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**Current Activities
on Safety Improvement at Ukrainian NPPs.**

Presentation

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'ENERGOATOM'

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INTRODUCTION.

This report describes general development status of the national programs on safety improvement of the Ukrainian NPPs, basic approaches adopted for planning and implementation of safety improvement works, and state of implementation of principal technical activities aimed at safety improvement of Ukrainian NPPs.

(Slide 1)

1. Summary of the current situation in the nuclear power industry of Ukraine.

In Ukraine at five nuclear power plants 17 power units were constructed and commissioned. At present there are 14 power units in operation. Three power units of Chernobyl NPP were stopped (Chernobyl Unit 4 was destroyed during the accident in April, 1986; Chernobyl Unit 1 and Unit 2 had been stopped and are on the decommissioning stage). (*Slide 2*).

As of 1st April, 2000 gross installed capacity of Ukrainian NPPs was 12.818 GW (*Slide 3*).

Under conditions of comprehensive economic recession in Ukraine electricity production reduces either (*Slide 4*), caused, mainly, by the shortage of both fossil fuels (oil and gas) and funds to purchase it and ending of the life time of the power generating capacities of the conventional power industry.

In 1999 share of electricity produced by NPPs which have 24,6% (*Slide 5*) of total installed capacity was 42,1 %. (*Slide 6*).

Over the last 3 years appeared a trend on reduction of power generation by NPPs either, caused by prolongation of the maintenance duration due to additional works related to the equipment diagnostics, performance of rehabilitation and upgrading. It resulted in decrease of the load factor (*Slide 7*).

2. Approaches approved for development of activities intended for safety improvement at Ukrainian NPPs.

2.1. With regard to the design peculiarities Ukrainian nuclear power units can be divided into four reactor groups:

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- WWER-1000 (V-320) - large series
- WWER-1000 (V-302, V-338) - small series
- WWER-440 (V-213)
- RBMK-1000 (second generation).

2.2. Over the period from 1986 to 1990 a set of activities to improve technological solutions was defined on the basis of analysis of erection, start-up and operation of WWER-1000 and WWER-440. These activities include:

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- individual specific measures;
- calculation and validation of specific activities;
- validation to assess long-term tasks of safety and reliability improvement.

These measures were described in a number of published nuclear power regulations applied in the industry (in the first turn in SM-88 and SM-90 'List of Combined Activities Aimed at Safety Improvement of Power Units with WWER and RBMK Reactors in Operation').

It shall be emphasized that these comprehensive activities integrated experience, expertise and approaches of the key organizations involved in creation of the power units. However, it was not a corollary of the comprehensive safety assessment.

2.3. In early nineties many technical regulations have been enacted, including those related to the safety provision. It required that analysis of the conformity with the regulatory requirements be made, and measures to eliminate inconsistencies and/or compensating measures be developed and implemented.

2.4. In 1994 GOSKOMATOM of Ukraine developed a 'Program on Safety Improvement of NPPs with WWER-1000 and WWER-440 reactor types' and a 'Program of the Priority Measures on Safety Improvement of NPPs with WWER-1000 and WWER-440 reactor types' (both were agreed upon with, GosAtomNadzor of Ukraine, the then Regulatory Authority).

The specified program was developed based on the following principles:

(Slide 10)

- ensuring of elimination of major inconsistencies with the safety regulations requirements and/or compensating measures on elimination of inconsistencies impact on safety;
- deterministic assessment of safety deficiency and elaboration of measures based on available expertise and operational experience;
- classification of safety deficiency similar to IAEA's classification;
- integration in the 'Program..' of principal activities on safety improvement complemented with less significant measures relating to reliability (availability) included in the specific programs developed by NPPs.

2.5. The measures were implemented in compliance with plans developed for specific NPPs and power units.

2.6. Since safety is a priority it was considered reasonable to summarize available expertise and activities including those related to the international projects, to make 'Programs on Safety Improvement of WWER NPPs' more detailed in order:

- to define full set of long-term safety improvement activities which can be defined based on the present level of expertise (strategic plan);
- to define package of priority measures intended for safety improvement.

2.7. By now NNEGC ENERGOATOM has developed the documents listed hereafter:
(Slide 11)

- industrial program on safety improvement 'List of Combined Activities Aimed at Safety Improvement of Power Units with WWER 1000 (320) Reactors in Operation;
- Program on Priority Measures for Safety Improvement of Ukrainian NPPs. These activities are to be implemented within 3 years (*was approved by NRA*);
- Comprehensive Program on Safety Improvement and Upgrading of Rivne Units 1 and 2 (developed by the joint effort of the NNEGC, RNPP and JSC Siemens ; reviewed and approved by the NRA).

'List of Combined Activities Aimed at Safety Improvement of Power Units with WWER-1000 (320) Reactors in Operation' is a follow up of the 'Program on Safety Improvement of WWER-1000, WWER-440 NPPs' which was approved by the GOSKOMATOM of Ukraine and agreed on with the GOSATOMNADZOR of Ukraine in 1994.

Necessity to upgrade this 'Program on Safety Improvement of WWER-1000, WWER-440 NPPs' and make it more detailed was caused by the following factors:

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- some issues were revised in addition which allowed to clarify the substance of problems and ways of their solution;
- in the framework of activity of international expert organizations a number of issues were reviewed, among them, those related to the categorization of priorities on safety effects;
- detailed long-term upgrading programs for Khmel'nitsky -2 and Rivne- 4 units under construction were developed, revised and agreed. The design of these power units under construction is similar to that of the operating units.
- necessity to specify in more details possible areas of technical development and their relationship depending on the character of the activity (general development for all power units, individual development, etc.).

The following fundamental documents were used to compile this program:
(Slide 13,14)

- applicable Ukrainian technical codes and standards on safety ;
- combined activities on safety and reliability improvement of operating nuclear power plants with WWER reactors which were developed in the USSR in 1987-1989;
- technical safety analysis reports (so called TOBs) done for all operating power plants and units under construction in 1992-1993;
- 'Program on Safety Improvement of WWER 1000 and WWER 440 NPPs' developed by the GOSKOMATOM of Ukraine and agreed on with the GOSATOMNADZOR of Ukraine in 1994;
- Program on Upgrading of Reactor Units of WWER-1000/V-320 type at Ukrainian Nuclear Power Plants.
- documents of the IAEA's missions to Ukraine (OSART, ASSET, SRM);
- studies of the IAEA in the field of general safety of the WWER 1000 reactors, including those performed under extra budgetary program (document IAEA-EBP-WWER-05; WWER dealing with Safety Problems of the NPPs with reactors of WWER 1000/320 type and their categorization),etc.

'List of Combined Activities...' provides the following definitions (Slide 15):

- Part 1- priority measures aimed at ensuring of acceptable safety level.
 - Part 2- long-term activities aimed at upgrading of the available safety level;
 - Part 3 - activities of reliability and operation availability enhancement;
 - Part 4 includes additional materials comprising summarized information on the following issues:
- * elimination of deviations from technical codes and standards in the course of implementation of the 'Program on Upgrading';

- * implementation in the 'Program on Upgrading' of recommendations provided in the IAEA's Report IAEA-WWER-05.

The industrial program comprises (*Slide 16*):

- specific technical measures defined on the basis of analyses of the fundamental documents. In parallel, for some problems concrete technical solutions were outlined, while for the rest, direction for the search of technical solutions was indicated ;
- analyses and validation aimed at both verification of existing technical solutions and/or justification of the required modernization.

Activities which may appear in the course of these analyses and justification refer to the long-term measures. Their implementation is subject to separate review in the future revisions of the program.

Based on the 'List of activities ...' and 'Comprehensive program...' the long term plans for specific NPPs and power units are being clarified with the priority activities and current financial opportunities being identified.

2.8. Compiling of the long-term activities list was based on the summarized experience of the previous activities, including (*Slide 17*):

- activities implemented in Ukraine and Russia;
- international projects on WWER NPPs safety analysis (including analyses made by IAEA such as : IAEA-EBP-WWER-03, IAEA-EBP-WWER-05; WVEER-SC-202).

Safety problems and their categorization for different reactor types of Ukrainian NPPs are shown respectively on (*Slide 18, 19, 20*):

2.9. Since compiling of the list of activities and their prioritization is based on the deterministic approach, they have to be specified for each power unit after Safety Analysis Report is implemented (SAR).

3. Enclosure 1. Summarized information on implementation status of the activities rated Category III at Ukrainian NPPs with WWER-1000 type reactors

Here is some information on current implementation status of the most significant safety improvement activities (in compliance with IAEA's documents, namely: IAEA-EBP-WWER-03, IAEA-EBP-WWER-05), many of them being top priorities (Slide 21):

No.	Title of the Safety Problem	Zaporizhzhya NPP						Rivne NPP	Khmelnitsky NPP	South-Ukraine NPP		
		1	2	3	4	5	6	3	1	1	2	3
1.	GENERAL ISSUES											
1.1	Equipment certification											
	Development of materials on the equipment certification	2005	2005	2005	2005	2005	2005	2005	2005	2002	2002	2005
	Equipment classification	+	+	+	+	+	+	+	+	+	+	+
2.	REACTOR CORE											
2.1.	Reliability of the control rod insertion \ fuel assembly deformation											
	Ensuring design time of the CPS (control and protection system) control rod drop. Calculation of the loads onto the support frame of the fuel assembly	+	+	+	+	+	+	+	+	+	+	+
	Introduction of the "weighted" CPS control rods.	-	-	+	-	-	+	+	-	-	-	-
	Replacement of the 5 th Group's half length control rods by the full length control rods	+	+	+	+	+	+	+	+	+	+	+
	Installation of racks for the spent fuel assemblies compacted storage	+	+	+	+	+	+	+	+	+	+	+
	Implementation of measures aimed at preventing ingress of pure condensate into the primary circuit.	+	+	+	+	+	+	+	+	+	+	+

No.	Title of the Safety Problem	Zaporizhzhya NPP						Rivne NPP	Khmelnitsky NPP	South-Ukraine NPP		
		1	2	3	4	5	6	3	1	1	2	3
	Replacement of the Control Rod Bank/Individual Control Rod System	-	-	+	-	-	-	-	+	+	-	-
	Replacement of sensors of the CPS control rod position.	+	+	+	+	+	+	+	+	+	+	+
2.2	Monitoring of subcriticality under the reactor shutdown conditions											
	Replacement of the neutron flux monitoring instrumentation-03 by the neutron flux monitoring instrumentation-07	+	+	-	-	-	+	+	-	+	-	-
	Modernization of the reactor refueling machine control system	+	+	+	+	+	+	+	+	+	+	+
3.	INTEGRITY OF COMPONENTS											
3.1	Embrittlement of the reactor pressure vessel (RPV) and its monitoring											
	Insufficiently accurate evaluation of the fluence accumulated by the reactor critical zones.	+	+	+	+	+	+	+	+	+	+	+
	Upgrading of the radiation monitoring system under the existing test samples program in order to improve the representation of results of the test sample trials.	-	-	-	+	-	-	-	-	-	-	-
	Development and implementation of a regular working method for specifying the current residual radiation lifetime of the reactor pressure vessel's safe operation with taking into account the actual reactor's status, its operational conditions as well as indications of the system for monitoring of radiation burden to the reactor pressure vessel; dosimetric experimental results covering WWER-1000 reactors and mock-ups and the results of the test specimen trials.	2001	2001	2001	2001	2001	2001	2001	2000	2001	2002	2001
	Identification of the current residual radiation lifetime of the pressure vessels' safe operation with taking into the account the actual data	2001	2001	2001	2001	2001	2002	2001	2001	2000	2000	2001

No.	Title of the Safety Problem	Zaporizhzhya NPP						Rivne NPP	Khmelnitsky NPP	South-Ukraine NPP		
		1	2	3	4	5	6	3	1	1	2	3
	Heating up to 55° C of the water supplied to the reactor from the ECCS passive part (hydro tanks)	2001	2001	2001	2001	+	+	+	+	2000	2000	2002
	Ensuring the water supply with a temperature not less than 20 °C, to the reactor from the ECCS active part	2001	2001	2001	2001	2001	2001	2001	2002	+	+	2002
	To perform the transition of reactor core to the uranium-gadolinium fuel with low-leakage rate layouts to ensure the reactor installation lifetime extension	-	-	-	-	-	-	2000	-	-	-	-
	Upgrading of the monitoring system-187 (only for «small series»)									+	2000	
	Supply of a new mast manipulator with increased positioning precision (only for Å-320)	+	2000	2001	2001	2002	+	+	2001			2001
	To manufacture a testing sample with artificial flaws made of the material compatible with the RPV material (only for «small series»)									2000	2000	
3.2.	Non-destructive examination											
	Development and implementation of the systems for the acoustic-emissive diagnostics of the SG headers' condition	+	+	+	+	+	+	+	+	+	+	+
	Development and implementation of the system for detection of objects freely and poorly fixed	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002
	Development and introduction of the system for the residual fatigue lifetime diagnostics.	2001	2002	2003	2004	2000	2005	2008	2004	2003	2004	2007
	Development, purchase and implementation of a set of the system for periodical metal inspections conducted inside the reactor pressure vessel	2001	2001	2001	2001	2001	2002	2000	2000	2000	2000	2001
	Compiling of a list of areas with increased risk of leak happened during inspection.	+	+	+	+	+	+	+	+	+	+	+
3.3.	Integrity of the SG header											
	Improvement of the SG blow-down system..	+	+	+	+	+	+	+	+	+	+	+

No.	Title of the Safety Problem	Zaporizhzhya NPP						Rivne NPP	Khmelnytsky NPP	South-Ukraine NPP		
		1	2	3	4	5	6	3	1	1	2	3
	Development of the system for inspecting the SG heat-exchanging tubes' integrity	+	+	+	+	+	+	+	+	+	+	+
	Development of organization and technical measures on the accident management, e.i: coolant leak from the primary to the secondary circuit with equivalent cross-section of 100 (mode automation)	+	+	+	+	+	+	+	+	+	+	+
	Implementation of the system for continuous automatic monitoring of the primary coolant's parameters (δI , \bar{O} , I_2)	+	+	+	+	+	+	2000	2000	+	+	2000
	Implementation of activities aimed at improving the reliability of SG and its auxiliary systems (modernization of SG water supply)	+	+	+	+	+	+	+	+	+	+	+
	Performance of the SG chemical flushing	+	+	+	+	+	+	+	+	+	+	+
3.4.	Integrity of the steam and feed water lines											
	Performance of the rigid fixing of steam lines and feedwater lines at the reactor hall outlet.	2002	2002	2002	2002	2002	2002	2002	2002	+	+	2002
	Performance of a specific analysis to identify the impact level during pipeline breaks in «pipeline tunnels» and the probability of the secondary impacts' consequences (only for A-320)	-	-	-	-	-	-	2002	2002			2002
	Replacement of pipelines affected by intensive erosion, by the stainless steel pipelines	+	+	+	+	+	+	+	+	+	+	+
	System to measure main steam humidity upstream the main steam gate valve	+	+	+	+	+	+	+	+	+	+	+
	Reconstruction in the feed water system (in order to reduce the probability of brittle fractures of SG nozzles).	+	+	+	+	+	+	+	+	+	+	+
	Implementation of activities aimed at improving the reliability of main steam lines during transients	+	+	+	+	+	+	+	+	+	+	+
	Monitoring of temperature fluctuations of the main steam lines	+	+	+	+	+	+	+	+	+	+	+

No.	Title of the Safety Problem	Zaporizhzhya NPP						Rivne NPP	Khmelnitsky NPP	South-Ukraine NPP		
		1	2	3	4	5	6	3	1	1	2	3
	To use metal inspection results to forecast early the probability of cracking (ã.i. apply a «leak-before-break» concept)	2001	2002	2002	2003	2004	2004	2002	2002	2001	2001	2002
4.	SYSTEMS											
4.1.	Clogging of the EÑNS sump filters											
	Measure aimed at ensuring the residual heat removal during an accident with a primary circuit break:											
	- implementation of compensatory measures - erection of bridges «TQ÷TG»	-	-	-	-	-	+	+	+	-	-	-
	- replacement of existing thermal insulation by disposable and in-destructible one.	2007	2006	2005	2004	2003	2002	2001	2002	2001	2002	2003
	- realization of measures aimed at improving organization of medium collection during LOCA type accident with penetration into the containment sump.	+	+	+	+	+	+	+	+	+	+	+
4.2.	Implementation of compensatory measures at ECCS.											
	Replacement of service water pipelines of the safety system pump piping by the stainless steel pipelines.	+	+	+	+	+	+	+	+	+	+	+
	Implementation of system for hydro tests of the emergency and normal cooling heat exchangers.	+	+	+	+	+	+	+	+	+	+	+
	Improvement of the system for process leakage collection in order to reduce operating costs for their treatment and recovery.	+	+	+	+	+	+	+	+	+	+	+
	Upgrading of the reactor air valve elbow.	+	+	+	+	+	+	+	+	+	+	+
	Modernization of the ECCS servicing sites	+	+	+	+	+	+	+	+	+	+	+
	Physical and functional separation of ECCS	+	+	+	+	+	+	+	+	+	+	+
	Modernization of the emergency pumps' sealing systems.	+	+	+	+	+	+	+	+	+	+	+
	Replacement of impulse lines in the reactor hall by new ones made of stainless steel	+	+	+	+	+	+	+	+	+	+	+

No.	Title of the Safety Problem	Zaporizhzhya NPP						Rivne NPP	Khmelnitsky NPP	South-Ukraine NPP		
		1	2	3	4	5	6	3	1	1	2	3
4.3.	Certification of the SG safety relief valves for water flow											
	Development of organization and technical measures on the accident management: coolant leakage from the primary to the secondary circuit with equivalent cross-section of 100 (mode automation)	+	+	+	+	+	+	+	+	+	2002	+
	Replacement of the SG safety valves by pilot operated relief valves that meet the codes and standards' requirements	2001	2001	2001	2001	2001	2001	1999	2002	2001	2002	2002
	Implementation of activities aimed at improving the reliability of discharge devices of the secondary circuit protection.	+	+	+	+	+	+	+	+	+	+	+
4.4	Operational safety											
	Replacement of control valves of the SG power center by the upgraded ones with improved design	+	+	+	+	+	+	+	+	+	2000	+
	Replacement of booster pumps of the turbine driven feed water pump by the upgraded ones	+	+	+	+	+	+	+	+	+	+	+
	Replacement of lens compensators by rubber-cord ones on the turbine circulating water lines	+	+	+	+	+	+	+	+	+	+	+
	Replacement of tube bundles of low pressure re-heaters 3 and 4 by the new ones made of stainless steel	+	+	+	+	+	+	+	+	+	+	+
	Modernization and rehabilitation works at the secondary circuit.	+	+	+	+	+	+	+	+	+	+	+
5.	I & C											
5.1.	System for the reactor pressure vessel head leak monitoring											
	Development and introduction of the systems for the primary coolant leak monitoring	2001	2002	+	+	+	+	+	+	+	+	+
	To develop and implement a comprehensive diagnostics system, including :											

No.	Title of the Safety Problem	Zaporizhzhya NPP						Rivne NPP	Khmelnitsky NPP	South-Ukraine NPP		
		1	2	3	4	5	6	3	1	1	2	3
	- diagnostics and monitoring for the NPPs with WWER-1000 reactor installations.	2004	2005	2006	2007	2008	2009	2008	2009			2007
	- reactor vibration diagnostics	2001	2002	2003	2004	2005	2006	2002	2000	2003	2004	2004
	- RCP vibration inspection and diagnostics	2002	2003	2004	2005	2001	2006	+	+	2003	2004	2005
	- mode diagnostics	2004	2005	2006	2007	2008	2009	2008	2009	2005	2006	2007
	- in-core noise diagnostics system	2002	2000	2001	2004	2003	2005	2008	2004	2005	2006	2007
	- check valves diagnostics	2002	2003	2004	2005	2001	2006	2007	2002	2004	2005	2006
	- diagnostics for valves with air operated actuator	2002	2003	2004	2005	2001	2006	2007	2002	2003	2004	2005
	- system of the industrial television for closed premises	+	+	+	+	+	+	+	+	+	+	+
	Replacement of the level measurement transducers in the steam and gas box by the «SAPFIR-22» transducers	+	+	+	+	+	+	+	+	+	+	+
	Implementation of the two-set systems AZ (emergency protection) and AZTP (emergency protection for process disturbance) (for small series).	+	+	+	+	+	+	+	+	2000	2001	+
	Implementation of measures to improve reliability of control components of the safety important systems that allows to decrease the possibility of failures and reduces the number of false failures and the possibility of power unit shutdowns, including:											
	- improvement of reliability of the actuation of the fast-acting steam dump valve with discharge into the atmosphere as well as the SG pilot safety device actuation.;	+	+	+	+	+	+	+	+	+	+	+
	- application of the upgraded sensors;	+	+	+	+	+	+	+	+	+	+	+
	- application of modernized unified complex of engineering means;	+	+	+	+	+	+	+	+	-	-	+
	- improvement of pressure control reliability in the primary circuit;	+	+	+	+	+	+	+	+	+	+	+

No.	Title of the Safety Problem	Zaporizhzhya NPP						Rivne NPP	Khmelnitsky NPP	South-Ukraine NPP		
		1	2	3	4	5	6	3	1	1	2	3
	-improvement of reliability and operability of the turbine protection systems;	+	+	+	+	+	+	+	+	+	+	+
	- automated control on the basis of ASUT (automated turbine control system) -1000R.	+	+	+	+	+	+	+	+	+	+	+
	Implementation of measures to improve the reliability of the turbine protection systems:											
	- introduction of systems for centralized testing of the ECCS and turbine protection systems.;	+	+	+	+	+	+	+	+	+	+	+
	- introduction of systems to protect the thermal output circuit from ingress of the ECCS radioactivity;	+	+	+	+	+	+	+	+	+	+	+
	-improvement of reliability of protection against the axial displacement of the rotors of the turbine driven feed water pump;	+	+	+	+	+	+	+	+	+	+	+
	Installation of electrical equipment of the individual radiation monitoring system	+	+	+	+	+	+	+	+	+	+	+
	Rehabilitation of the information computer system (for the small series)									+	+	
	Introduction of SPDS	2000	2000	2000	2001	+	2001	2000	+	+	2000	2000
6.	ELECTRIC POWER SUPPLY											
6.1.	Time of the battery discharge											
	Increase in the battery discharge time (battery replacement)	1999	2000	2000	2000	2000	2000	+	2002	+	+	2000
	Implementation of measures to improve reliability of the stand-by diesel power station start-up.	+	+	+	+	+	+	+	+	+	+	+
	Replacement of UPS control units	+	+	+	+	+	+	+	+	+	+	+
	Rehabilitation of emergency generator complex breaker control circuits (KAG-24) and of the relay protection at power units.	+	+	+	+	+	+	+	+	+	+	+

No.	Title of the Safety Problem	Zaporizhzhya NPP						Rivne NPP	Khmelnitsky NPP	South-Ukraine NPP		
		1	2	3	4	5	6	3	1	1	2	3
	Implementation of the measures to improve reliability of the electric motor relay protection and to reduce the overvoltage level during short circuit..	+	+	+	+	+	+	+	+	+	+	+
	Upgrading of the transformer protection systems	+	+	+	+	+	+	+	+	+	+	+
	Replacement of the input switching devices at the assemblies of the three-phase in-door switchgear with one-side access.	+	+	+	+	+	+	+	+	+	+	+
	Improvement of reliability of the power supply of the ventilation system	+	+	+	+	+	+	+	+	+	+	+
7	CONTAINMENT											
	Replacement of penetrations by the upgraded ones produced by the «ELOKS» Company.	+	+	+	+	+	+	+	+	+	+	+
	Implementation of compensatory measures to prevent hydrogen accumulation inside the containment	+	+	+	+	+	+	+	+	+	+	+
8.	INTERNAL HAZARDS.											
8.1.	Fire prevention											
	Replacement of existing fireproof doors installed in the protecting structures of the SS (safety systems) trains premises	2000	2000	+	+	2001	2000	-	+	+	+	-
	Use of fire-retardant cable coating	2000	2001	2002	2002	2003	2003	+	2002	+	+	2003
	Replacement of the combustible oil by the noncombustible lubricating liquids in the MCP lubrication system	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002
	Improvement of the fire-resistance of turbine hall metal structures by coating them with fire-proof material	+	+	+	+	+	+	2000	-	+	+	-
	Development and introduction of the circuit for automatic hydrogen discharge from the generator vessel outside the turbine hall in case of the «fire» signal.	-	-	-	-	-	-	-	-	-	-	-

No.	Title of the Safety Problem	Zaporizhzhya NPP						Rivne NPP	Khmelnitsky NPP	South-Ukraine NPP		
		1	2	3	4	5	6	3	1	1	2	3
	Implementation of fire prevention measures.											
	- rehabilitation of fire prevention of AMNF system;	+	+	+	+	+	+	+	+	+	+	+
	- rehabilitation of fire prevention of ICS;	+	+	+	+	+	+	+	+	+	+	+
9.	ACCIDENT ANALYSIS											
	Development of the guidelines concerning the beyond the design basis accident management for the NPP units.	+	+	+	+	+	+	+	+	+	+	+
	PSA development	2000	2000	2000	2000	2000	2000	2000	2000	+	1999	2000
	Development of the design basis accident analysis	2000	2000	2000	2000	2000	2000	2000	2000	1999	2000	2000
	Development of the beyond the design accident analysis.	2000	2000	2000	2000	2000	2000	2000	2000	1999	2000	2000
	Development of consolidated SAR	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000