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Temelin NPP Status:
The Challenge of Safety Improvements

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The decision to construct a nuclear power plant at the Temelin site in the Czech Republic was made in 1980, as a result of an expert site selection for four units with VVER-1000 type 320 reactors. The contract for the supply of the technical design from the former USSR was signed in 1982. This design included the reactor, auxiliary buildings and diesel generator stations. The design of the balance of the plant was entirely in the hands of the Czech party, according to the contract.

The basic design of Temelin units 1 and 2 was completed by the Czech architect–designer company Energoprojekt (EGP) of Prague in 1985. The site licence was issued in 1985 and the construction licence in November 1986. Actual erection of the buildings was begun in February 1987. Domestic specialists analysed and subsequently modified the original design before 1989.

After 1989, under the new political and (especially) economic conditions in the country, the need of the Czech Republic for a 4000 MWe power plant was re-evaluated, and at the same time new analyses of the design safety level were performed. In March 1993 the government of the Czech Republic decided that construction of Temelin would be completed with two units.

The present schedule for commissioning and commercial operation of the two units at Temelin are shown in Table 1.

Nuclear Safety Legislation Framework

The licence application for the commissioning and operation of a nuclear installation must be accompanied by, among other things, the Final Safety Analysis Report (FSAR), the content of which must include:

1. A description of changes to the original design which was assessed in the Preliminary Safety Analysis Report.
2. Supplementary and more precise evidence of nuclear safety and radiation protection measures.
3. Technical specifications for the safe operation of the nuclear installation.
4. Neutron-physics characteristics of the nuclear reactor.
5. The methods of radioactive waste management.
6. Quality evaluation of classified equipment.

International Expert Appraisals

International missions to the Temelin NPP date from the beginning of the 1990s. These missions were invited to provide an independent evaluation of the original Russian design and some other aspects of the plant construction from the stand-point of internationally adopted standards.

In 1990, on the invitation of the (at that time) Czechoslovak government, the IAEA organised three international expert missions:

- A mission aimed at the evaluation of Temelin site safety (April 1990).
- A pre-operation safety review (Pre-OSART) mission to assess the plant construction practice and preparation for safe operation (April/May 1990).
- A mission focused on the safety systems, core design and safety analyses evaluation (June/July 1990).

These missions stated that the design of Temelin NPP, its siting, and the organisation of its construction did not show any significant deviations from international practice. The final reports of those missions offered some partial recommendations as a contribution to enhancing the plant's safety level. A follow-up Pre-OSART mission took place in February 1992, to assess to what degree the 1990 recommendations were considered and implemented in the construction and in the preparation for future operation.

In addition to the activities listed above, in 1991 the Czech electricity company CEZ contracted the consulting company Halliburton NUS of the USA to perform an independent audit focused on the plant's technical concept and to verify whether the plant would be licensable with respect to standards accepted for a plant built in Western Europe or the USA in the mid 1990s.

The audit team concluded that the overall technical concept of Temelin was in many respects consistent with modern reactor designs used in the West. Temelin included, or could be practically modified to include, essentially all features necessary to reflect Western nuclear power plant standards of the mid 1990s. Some of the initial Temelin design concepts and criteria fell short of modern practices, but these shortcomings could be removed by changes in the design. These included the addition of a new instrumentation and control (I&C) system, improved fuel and core design, improvements resulting from VVER and PWR operating experience, and improvements resulting from the audit team recommendations.

In addition, some analyses were performed by Colenco of Switzerland and TÜV Bayern of Germany, which specifically assessed the I&C design.

Among other significant IAEA activities with respect to Temelin, the following should be especially mentioned:

- A quality assurance review (QARAT) mission focused on quality assurance (March/April 1994).
- A consultants' meeting on Temelin design changes at the IAEA headquarters in Vienna (November/December 1994).
- A mission focused at fire protection of the plant (February 1996).

A special mission of the IAEA in 1996 examined how the Temelin plant has overcome safety issues identified by the IAEA as generic for nuclear power plants with VVER-1000 type 320 reactors. The mission evaluated the revised design, the implementation of previously suggested alterations, and preparations for operation. This included compatibility issues, i.e. the compatibility of modern Western technology with the original Russian design.

In general, this mission concluded that the future plant operator had made a significant effort in improving the plant design, and highly commended this effort. The mission emphasised that the combination of Western and Russian technology in the Temelin design had been considered very carefully indeed. In the mission's opinion, in some cases the combination of Western and Russian technology resulted in a pronounced improvement of the safety assurance level, compared with international practice.

Another IAEA mission focused on commissioning Temelin took place in February 2000, and an OSART (Operational Safety Assessment Review Team) mission is planned for February 2001. A list of the international missions is shown in Appendix 1.

Main Design Changes and Safety Improvements

The results of the independent international reviews organised by the IAEA, the proposals of Czech specialists (including the recommendations of the State Office for Nuclear Safety (SUJB)), and the results of the NUS Halliburton audit were used as a basis for technical improvements which, following implementation prior to commissioning, will assure that both units of Temelin NPP will reach the engineering standards usual for Western power plants at the end of the 1990s.

Among a number of improvements related to the replacement of components and systems, the following items have been replaced:

- the I&C system;
- the core and nuclear fuel;
- the radiation monitoring system;
- the diagnostic system, which has also been supplemented;
- cables (replaced with fire-retardant and fire-resistant ones).

In addition, significant changes were made to the electrical design (electrical protection, addition of two non-safety grade diesel generators, increased discharge time of batteries, etc.). All significant design modifications are summarised in Appendix 2.

Temelin NPP Safety Analyses

Westinghouse has provided the fuel, I&C system, safety analyses and emergency response guidelines for Temelin. The scope of Westinghouse involvement permits the application of the same systematic and integrated approach to nuclear safety (control, monitoring, protection) that is applied to a Westinghouse designed plant.

This approach integrates core design, plant and core monitoring, plant and core control, protection system design, safety analyses, core and plant operating limits, and emergency response guidelines. This integrated approach enhances safety defence-in-depth, which is considered to be composed of the following elements:

- Control systems (maintain plant parameters during normal operation).
- Alarms and manual controls (allows the operators to observe and correct deviations from normal operation).
- Limitation systems and backup controls (the Temelin design provides for extensive "supervisory" control that can automatically take rapid action in the event of a malfunction, thus avoiding the need for protective action that would trip the plant).

- Primary Reactor Protection System (PRPS) — a safety system of Class 1E providing automatic protection to shut down the reactor, and automatic actuation and control of emergency safeguards features (ESF).
- Diverse Protection System (DPS) — a safety system of Class 1E providing backup protection for a postulated failure in the PRPS (provides reactor trip, some ESF actuation and control).

As stated above, a systematic approach to safety analysis is also a systematic approach to protection system design. That is, one must:

- Define unacceptable consequences (offsite dose, fuel failure, etc).
- Determine limits on plant operation which could lead to unacceptable consequences if exceeded.
- Define required protection system functions based upon events and consequences.
- Select acceptance criteria, assumptions and methods.
- Analyse the complete spectrum of plant conditions for the accident scenarios considered.
- Demonstrate by results of analyses that the protection system keeps the plant safe and that the consequences are consistent with accepted criteria.
- Develop limiting conditions for operation and monitoring requirements: protection system setpoints derived from the safety analysis; plant operations maintained within limits assessed in the safety analysis.

Safety Improvement Programme

In accordance with CEZ policy, as stated in its safety strategy, it is planned to perform continual safety assessments on the plant and to incorporate additional improvements beyond the framework of the legal requirements. This is one of the measures aimed at attaining a high safety level.

The Safety Improvement Programme has been defined for the period after the start of trial operation of unit 1. However, fulfilment of some items of the programme has been or will be initiated in advance. The programme is an open document that will be systematically updated on the basis of:

- periodic safety assessments of the NPP units;
- WANO performance indicators;
- the results of operational experience;
- assessments of supervisory bodies (the nuclear and civil safety authorities);
- recommendations of independent assessments (by WANO, IAEA, external audits).

The aim of the programme is not only to improve safety but also the analytical assessment of safety and the impact on the environment, as well as improvements in the organisation and human factors. The programme will be updated every December (the first update will be done in December 2000) based on preliminary items/activities discussed by the Temelin Safety Technical Commission Meeting, or whenever required on the decision of the top management of the Temelin Construction Division. The first version of the programme is shown in Appendix 3.

General Conclusions of the March 1996 Mission

1. It is recognised that CEZ has made a large effort to improve the design of Temelin independently of the identification of safety issues by the IAEA.

The organisation of its actions in terms of the IAEA issues was only a convenient way to demonstrate that all of the issues are being taken into consideration.

2. The scope of national participation in the Temelin design, manufacturing and construction has had a positive impact on solving several safety issues identified in VVER-1000 type 320 plants.
3. The adoption of Western technology and practices for part of the scope of supply (e.g. fuel, I&C, radiological protection, accident analysis) has helped to solve a large number of safety issues identified for VVER-1000 type 320 NPPs.
4. Several safety issues which are addressed by ongoing activities have not been completely solved, but the related activities are properly managed and, in most cases, there seems to be sufficient time for their completion.
5. The mission recognises the effort of Temelin NPP to ensure that all the safety issues identified by the IAEA have been addressed. In general this effort was successful, since no issue has been identified which has not been addressed to some degree. Most of the issues have been properly addressed.
6. The combination of Eastern and Western technology and practices and the potential compatibility problems seem to have been carefully considered at Temelin. In several cases, the combination of Western and Eastern technology has led to safety improvements in comparison with international practices.

Conclusion

Temelin nuclear power plant is an excellent combination of verified technologies. It is a combination of the very good Russian design safety concept, the advanced Westinghouse control system, and the precise work of Czech building and engineering companies. The plant's specifications are equivalent to those applicable in the most advanced European countries. Temelin will be a significant addition to the Czech Republic's contribution to avoiding pollution and climate change. One year of operation will avoid the emission of 12 million tonnes of CO_2 and 23 600 tonnes of SO_2.

Table 1. Schedule for commissioning and commercial operation at Temelin NPP.

Activity	**Unit 1**	**Unit 2**
Containment integrity testing***** (leakage test and strength test)	Done 01/1999	Planned 12/2000
Control room technology testing	Done 06/1999	Planned 01/2001
Primary circuit integrated hydro-testing	Done 03/2000	Planned 07/2001
Fuel loading into the reactor (start of physical commissioning)	Done 07/2000	Planned 11/2001
Start of commercial operation after complex testing and successful 144 hour test	Planned 05/2001	Planned 08/2002

*Strength and leakproof testing of Temelin unit 1 containment took place during the period from 14 December 1998 through 5 January 1999. The containment met all strength and leakproof criteria. The leak amount found during the leakproof testing is one order lower than the prescribed values. The test results achieved can be compared to the best results achieved abroad.

Appendix 1. International missions of the IAEA to Temelin NPP.

Mission Objective / Dates	Focus / Participation	Conclusions
Site Safety Review Mission (4/1990)	* The site selection assessment including demographic conditions, dispersion features and external events * Italian, Austrian, British, Dutch and IAEA experts	* The mission's conclusion was that the Temelin site meets all safety criteria in accordance with the IAEA recommendations
Pre-OSART Mission (4-5/1990)	* Evaluation of 10 safety aspects of the standard agenda of Pre-OSART mission * Canadian, American, Italian, German, Finnish, British and IAEA experts	* The overall conclusion was that the work carried out at the site is of a high quality. The mission identified good practices which are of interest for other plants and made several proposals for improvements including a positive statement about the intent to replace the existing I&C with a Western advanced design
Design Review Mission (6-7/1990)	* The reactor core and safety systems design assessment * American, French, German, Bulgarian and IAEA experts	* The design was found to be very similar to modern PWR plants which have been put into operation in other countries. The mission did not identify any major safety problems and recommended possible further improvements
Pre-OSART Mission Follow-Up (2/1992)	* The Pre-OSART findings and recommendations made in 1990 reviewed in order to determine the actions resulting from the previous mission * British, Italian and IAEA experts	* The conclusion was that despite the large number of recommendations made, the plant has made satisfactory progress in addressing the issues raised by the Pre-OSART mission review
Quality Assurance Review (QARAT) Mission (3-4/1993)	* QA system assessment, mainly management and QA Department functions * French and IAEA experts	* The expert group confirmed the positive development of this field being managed by a competent team and the senior management
Leak Before Break (LBB) Application Review Mission (5/1993, 12/1993, 12/1994, 12/1995)	* A review of the modern Western concept application during the integrity assessment of the high energy stressed pipelines * Austrian, Japanese, German and IAEA experts	* It was confirmed that the LBB application was successfully performed at Temelin in accordance with world practice and that breaks are extremely unlikely
Fire Safety Mission (2/1996)	* A fire analysis, licensing and operation performance review from fire safety point of view * Canadian and IAEA experts	* The experts' conclusion was that significant improvements had been made in accordance with international trends in fire protection
Probabilistic Safety Assessment Review Missions (5/1995 and 1/1996)	* Transfer of technology, methodology and results of the PSA study review * Austrian, American, German, British, Spanish and IAEA experts	* The general conclusion was that the Temelin team has adopted the PSA methodology very well and despite conservative assumptions the results confirmed the high level of plant safety
Safety Issues of VVER-1000 Resolution Review Mission (3/1996)	* A review of resolution of VVER-1000 safety issues at Temelin which had been identified by the IAEA as a result of its thorough analyses * French, Spanish, Russian, Swedish, German and IAEA experts	See General Conclusions below
Physical Protection Assurance Mission (IPPAS) (9/1998)	* Review of the NPP physical protection aspects defined by the IAEA * American, French, Finnish, Canadian and IAEA experts	* The conclusion of the experts was very positive on the physical protection assurance and its licensing. They concluded that the system meets fully the international requirements

Appendix 2. Main design changes and safety improvements.

No.	Item Description	Note
1	Instrumentation and control (I&C) system replacement	I&C of units 1 and 2
2	Reactor core design and nuclear fuel	New nuclear fuel brings substantial nuclear safety enhancement, radioactive waste amount decrease and operational cost reduction
3	Radiation monitoring system (RMS)	Original system design did not comply either with technical or legislative requirements
4	TMDS	Primary Circuit Diagnostic System was a “white spot” in the initial project (listed in a book AIX)
5	Sipping system	Original Russian system (KGO) did not meet requirements of new legislative and Western standards
6	Bitumenisation line	Requirement for radioactive waste reduction (RAO) specified by Pre-OSART
7	Refuelling machine I&C	Replacement of original GANZ control system by Ansaldo system
8	Spent nuclear fuel compact storing	Compact grate allows substantial increase of storage capacity in the spent fuel pool
9	Full scope simulator	Operative personnel training assurance
10	Technical support centre (emergency preparedness)	Fulfilment of recommendations adopted after TMI accident
11	Inverters/rectifiers (AEG)	Replacement of original Russian AEP instrumentation (ANN) of safety systems power supply, 4th and 5th systems and protection systems was initiated by nuclear safety enhancement requirements
12	Penetrations (Škoda & ISTC companies)	Assurance of safe and reliable hermetic penetrations
13	Breakers J2UX replacement	Continuous negative operational experience from NPP BO and NPP DU (fires, etc)
14	Unit transformer penetrations (Passoni Villa bushings)	
15	Replenishment of reserve power supply source for 2 HVB	Strict compliance with own consumption block energising principles
16	Common reserve DGS (diesel generator station)	Systems “nuclear safety related systems” added by emergency/accident resource to maintain this sort of supply for important and expensive unit equipment
17	Accumulator batteries capacity increase	AKU exchange was initiated by negative operation experience; capacity increase allows overcoming of defect states in total loss of supply regime
18	“Reserve protections” implementation and full selectivity in radial networks 6kV/nn assurance	Overall selective scheme ensures elimination of failure consequences in the unit electrical section (short-circuit, dead earth, etc)
19	Volume compensation system – electrical heaters continuous regulation (pressuriser)	Lower use of primary circle machinery components service life
20	Containment hydrogen recombiners	Elimination of post-accident hydrogen content in containment
21	Hydrogen post-accident monitoring system	Control of hydrogen post accident content development in containment
22	Valve replacement	Replacement of defect and low reliable valves
23	Reconstruction of stable fire extinguishing equipment (SHZ) of the outdoor power transformers	Adding of existing manual SHZ starters by automatic activation and modification of spray equipment baskets and increasing the number of nozzles, inter-wall installation
24	Secondary voltage regulation (SRKOC)	Technical requirements of CEZ specified in relation to preparation of operation with UCPTE

No.	Item Description	Note
25	Terminal NPP TE (TELETE)	Technical requirements of CEZ specified in relation to preparation of operation with UCPTE
26	Modification of essential cooling water and non-essential cooling water systems	Since the technical calculations were carried out it was important to implement modifications for system functionality assurance
27	Pump replacement	Producers ceased to exist, inappropriate characteristics
28	Containment sump modifications	Net construction modifications in compliance with tests carried out in Russia
29	Suction from containment (simple failure/defect)	Installation of one closing valve and adjacent piping under containment
30	Titanium tubing in condensers	Life service increase, transition to more advantageous chemical regime by pH increase
31	Control rod drive system (LPK)	Life service and reliability increase by use of Škoda innovated drives
32	New chemical control	Higher chemical control quality provides higher life serviceability of important components, especially steam generators
33	Safety analyses (US RG 1.70)	Analyses elaboration mainly in relation to fuel replacement and I&C
34	ATWS analyses	Analyses performance in accordance with the newest nuclear power knowledge
35	PSA – level 1 and 2 (probabilistic safety analyses)	Level 1 – discusses probability of active zone damage Level 2 – discusses probability of leakage due to containment damage
36	Beyond-design analyses	Selected accident analysis for new accident management conception
37	IV&V (independent verification and validation of SW)	Independent verification of correctness of SW reactor accident protections and safety/protection systems
38	Leak before break (LBB) assessment	Verification of the rate of assurance of primary section pipeline systems integrity (LOCA prevention)
39	Emergency operating procedures (EOP)	Symptom based oriented accident emergency procedures – accident prevention
40	Severe accident management guidelines (SAMG)	Logical continuity to EOP – accident consequences mitigation
41	Fire safety, cables, EPS	Implementation of non-combustible and non-fire-propagating cabling and electrical fire signalling systems (EPS) by Cerberus
42	Seismicity analysis	Elaboration of new seismic assessment (0.1 g) and floor response spectra for individual seismic buildings floors – seismic re-qualification
43	Documentation control system	Assurance of evidence documentation elaboration for selected facilities/equipment (solidity, serviceability, seismicity)
44	ISE (NPP information systems)	Implementation of computer information system
45	Accommodation of internal steam generators in-fittings (PG)	Accommodation in the supply point and PG separation (serviceability increase)
46	Supplementing of new level measurements in PG	Securing safety divisions sections
47	Polar bridge crane controlling system	Original controlling system Robotron (East Germany) replacement; it did not maintain fulfilment of required functions
48	Filtration station for emergency control room (ND)	HVAC systems filter adding maintains ND habitability even in accidental conditions
49	Unit control room HVAC systems accommodation (BD)	Maintenance of required control room habitability conditions for personnel (noise level, temperature, etc)

No.	Item Description	Note
50	GERB dampers	Seismic requirements fulfilment
51	Supplementary drencher fire extinguishing systems for main circulation pumps	Supervisory body's requirements fulfilment
52	Supplementary post-accident liquid RAO processing (liquidation) systems	Radioactive waste volume reduction (RAO)
53	Supplementary boron collection water systems and post-active water exchange separation systems	Radioactive waste volume reduction (RAO)
54	Asbestos sealing replacement	Replacement by Teflon maintains higher serviceability of the technological equipment
55	New exchangers of active accident systems	Low quality of original exchangers design
56	Supplementary of pressuriser relief valve	Avoiding number of actions of the pressuriser main safety valves
57	Supplementary fast-speed valves on steam generator steam piping	Protection of important and expensive component
58	Main circulation pumps modernisation	Maintenance of required flow through active zone, impeller reinforcement, rotor balancing, etc
59	High-activity RAO organised deposition	Changing of original radioactive waste deposition concept (RAO)
60	Freon replacement	Chilling station reconstruction by using absorption units

Appendix 3. Temelin safety improvement programme.

No.	Technical Description	Start;End	Notes
1	PSA level 1 upgrade	09/1999; 08/2000	Internal event "shut down" in 08/2000 and external (fire, floods, etc) in 12/2000
2	PSA level 2 upgrade	03/2001; 09/2001	
3	Safety monitor (SM)	11/1999; 12/2001	SM trial network operation in 11/1999 with existing models, gradual upgrade of SM models – upon PSA level 1 models upgrade
4	SAMG (severe accident management guidelines)	01/2000; 02/2001	
5	Installation of restrictors in room A820 and in the hermetic zone	1999; 2000	
6	Information system of the NPP modules: -documentation -management -technical change -management	1999; 2000	Documentation management module has already been in a trial operation, technical change management module will be set into operation in 2000
7	Fuel management: - PIIP extension to further campaigns; - PIIP methods improvement; - Transition to developed alloys in PS construction; - Fluency decrease on TNR	07/2004; as required 04/2002; as required Depends on operational results 07/2001; 07/2004	Concerns implementation of selected items of post irradiation inspection programme (PIIP) in the frame of SUJB campaign requirements Application of improved methods within PIIP ZIRLO, E635, and conditions for PE and PS load bearing elements TNR residual service life increase resulting in safety enhancement for the plant's entire service life period
8	Core control: - Transition to DMM version of AZ Beacon condition monitoring; - Adaptation of developed calibration method ex-core/in-core; - Implementation of fuel state monitoring program and methodology	Approx. 2004 Approx. 2003 1989; 2005	DMM version monitors DNBR directly. Transition is connected with safety analysis re-evaluation Accuracy enhancement and calibration simplification resulting in safety enhancement Variant of NPP DU program; development started, consistence with high degree fuel burn-up program
9	Safety analysis: - Regular re-evaluation of accuracy codes for accuracy prediction enhancement; - Application of improved methods during regular safety analyses re-evaluation; -Technology transfer for selected safety analyses; -Implementation of fuel rods analysis program and improved methods for high burn-up conditions	03/2000; 2030 2001; 2030 1999; 2001 1989; 2005	Explicit formulation of margins Projection of current reserves and operational experience into selected limits for NPP operation Approved by Investment Commission within fuel contract Development has started and continues; will be as overall CEZ Thermomech code
10	EIA (updating of elaborated Environmental Impact Assessment studies)	11/1999; 11/2000	Processing of Environmental Impact Assessment studies according to CR Law No. 244/1992 Coll. with regard to changes applied in the building proceeding since 1 July 1992
11	Safety indicators evaluation implementation as per SUJB methodology	Trial operation initiation; Continuous	In accordance with agreement with SUJB in "pre-trial" operation

No.	Technical Description	Start/End	Notes
12	Engineer (display) simulator	2000; 2002	Technical tool for management and optimising of operating procedures and personnel activities on BD
13	Physical protection – replacement of identification system	2003; 2005	Replacement of existing identification system for checking the vehicle authorisation to enter the NPP Temelin guarded area on the main entrance
14	Fire protection – reconstruction of CEZ Temelin Fire Rescue Corp controlling centre	1999; 2000	
15	Fire protection – vehicle fleet	2001; 2005	Gradual replacement of vehicle fleet in company's Fire Rescue Brigade will be implemented
16	Monitoring of temperature increase impact in Vltava River by Temelin discharge on water quality development in relation to its further utilisation	2000; 2003	The task encompasses monitoring and assessment of water quality changes at Orlík dam and tributary streams, their seasonal changes, monitoring of radioactive elements content in fish and dam bottom sediments bio-mass, monitoring of water macro-fyt as water environment bioindicators, changes in fish sort population and fish bio-mass, chlorophyll concentration and other hydro-biological characteristics monitoring
17	Monitoring and evaluation of underground water quality, monitoring of underground water level and evaluation of underground water regime (underground water movement, level fluctuation, flow direction changes)	2000; see note	Assessed period of implementation – full scope minimum 10 years; limited scope (underground water quality) during the entire NPP life service
18	Analysis of agricultural activity initial state in Temelin site adjacent area	1993; 2000	
19	Monitoring of Temelin operation impact on elements of environment	2000; see note	Will be specified later
20	Monitoring of Temelin operation impact on health of population	2000; see note	Will be specified later
21	Upgrade of nuclear materials registration programme	01/2000; 12/2000	
22	ALARA centre equipment	01/2000; 12/2000	Replacement
23	SW means for defectoscopical controls planning and management	01/2000; 12/2000	Upgrading
24	HARSHAW TLD system equipment	01/2000; 12/2000	Equipment for measuring and evaluation of equivalent dose - replacement
25	Systematic approach to training (SAT) items implementation	1999; 2002	SAT in CEZ and subcontractor personnel preparedness
26	Simulator adaptation - replica for unit 1	2002; 2003	Adaptation to unit 1 commissioning results and to operation experiences after approx 1 year
27	Cable life service monitoring program	1999; 2000	Finishing of Temelin cable system regulated aging program
28	Design basis documentation reprocessing	2001; 2003	The project is in the preparation stage but conditions for its implementation were created in the second half of 1990s within extensive project changes. Contractual assurance – cooperation with project organisations is expected

29	Digitalisation of Temelin selected documentation	1994; 2002	Gradual audit of project document contents and other documents on equipment of all professions and their transition into graphical and database SW systems have gradually been carried out within this project. The project leads to substantial change in the information use and database assurance method for control of configuration
30	Geographical information system (GIS)	2002; 2004	In compliance with the CEZ overall concept GIS will be built up in Temelin as well. Data preparation for GIS in the field of detailed geodetic documents and data on land plots and buildings has continuously been carried out