phases, starting with systems important to safety. The MORAVA programme is an open structure, where the implementation and content is subject to periodical review and assessment both by the Operator and by the Safety Authority. This allows to react on any new research information, results of systematic analyses of operating experience or regulatory action, such as the results of regulatory review (annually – after refuelling outage, periodically after 10 years operation) regarding full verification of the performance of the containment bubbler condenser (see position to country specific recommendation II-1), if necessary. Status of the MORAVA programme implementation is reported to the European Commission (EC). Latest information from June 2001 is attached (1). In addition to that, the plant Operator asked through the SUJB the International Atomic Energy Agency (IAEA) for peer review mission in 2003 subjected to resolution of safety issues indicated for VVER 440/213 reactor type under the Extrabudgetary Programme operated by this agency.

The Temelín design, based on VVER 1000/320 reactor type, underwent large scope safety improvement before completion of plant construction. Western European Nuclear Regulators Association (WENRA) and WPNS itself noted both comprehensiveness of this improvement. Large scope safety improvement of the Temelín design and its implementation during the construction of the plant was one of the major pre-requisites for obtaining the regulatory approval for start of the commissioning by the Operator. Overall safety performance, including the effectiveness of the design changes, is being monitored during commissioning of unit No.1 and will be finally assessed by the Regulatory Authority after its completion. The operator has already in place all necessary arrangements to react on results of systematic analyses of operating (commissioning) experience, any new research information or regulatory action, including results of regulatory review of two country specific recommendations for Temelín included in the WPNS report, if necessary (see position to country specific recommendations I-1 and II-2). Status of the Temelín plant construction and commissioning is regularly reported to the EU. In addition to that, the plant Operator asked through the SUJB the International Atomic Energy Agency (IAEA) for peer review mission in November this year subjected to resolution of safety issues indicated for VVER 1000/320 reactor type under the Extrabudgetary Programme operated by this agency.

With regard to the second general recommendation - type I:

“While the WPNS recognises that Candidate States may already have implemented these measures to varying degrees, all Candidate States with nuclear power plants should, as a short term priority, ensure that their nuclear safety programmes include listed measures considered as good practices within the EU”

The position of the Czech Republic is as follows:

- Regarding full safety analysis reports and related safety improvement measures, both Temelín and Dukovany Plants have in place plant-specific, in-depth Safety Analysis Reports that cover all relevant operating modes and all relevant internal and external hazards in accordance with well established international standards. For each nuclear installation there are – Sitting Safety Analysis Report (performed before sitting), Preliminary Safety Analysis Report (performed before construction start up) and Final (Pre-Operational) Safety Analysis Report. Out of scope of safety analyses reports plant-specific beyond design basis and/or severe accident (depending on terminology used) vulnerability analyses were conducted. Based on these, specific scenarios were selected, for which variety of mitigation measures were implemented taking into account, among others, defence-in-depth concept. Both, design basis events safety analyses and severe accident vulnerability analyses are subject to periodic update based on operational feedback, availability of new research information and upgraded analytical codes. For Dukovany NPP FSAR was updated after 10 years of operation (in 1995) as a part of periodic safety review and since the time the report, where appropriate, is updated and submitted to the regulatory authority every year (“living” SAR with thorough overall review with 10-year periodicity). Severe accident vulnerability analyses were updated in 1999. For Temelín NPP severe accident vulnerability analyses are being updated currently, according to new analytical code – MELCOR. Where appropriate, in line with this update, the results of such analyses are projected to specific safety improvement measures. This is the case of design safety improvement project at Temelín as well as Dukovany plant modernisation programme MORAVA for example.

- Regarding safety reassessment practices, specific multilevel safety re-assessment practice is in place in the Czech Republic on a recurrent basis, co-ordinated, as appropriate, with national license renewal schedules. This concept was applied for first time after 10 years of operation of Dukovany units. Where appropriate, outcomes of these re-assessment activities may result in specific safety improvement actions. This is the case of Dukovany plant modernisation programme MORAVA for example.
- Regarding emergency operating procedures, modern Symptom Based Emergency Operating Procedures based on Westinghouse methodology are in place at both plants. Appropriate instructions on management of beyond design basis accidents exist. On top of that, both plants signed contract for support in development of modern Severe Accident Management Guidelines using advanced Westinghouse methodology. Both projects were already launched; the project started in 2000 and is scheduled to finish in 2003.
- Regarding feedback of experience, Dukovany and Temelín plants and the Regulatory Authority all have in place specific procedures for systematic analysis of operating experience and new research information to ensure continued learning and improvement as an element of safety culture. Of course, at Temelín, the scope of implementation reflects present status of the plant. At the Operators facilities, implementation of these procedures is subject of regulatory reviews and inspections and international peer reviews (ASSET missions to Dukovany and OSART mission to Temelín, both of them organised by the IAEA). With regard to the Regulatory Authority, this issue was observed with positive result by the International Regulatory Review Team (IRRT) mission, which recently visited SUJB.
- Regarding resources of the regulator, adequate human and financial resources for the Regulatory Authority in the Czech Republic, including in particular access to independent technical support, were recognised by above mentioned IRRT mission organised under the IAEA umbrella in May 2001 (members of the team were, among others, representatives from EU countries such as Germany, Finland or UK). IRRT Final Report is attached (2).

With regard to the third general recommendation - type II:

“While the WPNS recognises that Candidate States may already have implemented these measures to varying degrees, all Candidate States with nuclear power plants should ensure that their nuclear safety programmes include listed measures considered as good practices within the EU”

The position of the Czech Republic is as follows:

- Regarding probabilistic safety assessments – it is understood as part of a safety culture, that comprehensive, plant-specific probabilistic safety assessments are developed to well established international standards on plant specific basis, even though it is not required in the national legislation. At present, Dukovany plant has updated PSA study, peer reviewed in the end of 1998 by extended IPERS mission organised by the IAEA. In case of Temelín, level 1 and 2 PSA study was developed in mid of '90 using very conservative, to the large extent generic data for VVER 1000/320. In 2000 operator announced signature of contract to update these studies in order to reflect as-built status of the plant. Studies are used by the Operators as a tool to support the identification and prioritisation of issues arising from the safety analysis reports and the periodic reassessments of safety (for example in case of definition of Dukovany MORAVA modernisation programme). Regulatory body do not set probabilistic safety goals (as in many other countries),

nevertheless accepts, resp. uses, the PSA methodology in specific cases such as approvals of changes to Technical Specifications or definition of emergency planning zone.

- Regarding regulatory quality management, implementation of a modern, well documented quality management system at the Regulatory Authority in the Czech Republic was recognised by above mentioned IRRT mission organised under the IAEA umbrella in May 2001 (members of the team were, among others, representatives from EU countries such as Germany, Finland or UK).

With regard to the general recommendation III.2 – type II:

“Taking what is already implemented into due account, all Candidate States should continue to develop and implement their national programmes regarding the safe management of spent fuel and radioactive waste, and for decommissioning of nuclear facilities no longer in use, and regarding the safety of their research reactors (if applicable)”

The position of the Czech Republic is as follows:

- Regarding the development of national strategies for the long term safe management of spent fuel and radioactive waste, including appropriate schemes for storage or disposal of all types of radioactive waste and for decommissioning of nuclear facilities no longer in use

In the Czech Republic a new document headed „Conception for Spent Fuel and Radioactive Waste Management in the Czech Republic“ is being developed. At the moment the environmental impact assessment of the „Concept“ under Act No 244/1992 Coll. on EIA is being carried out, and the public hearing is scheduled for the September of 2001. Consecutively, an amended version of the Concept will be submitted to the Czech Government for approval. The new document linking to previous conceptual documents (e.g. Conception of disposal of radioactive waste from nuclear facilities approved in 1981 and documents approved by the Czech Government in the beginning of ninetieth years) formulates governmental strategy for the period until about 2025, with a perspective to the end of the 21 century.

Strategy of decommissioning of nuclear facilities no longer in use is given in the conceptual document - Energy Policy- approved by the Czech Government in January 2000. Conditions and requirements set up decommissioning are stipulated by the Atomic Act.

Construction of the deep geological repository in the Czech Republic is currently treated as the basic option. On the other hand it should be noted that spent nuclear fuel is to be delivered for storage in that repository as late in 2065 so that there is sufficient time for closing the fuel cycle, if necessary, or developing new transmutation procedures.

More information regarding the issue of spent fuel and radioactive waste policy and on preparation of deep geological repository in the Czech Republic was provided to the EU in the form of the special report of the Ministry of Industry and Trade under title “Report on Sufficiency of Capacity to Store Spent Nuclear Fuel and on Progress in the Selection of the Definitive Deep Geological Repository” in August 2001. The report is attached (3).

Date of approval of „Conception for Spent Fuel and Radioactive Waste Management in the Czech Republic“: December 2001

- Regarding the provision of adequate facilities for safe interim storage of spent fuel

In the Czech Republic it was decided to operate the Dukovany Nuclear Power Plant and the newly built Temelín Nuclear Power Plant on a once through fuel cycle basis and to store the spent nuclear fuel in dry cask storage repositories. Repository with a capacity to hold 600 tonnes of heavy metal has been operated since 1997 at Dukovany NPP site and is scheduled to be completely filled by 2006. Therefore a permission procedure for construction of a new spent fuel storage facility with capacity for up to the end of operation of the NPP (for 1340 tonnes of heavy metal) is under way. The repository is scheduled to start trial operation in the first quarter of 2006.

As for Temelín NPP, it is planned to store the spent fuel in the reactor storage pool of the plant for about 10 years. Subsequently, after the year 2014, the spent fuel should be transferred to dry cask storage facility situated on site. The repository is to be put in testing operation in 2011 or 2012. The siting process will start after start-up of second unit of Temelín NPP. The reserve interim storage capacity is also prepared. The siting approval process will be nearly finished in Skalka site located in Southern Moravia. "Skalka" is considered to be a stand-by project and would be implemented only if the on-site storage facility at Temelín NPP is not built. From three research reactors operated in the Czech Republic, the LVR-15 is the only one producing spent fuel. The spent fuel from the reactor is stored in storage facility at site of the Nuclear Research Institute at Rež, which is the operator of the research reactor. Capacity of the storage facility is sufficient until 2002 only. At present time conditions for increasing capacity of the facility, which would enable to raise its capacity for another 10 years of spent fuel storing, are considered.

- Regarding the closure of old facilities for storage and disposal of radioactive waste not in compliance with modern standards, and transfer of waste from these facilities to modern facilities to the extent reasonable feasible

For low/medium level waste the following near-surface repositories are under operation in the Czech Republic: Dukovany, Richard and Bratrství; one repository has been closed down at Hostím. All repositories are operated and monitored (including Hostím) by the Radioactive Waste Repository Authority (RAWRA) in compliance with relevant permits issued by the State Office for Nuclear Safety (SUJB- Czech Regulatory Authority) and in compliance with the Czech law based on internationally accepted principals for radioactive waste treatment. Considering the current production of radioactive waste, the capacity of repositories is sufficient in the prospect of decades (Dukovany repository until 2100, Richard until 2070 and Bratrství until 2030). No new repositories for low/medium level waste are planned; their existing capacity will be used in an optimal way and prospective increasing of it will be considered, if necessary.

- Regarding the assurance of adequate financial resources to support the safety of facilities for spent fuel and radioactive waste management during their operation lifetime and for decommissioning, based on the principle that the waste producer should pay

In compliance with Czech legislation and internationally accepted principles, the radioactive waste originator bears all costs of radioactive waste management from the origin until disposal of such waste, including the cost of monitoring of repositories after their closing down and the cost of necessary research and development. The originator pays for the cost of these activities in the forms of payments to the Nuclear Account. The Nuclear Account is controlled by the Government and funds collected on the Nuclear Account may only be used

through RAWRA for the tasks as specified in the Atomic Act. Besides payments of originator to the Nuclear Account, there are other contributions:

- ◆ Revenues of investments of free funds from the nuclear account on the financial market under the conditions as stipulated by the Atomic Act and under the supervision of the Czech Ministry of Finance;
- ◆ Interest accrued on the nuclear account;
- ◆ Payments from the state budget allocated to cover the cost of radioactive waste management, pertaining to the radioactive waste disposed of as per regulations that had been in force prior to the Atomic Act;
- ◆ State fees for disposal of radioactive waste found at the territory of the Czech Republic in case its originator was not identified;
- ◆ Paid activities conducted by RAWRA, grants and financial payments coming from abroad (e.g. EU projects).

The distribution of Nuclear Account funds and the amount and way of payments are set out by the Government order No.224/1997 Coll. The creation of Nuclear Account funds is evaluated in regular intervals (five years) with estimate of their need. (Levy of CZK 50/MWh is imposed on NPP operator-CEZ).

Decommissioning of nuclear facilities and workplaces with significant and very significant ionizing radiation sources is funded through reserve funds established and kept in accordance with the Atomic Act by each operator/licensee of such installation. Licensees have approved relevant safety documentation on decommissioning including estimation of financial costs of the decommissioning. The estimation is verified by RAWRA. Financial funds have to be available for preparation and decommissioning proper in the required time and amount in compliance with the approved programme of the decommissioning. Such financial provisions are tax-deductible. As per section 26, paragraph 3, subparagraph h) of the Atomic Act, RAWRA checks the aforementioned funds for decommissioning. Checks will be conducted in the required intervals.

With regard to the first country specific recommendation - type I:

“The Czech Republic should, as short term priority, ensure that the safety case demonstrating appropriate protection against high energy pipe breaks and consequential failures of the steam and feed water lines at Temelín 1-2 complies with requirements and practices widely applied within the EU and that an appropriate combination of measures are in place.”

The position of the Czech Republic is as follows:

The issue of protection against high energy pipe breaks and consequential steam and feed water lines is included in the existing licensing case of Temelín unit No.1. To solve the difference in opinions of experts with regard to this issue, the Regulatory Authority initiated revisit of the safety case documentation in order to re-evaluate its compliance with requirements and practices widely applied in the EU. Alternative methods of assessment will be applied for this purpose as well as data collected during unit No. 1 commissioning tests. The result of these efforts will be made available to the Regulatory Authority till the end of September 2002 for decision (see the following timetable). According to the result, schedule for implementation of additional safety measures (if any necessary), will be included to the above-mentioned regulatory submittal. The CR will report to the EU on this subject on regular basis.

No.	Activity description	Status	Time schedule
1.	Preparation of Comprehensive Safety Case on Temelín NPP high energy piping layout at 820 and 826/1 BRU-A and SGSV steam-water mixture qualification (the report will comprise results of steps 2 – 7)	Started 30.1.2001	30.9.2001 1st Progress 30.10.2001 2 nd Progress Rep. 30.3.2002 3 rd Progress Rep. 30.6.2002 Final Report 30.9.2002 Regulatory Submittal
2.	Stress state calculation and measurement including: – pipe whip restrain reassessment – pipe penetrations reassessment – integrity reassessment of steam piping due to water overflow – probability calculation according to PRISE methodology (US NRC) in comparison with LBP Pipe (SKI Methodology) – stress state measurements projects	Finished Finished Started Started Started	10.3.2001 15.8.2001 30.10.2001 30.10.2001 till 2003
3.	LBB concept application assessment including: – comparison with Break Preclusion Concept – dynamic loading calculations due to steam water hammer – E-C assessment – LBB concept application according to the US NRC SRP 3.6.3.	Started Finished Started Started	30.10.2001 15.8.2001 15.9.2001 30.4.2002
4.	TH analysis of multiple steam and feed water lines breaks in respect: – core cooling and final performance – PTS situation – radiological consequences	Started	15.10.2001 15.10.2001 15.10.2001
5.	Feasibility study on separation of steam and feed water lines by qualified separation walls design	Started	30.6.2002
6.	UT Qualification of method, equipment and personnel according to ENIQ methodology for circumferential welds and pipe whip restrain fixation elements, UT testing and assessment of results	Started	30.11.2001 and during outage

7.	Qualification file development for the BRU-A valve and the SG SV (IPU-Valves) for steam-water mixture performance	Started	30.6.2002
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With regard to the second country specific recommendation - type II:

‘The Czech Republic should report on the measures to complete the regulatory review regarding full verification of the performance of the containment bubbler condenser system at Dukovany 1-4 for all design basis accidents.’

The position of the Czech Republic is as follows:

The CR will report on progress in completion of its review on regular basis. Final decision is scheduled to be taken in frame of periodic safety assessment of the Dukovany units after twenty years of operation - not later than by the end of 2004. New PHARE project PH/TS/17 may contribute to the final resolution of this issue as well as the initiative for selected experiments and subsequent analyses announced by the VVER 440/213 operators.

With regard to the third country specific recommendation - type II:

“The Czech Republic should report on measures to complete the demonstration of reliable function of key steam safety and relief valves in Temelín 1-2 under dynamic load with mixed steam-water flow.”

The position of the Czech Republic is as follows:

Demonstration of reliable function of key steam safety and relief valves is included in original licensing case of Temelín unit No. 1. To solve the difference in opinions of experts with regard to this issue, the Regulatory Authority initiated revisit of the qualification documentation in order to re-evaluate validity of Temelín key steam safety valves qualification. The result of these efforts will be made available to the Regulatory Authority till June 2002 for final decision. According to the result, schedule for implementation of additional measures (if any necessary) will be included to the above-mentioned regulatory submittal (see the timetable above). The CR will report to the EU on this subject on regular basis.

Done in Prague, September 2001